Attachment 7

San Francisco Comments on Tentative Order for NPDES Permit No. CA0037681

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Via email: jwatkins@waterboards.ca.gov, mitschele.becky@epa.gov

Re: National Pollutant Discharge Elimination System Permit for the City and County of San Francisco Oceanside Water Pollution Control Plant (NPDES No. CA0037681)

Dear Ms. Watkins and Ms. Mitschele,

Thank you for the opportunity to comment on the Tentative Order reissuing the National Pollutant Discharge Elimination System Permit (NPDES) permit for the San Francisco Oceanside Water Pollution Control Plant (OSP). The San Francisco Public Utilities Commission (SFPUC) greatly appreciates the time and thought that staff dedicated to understanding and working to resolve the myriad complex technical issues raised with this reissuance.

Attachment A summarizes each of the SFPUC's outstanding comments and request on all issues. Please note that three of the issues summarized in the table raise substantial practical, policy and legal concerns for the SFPUC. Accordingly, this transmittal includes supplemental comments on these issues, which are related to the permit provisions regarding compliance with the Combined Sewer Overflow Control Policy, sewer overflows in the combined sewer system, and new requirements to collect samples at combined sewer discharge outfalls.

Sincerely,

Greg Norby
Assistant General Manager
Wastewater Enterprise

Enclosure
Attachment A – Summary Table of Comments
Attachment B – Supplemental CSO Control Policy Comments
Attachment C – Supplemental Sewer Overflows in the Combined Sewer System Comments
Attachment D – Supplemental Combined Sewer Discharge Monitoring Comments

Attachment A – Summary Table of Comments

In order to assist Regional Water Board and EPA staff in locating the sections of the Tentative Order being commented on, the page numbers and sections provided correspond to the Tentative Order publicly noticed on April 19, 2019. The sequence of issues raised in these comments follows the organization of the Tentative Order and does not reflect the relative importance of each issue to the SFPUC.

TABLE OF COMMENTS

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1	5	III.D	SFPUC requests that the phrase "to a water of the United States" be added to Discharge Prohibition III.D to align this prohibition with Discharge Prohibition G in the existing permit, and with other language in the Tentative Order. Specifically, the requested change would clarify that this prohibition does not apply to Sewer Overflows from the Combined Sewer System.	Discharge to a water of the United States from any location other than Discharge Point No. 001 is prohibited, except from Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD-005, CSD-006, and CSD-007 during wet weather (as defined in Attachment A) in accordance with the requirements in this Order.
2	7	V	The SFPUC is concerned that inclusion of a broad requirement to comply with receiving water limitations in addition to the specific water quality based effluent limitations in the permit creates uncertainty regarding whether compliance with the more specific terms of the permit – especially those related to wet weather – is sufficient to ensure that discharges are not causing or contributing to violations of water quality standards. Please see Attachment B for more detailed comments. If the Regional Water Board and EPA do not delete this standard provision and the broad prohibition on nuisances in Attachment G (see Comment No. 58), the SFPUC requests the edits specified in Comment Nos. 3, 54, and 55 to more explicitly clarify the applicability of these provisions to dry weather discharges only.	~~**V. RECEIVING WATER LIMITATIONS.**~~ ~~Discharge shall not cause or contribute to a violation of any applicable water quality standard (with the exception set forth in State Water Board Order No. WQ 79-16) for receiving waters adopted by the Regional Water Board, State Water Resources Control Board (State Water Board), or EPA as required by the CWA and regulations adopted thereunder. If more stringent water quality standards are promulgated or approved pursuant to CWA section 303, or amendments thereto, the Regional Water Board and EPA may revise or modify this Order in accordance with the more stringent standards.~~
3	7	IV.B	See explanation of request in Comment No. 2	During wet weather, the Discharger shall comply with the narrative water quality-based effluent limitations contained in Provision

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				VI.C.5.c (Long-Term Control Plan) for the Discharge Points in Table 2.
4	13	VI.C.4.b.iv	SFPUC requests that the local limits evaluation be due with the Report of Waste Discharge (ROWD). SFPUC has a single Pretreatment Program that includes both the Oceanside and Southeast Water Pollution Control Plants, and local limits apply citywide. Because the two plants' permits are adopted separately and at different times, SFPUC requests the evaluation be due by the ROWD due date. SFPUC plans to evaluate local limits for both plants every five years, but timing of this evaluation and the permits' effective dates plus 180 days may not coincide.	Evaluation of the need to revise local limits as required under 40 C.F.R. sections 122.44(j)(2)(ii) and 403.5(c)(1) and, ~~within 180 days following the effective date of this Order~~ by <<Insert ROWD Due Date>>, submission of a report describing the changes to local limits with a plan and schedule for implementation, or the rationale for making no changes to local limits.
5	13 – 14	VI.C.4.d	SFPUC requests the addition of clarifying language that compliance with the State Water Board Order No. 2006-0003-DWQ as amended by Order No. WQ 2013-0058-EXEC is separate from the NPDES permit. The suggested language is consistent with the recently adopted permits for West County Agency (Order No. R2-2019-0003) and City of Palo Alto (Order No. R2-2019-0015).	**d. Separate Sanitary Sewer Systems.** … State Water Board Order No. 2006-0003-DWQ, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, as amended by State Water Board Order No. WQ 2013-0058-EXEC, contains requirements for operation and maintenance of collection systems and for reporting and mitigating sanitary sewer overflows. While the Discharger must separately comply with both ~~The~~the statewide WDRs and this Order, the statewide WDRs more clearly and specifically stipulate requirements for operation and maintenance and for reporting and mitigating sanitary sewer overflows. Implementing the requirements for operation and maintenance and mitigation of sanitary sewer overflows set forth in the statewide WDRs (and any subsequent order updating those requirements) shall satisfy the corresponding federal NPDES requirements specified in Attachments D and G of this Order for the separate sanitary collection systems. Following the reporting requirements set forth in the statewide WDRs (and any subsequent order updating these requirements) shall satisfy the NPDES reporting requirements for sanitary sewer overflows specified in Attachments D and G.

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6	15	VI.C.5.a.i.(f)	SFPUC requests changes to clarify that the annual inspections are limited to combined sewer outfalls, consistent with Oceanside's current permit, the SFPUC Southeast Plant permit, CSO Control Policy guidance on Nine Minimum Control implementation, and the subsequent text within that provision (*e.g.*, "entering the regulator structure…adjusting tide gates…").	**(f) Inspections.** The Discharger shall conduct an inspection program of the combined sewer system to provide reasonable assurance that unpermitted discharges, obstructions, and damage will be discovered. At a minimum, the Discharger shall do the following: **(1)** Inspect each combined sewer discharge outfall and associated structures (e.g., tide gates and sensors) ~~critical facility and major system component identified in accordance with Provision VI.C.5.a.i(c), above,~~ at least once every 12 months to ensure they are in good working condition. ~~The inspection shall include, but not be limited to,~~ Inspections of outfalls shall include entering the regulator structure, if accessible; determining the extent of any structural defects or debris and grit buildup; removing any debris that may constrict flow, cause blockage, or result in a prohibited discharge; and adjusting tide gates to minimize combined sewer discharges and to prevent tidal inflow.
7	15	VI.C.5.a.ii.(a)	SFPUC requests removal of the requirement to control intrusion from receiving waters. "Intrusion" is not defined in the Tentative Order, but is assumed to be a situation wherein Bay or Ocean water enters the combined sewer system via a combined sewer discharge (CSD) weir during high tides. This does not occur on the Westside of the City because the CSD weir elevations are quite high relative to the tidal height, even under King Tide conditions. As such, the City proposes that this control measure be removed.	**ii. Control No. 2: Maximize Use of Collection System for Storage.** The Discharger shall maximize use of the combined sewer system for in-line storage to reduce the magnitude, frequency, and duration of combined sewer discharges. At a minimum, the Discharger shall implement the following controls: ~~**(a)** Prevent intrusion of receiving waters into the combined sewer system;~~
8	15	VI.C.5.a.ii.(b)	SFPUC does not own any inoperative or unused treatment facilities, and the requirement to use all operative facilities is addressed in the LTCP provisions related to operations during wet weather. As such, the City proposes that this control be removed.	~~**(b)** Use all facilities, including any inoperative or unused treatment facilities, to store or treat wet weather flows to the maximum extent practicable; and~~

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9	15	VI.C.5.a.ii	The SFPUC is strongly concerned that the Tentative Order's requirements related to sewer overflows from the combined sewer system (SOCSS) are inappropriate and have no basis in in the CSO Control Policy. See Comment Nos. 16 and 17. The SFPUC is amenable, however, to reporting the occurrence, cause and location of SOCSS to facilitate EPA, Regional Water Board, and the public's evaluation of the effectiveness of the City's operation and maintenance of the collection system. The changes requested require reporting to CIWQS and are consistent with the City's recent efforts to standardize field response to and recordkeeping of sewer overflows in both the combined and separate sewer systems. This reporting is being proposed as an element of Control No. 2: Maximize Use of the Collection System for Storage. The SFPUC requests replacement of the Tentative Order language that referenced the State's Waste Discharge Requirements for Sanitary Sewer Systems ("SSS WDR"), Order 2006-0003-DWQ, with language that explicitly identifies the reporting requirements in that order that apply to discharges of untreated wastewater from a collection system that do not reach surface waters. The SFPUC's concern is that incorporation of the "notification and reporting requirements" of the WDR into the permit leaves open to interpretation the specific requirements that are applicable here. All requirements enumerated in the SFPUC's requested changes are intended to be identical to those in the State Water Board's SSS WDR.	To allow evaluation of the Discharger's program to properly operate and maintain the combined sewer collection system, the Discharger shall undertake the following within six months of the effective date of this order: 1) Complete the CIWQS Online Collection System Questionnaire and begin entering all SOCSS information into the CIWQS Online SSO Database. All information entered into the CIWQS Online SSO Database shall be certified by the Discharger's Legally Responsible Official(s). The Collection System Questionnaire shall be updated and certified every 12 months. 2) Begin reporting all SOCSS 1,000 gallons or greater by submitting a draft report to CIWQS within 3 business days of becoming aware of the SOCSS and certifying within 15 calendar days of the SOCSS end date. 3) Begin reporting all SOCSS less than 1,000 gallons by submitting a certified report to CIWQS within 30 calendar days of the end of the month in which the SOCSS occurred. 4) Begin certifying that no SOCSS occurred within 30 calendar days of the end of the month.
10	16	VI.C.5.a.iv	SFPUC suggests the modifications for clarity. The requirement to operate at "maximum capacity" is confusing in light of the specific	**iv. Control No. 4: Maximize Flow to Treatment Plant.** The Discharger shall ~~operate~~ fully utilize the Oceanside Water Pollution Control Plant ~~at maximum~~ capacity during wet weather.

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			operational requirements in the LTCP provisions.	The Discharger shall maximize the volume of wastewater that receives treatment at the Oceanside Water Pollution Control Plant (i.e., secondary treatment for 43 MGD and primary treatment for an additional 22 MGD) and is discharged at Discharge Point No. 001.
11	16	VI.C.5.a.vi	SFPUC has already installed infrastructure to control solids and floatable materials in combined sewer discharges. The suggested language is to clarify that the control of solids and floatable materials in combined sewer discharges does not require new capital projects. Instead, it requires that existing infrastructure for solids and floatable materials control be maintained as operational, and that the City continue implementation of relevant best management practices (*e.g.*, street sweeping) as described by EPA guidance on implementation of the Nine Minimum Controls.	**vi. Control No 6: Control Solid and Floatable Materials in Combined Sewer Discharges.** The Discharger shall continue to implement measures to minimize the volume of solid and floatable materials in combined sewer discharges (e.g., equip Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD -005, CSD-006, and CSD 007 with baffles, screens, or racks, or other means to reduce the volume of solid and floatable materials). The Discharger shall also remove and properly dispose of solid and floatable materials captured in the combined sewer system.
12	16 – 17	VI.C.5.a.vii i. (a)	SFPUC requests the removal of repetitive language. A detailed list is included in the bullets following the paragraph as part of the same control number.	**(a) Combined Sewer Discharges.** The Discharger shall inform the public of the location of combined sewer discharge outfalls (i.e., Discharge Point Nos. CSD 001, CSD-002, CSD-003, CSD-004, CSD 005, CSD-006, and CSD 007), the actual occurrences of combined sewer discharges~~, the possible health and environmental impacts of combined sewer discharges, and the recreational or commercial activities (e.g., swimming, shellfish harvesting) curtailed as a result of combined sewer discharges~~.
13	17	VI.C.5.a.vii i. (a)(1)	SFPUC requests removal of overly prescriptive requirements about permanent signage. Flexibility is required to enable engagement of various stakeholders, including the San Francisco Department of Public Health and the federal entities that own the shoreline. For example, the National Park Service controls access and is required to approve the terminology, size, font size, and material of	**(1)** The Discharger shall maintain permanent identification signs at the locations of Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-005, CSD-006, and CSD-007, and at public access points. The Discharger shall inspect, and replace as necessary, all permanent signs at least once per calendar year to ensure that the signs are visible and readable. New or replacement signs shall ~~be a minimum of 12 by 18 inches, with a font size of at least 50; be printed on reflective material; and~~ contain the following information, at a minimum:

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			signage at beaches in the Golden Gate National Recreation Area.	• SFPUC Discharge Point No. (discharge identification number). • Report dry weather discharges at (telephone number). • Description of discharge, including the words "sewage" and "pathogens" ~~This outfall may discharge sewage mixed with rainwater during or following rain events. Avoid water contact – pathogens that cause illness may be present in the discharge.~~ • Warning, alert, caution, or other term to notify the public that caution is needed.
14	17	VI.C.5.a.viii(a)(2)	SFPUC staff post warning signs at beach locations where water contact recreational activities may be affected by combined sewer discharges. The signs are posted on the same day as the combined sewer discharge event or the next morning if the discharge occurs in the evening. SFPUC requests a change to the required morning and evening timing to within two hours of civil twilight and 4:00 p.m. because of safety and limited accessibility. Depending on the time of year and weather conditions, posting all City sites by 8:00 a.m. would require staff to perform these activities in the dark, which presents significant safety concerns. Many posting locations and surrounding areas have minimal or no artificial lighting, making natural sunlight the main source of light. Civil twilight is defined as the time period when the sun is no more than six degrees below the horizon at either sunrise or sunset. It is the time in which there is enough solar illumination for the human eye to clearly distinguish terrestrial objects, meaning that a recreator would be able to carry on ordinary outdoor activities and there would be enough natural sunlight and visibility for staff to perform posting. Two hours provides time for	**(2)** The Discharger shall post warning signs, including "No Swimming" signs, at beach locations whenever a combined sewer discharge occurs to inform users that bacteria concentrations may be elevated. The Discharger shall post warning signs ~~within four hours of when the discharge commences unless the discharge begins after sunset, in which case, the Discharger shall post warning signs by 8:00 a.m. the following day.~~ on the same day as the combined sewer discharge event unless the combined sewer discharge occurs after 4:00 p.m., in which case, signs shall be posted within two hours after morning civil twilight the next day. Signs shall be posted until analysis indicates that water quality meets bacteriological standards for recreation.

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			staff to travel and post at various locations throughout San Francisco during larger storms and/or more difficult weather conditions. In addition, at certain locations, the U.S. National Park Services closes sites at least one or more hours prior to sunset, making it impossible to post when a CSD occurs within an hour of sunset. For example, on May 6, 2019, a park hours sign was adjusted to close at 5 p.m. when sunset occurred at 8 p.m. The proposed 4:00 p.m. time presents much less accessibility issues because the earliest sunset time in San Francisco occurs at about 5:00 p.m.	
15	17	VI.C.5.a.viii(a)(4)	SFPUC provides electronic notification of CSDs on its website and telephone hotline. The purpose of this public notification is to provide day-of information for the public to understand whether it is safe to use the water for recreational activities. It is not clear how notification of CSD duration furthers this purpose. The duration of a CSD is not an indicator of how safe it is to be on the beach; rather the reported fecal indicator bacteria concentrations are the indicators. Moreover, determining CSD duration requires an involved calculation, making day-of notification infeasible. In addition, when an ongoing discharge is occurring, the CSD duration is changing (i.e., a moving target), so the value is unknown when our staff perform day-of notifications.	**(4)** The Discharger shall provide electronic notification of combined sewer discharges through a free-access website and telephone hotline. The electronic notification shall include information about the location~~, duration,~~ and impacts of combined sewer discharges, and provide a telephone number for the public to report discharges.
16	17	VI.C.5.a.viii.(b)	The SFPUC strongly objects to the various provisions in the Tentative Order related to Sewer Overflows in the Combined Sewer System (SOCSS). More specifically, the SFPUC disagrees that EPA or the State has jurisdiction	See Comment No. 9 for proposed language regarding reporting of SOCSS.

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			over discharges within the combined sewer system that do not reach surface waters, and which have no potential to do so. The Tentative Order implicitly and explicitly indicates that the CSO Control Policy regulates SOCSS. The SFPUC requests identification of the specific provisions in the Policy and/or any implementing guidance to support this position. The SFPUC conceptually agrees, however, that the frequency, cause and location of SOCSS may be a metric to evaluate the effectiveness of operation and maintenance of the collection system to the extent that they are indicative of blockages that may reduce storage capacity. Accordingly, in order to facilitate this evaluation, the SFPUC is willing to report SOCSS to the State's CIWQS database provide that the changes requested below are made.	
17	17	VI.C.5.a.viii.(b)	The SFPUC requests that the requirement to report SOCSS be removed from the provision related to Nine Minimum Control Measure 8. Neither the CSO Control Policy or related guidance requires or otherwise contemplates the reporting of SOCSS. For example, *EPA Combined Sewer Overflow Guidance for Nine Minimum Controls*, EPA 832-B-95-003 (May 1995) is entirely limited to discharges to receiving waters, stating: "The intent of the eighth minimum control, public notification, is to inform the public of the location of CSO outfalls, the actual occurrences of CSOs, the possible health and environmental effects of CSOs, and the recreational or commercial activities (e.g., swimming and shellfish harvesting) curtailed as a result of CSOs." Pg. 9-1.	**Control No. 8: Notify Public of Combined Sewer Discharges ~~and Sewer Overflows from the Combined Sewer System~~** ~~**(b) Sewer Overflows from the Combined Sewer System.** For combined sewer system excursions, the Discharger shall notify and report consistent with the sanitary sewer overflow notification and reporting requirements of State Water Board Order No. 2006-0003-DWQ, "Statewide General Waste Discharge Requirements for Sanitary Sewer Systems," as amended by State Water Board Order No. WQ 2013-0058-EXEC, and any subsequent order updating these requirements (i.e., State Water Board Order No. WQ 2013-0058-EXEC Attachment A, sections B.1, B.2, B.3, C.2, C.3, C.4, C.5, C.7, and C.8.i).~~

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18	18	VI.C.5.b	SFPUC requests an annual reporting deadline of February 1 for documentation of the Nine Minimum Controls, consistent with the annual report deadline. That will allow sufficient time for recording and reporting on wet weather performance and dry season maintenance activities, which are typically completed through the end of the dry season in late September.	**(2) Documentation of Nine Minimum Controls.** The Discharger shall maintain records documenting implementation of the nine minimum controls described in Provision VI.C.5.a. By ~~October 31~~ February 1 each year, the Discharger shall submit a report to the Regional Water Board and EPA covering the prior October 1 through September 30. The report shall summarize actions taken and planned to implement the nine minimum controls.
19	19-21	VI.C.5.d	The SFPUC strongly disagrees that an update to the City's LTCP is needed or appropriate. The City developed and implemented a multi-billion dollar LTCP that resulted in the current level of wet weather control, which was prescribed by EPA and the State as being protective of beneficial uses. Since completion of the LTCP, the City has performed extensive post-construction monitoring that demonstrates that system performance is consistent with the system design, and that beneficial uses are being protected (*see* Characterization of Westside Wet Weather Discharges and the Efficacy of Combined Sewer Discharge Controls, July 2014). Findings to this effect have been included in prior permits, including the current OSP NPDES Permit (R2-2009-0062). The requested changes are intended to reflect that the City has implemented a LTCP, and that the purpose of this section is to continue to assess the current performance in light of post-construction monitoring data and sensitive areas considerations. Please see Attachment B for more detailed comments.	Please see the specific line edits proposed in Comment Nos. 20 -27.
20	19	VI.C.5.d	Consistent with the CSO Control Policy, the SFPUC requests modifications to the	**d. LTCP <u>Assessment and</u> Update**. The Discharger shall <u>assess and</u> update<u> as appropriate</u> its LTCP by implementing the following

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			introductory paragraph to clarify that any LTCP update will be based on an assessment of post-construction monitoring results and an evaluation of sensitive areas. *See* Chapter 5, Post-Phase II Permitting, *EPA Combined Sewer Overflows Guidance for Permit Writers* (1995), which identifies these two elements as the only ones applicable to cities that have implemented a LTCP (i.e., "post-phase II permittees").	tasks. The objective of the tasks in Table 7 are to assess and update the LTCP to be consistent with the sensitive area and post-construction monitoring provisions of ~~based on the nine elements described in~~ the *Combined Sewer Overflow (CSO) Control Policy*. ~~and~~ The Discharger shall submit the required reports to the Regional Water Board and EPA as specified in the table below. In doing so, the Discharger may use previously completed studies to the extent that they accurately provide the required information.
21	19 - 20	Table 7, Task 1	The SFPUC requests replacement of the requirement to evaluate system response to 5 and 10-year design storms with a requirement to evaluate system response to a modeled typical year. As is industry standard and recommended by EPA guidance (EPA Combined Sewer Overflows Guidance for Monitoring and Modeling (1999)), one of the ways that the SFPUC evaluates performance of its combined sewer system is through hydraulic and hydrologic (H&H) model simulations of a typical year. "Typical year" is a technical term used to refer to a series of modified historical storm events that are based on a statistical analysis of a long-term rainfall dataset, and represents long-term rainfall averages in terms of rainfall depth, duration and intensity. The SFPUC has a very detailed and highly calibrated and validated H&H model, and has developed a typical year based on 30 years of measured rainfall data. The ability of the modeled typical year to simulate system performance is high because the results in terms of CSD frequency and volume closely match the long-term annual average monitored performance of the Westside system. Please remove all references to sewer overflows in the combined system in this section. Sewer	**1. Post-Construction Characterization, Monitoring, and Modeling of the Combined Sewer System** The Discharger shall submit a System Characterization Report with a comprehensive characterization of the combined sewer system developed through records review, monitoring, modeling, and other means as appropriate to establish the existing conditions upon which the ~~updated LTCP~~ Consideration of Sensitive Areas Report (Task 3) will be based. At a minimum, the System Characterization Report shall ~~do~~ include the following: **a.** ~~Include a~~ A description ~~thorough review~~ of the entire combined sewer system, including how it responds to typical year rainfall ~~various precipitation events (including 3 hour duration, 5 year and 10 year return frequency storms)~~ with respect to the volume and frequency of combined sewer system discharges ~~and sewer overflows from the combined sewer system~~, considering the impacts of climate change and sea level rise; **b.** ~~Describe~~ A description of each model used, including a discussion of model calibration and validation; **c.** ~~Identify t~~The location, frequency, and characteristics of actual combined sewer discharges and sewer overflows from the combined sewer system, and their locations relative to sensitive areas, for at least the last 10 years; ~~**d.** Describe any temporal or spatial trends of sewer overflows from the combined sewer system.~~ ~~**e.**~~**d.** ~~Identify~~ A summary of available information on the relationship between CSDs and the receiving water quality ~~the impacts that result from combined sewer discharges~~ (at a minimum, compare wet weather average and maximum

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			overflows in the collection system are not relevant to, or mentioned, in the CSO Control Policy and implementing guidance. Sewer overflows do not reach surface waters, are caused by localized constraints and have no relationship to CSDs and the system's ability to maximize storage and treatment. Please replace the requirement to identify water quality impacts of CSDs with a more holistic evaluation of information available on the relationship between CSDs and receiving water quality. The current provision's focus on water quality impacts seems unnecessarily focused on analyses of the pollutant concentrations in CSDs, whereas the SFPUC has other types of data and information (*e.g.*, receiving water monitoring and modeling) relevant to the relationship between CSDs and receiving water conditions. The SFPUC also requests an extension of the deadline to allow time to incorporate the Bayside drainage into these analyses. While the Bayside and Westside are hydraulically distinct, improvements must be identified and prioritized on a citywide basis. Extension of the deadlines will enable the SFPUC to undertake citywide analyses to better inform decision making.	discharge characteristics and receiving water monitoring data with Ocean Plan Table 1 water quality objectives); and ~~f.~~e Evaluate combined sewer discharge control efficacy (e.g., using TSS as a proxy for pollutant removal efficiency), including a description of any method used. Within 48~~2~~ months of this Order's effective date.
22	20	Table 7, Task 2	The SFPUC requests replacement of the requirement to submit a Public Participation Plan with a requirement to submit a description of completed and planned public participation efforts related to capital planning, including planning related to CSDs. This change will provide the SFPUC flexibility in engaging the public to ensure that public outreach – like capital planning – is iterative and adaptive. The	**2. Public Participation.** The Discharger shall submit a ~~Public Participation Plan~~ description of its completed and planned public participation efforts ~~describing the process it will employ~~ to actively involve the affected public in its decision-making process related to capital planning, including implementation of any additional ~~to select updated~~ long-term combined sewer system controls based on the results of the Consideration of Sensitive Areas Report. The affected public includes

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			SFPUC already has a robust public engagement program and is concerned that the requirement to submit a Plan indicates that the SFPUC will not be able to deviate from that plan without resubmittal of another plan to the Regional Water Board and EPA.	rate-payers (including rate-payers in separate sanitary sewer system service areas), industrial users, persons who use the receiving waters, and any other interested persons. The ~~Public Participation Plan~~ public participation efforts may include outreach through methods such as public meetings, direct mailers, billing inserts, press releases, postings of information on the Discharger's website, and development of advisory committees. Within 48~~2~~ months of this Order's effective date.
23	20	Table 7, Task 3	The changes requested by the SFPUC are intended to more closely align the requirements of this task with the CSO Control Policy, which requires post-LTCP assessment of discharges to sensitive areas. These changes also incorporate the cost and performance considerations of Task 4, and the implementation plan of Task 7 to reduce the number of specific, but strongly interrelated, tasks contained within Table 7. The SFPUC has evaluated an extensive range of alternatives for CSD reduction as part of its capital program and is currently moving forward with a project (real-time Operational Decision Support, or ODS) that may identify improvements to operation of existing infrastructure to further optimize performance. The requested deletion of the specific alternatives enumerated in the Tentative Order is intended to provide flexibility to the SFPUC to more efficiently build upon work done to date. If EPA and the Regional Water Board are concerned that the scope of alternatives may be inappropriately limited, the SFPUC is amenable to submitting a scoping plan, similar to that submitted by the Bay Area Clean Water Agencies for the Nutrient Watershed Permit (R2-2014-0014).	**3. Consideration of Sensitive Areas** Based on the results of the System Characterization Report, ~~T~~the Discharger shall submit a Consideration of Sensitive Areas Report that evaluates opportunities for improving reducing ~~prioritizes, and proposes control alternatives needed to eliminate, relocate, or reduce the magnitude or frequency of~~ discharges to sensitive areas from Discharge Point Nos. CSD-001, CSD-002, CSD-003, ~~CSD-004,~~ CSD-005, CSD-006, and CSD-007. The Consideration of Sensitive Areas Report shall include the following, at a minimum: **a.** Provide updated water contact recreational use surveys, focusing particularly on recreational use following combined sewer discharges; **b.** ~~Evaluate~~ Identify control alternatives such as increases in storage capacity, increases in treatment capacity, off-shore relocation, green infrastructure, and modifications to operation of existing infrastructure, for each combined sewer discharge structure and the combined sewer system as a whole.~~, including but not limited to the following:~~ ~~i. Green infrastructure and low impact development;~~ ~~ii. Increased storage within the combined sewer system;~~ ~~iii. Increased storage at the Oceanside Water Pollution Control Plant;~~ ~~iv. Increased treatment capacity at the Oceanside Water Pollution Control Plant;~~ ~~v. Operational changes to increase flows discharged at Discharge Point No. 001;~~ ~~vi. Increased pumping capacity at the Westside Pump~~

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			Finally, the SFPUC also requests that CSD-004 be removed from the list of outfalls discharging to sensitive areas. This outfall is located at a very remote location that can only be reached by a lengthy and rugged walk at very low tides through the rocky intertidal zone. No recreational or shellfishing is known to occur at this location because of its remoteness. These characteristics are one of the reasons that this outfall was constructed for drainage in the early 1900s.	~~Station; and~~ ~~vii. Use of high-rate treatment technologies and disinfection to minimize pollutant loads.~~ **c.** Evaluate the practical and technical feasibility of the proposed alternatives; **d.** Using a model, simulate existing conditions and expected conditions after construction and operation of each proposed alternative, including how the alternative would be expected to affect receiving water quality and combined sewer discharge volumes and frequencies at each combined sewer discharge outfall, and incorporating consideration of climate change and sea level rise; e. Summarize the feasibility, costs, and benefits of the evaluated alternatives; and ~~e.~~f ~~Prioritize and propose for implementation the proposed alternatives needed to eliminate, relocate, or reduce the magnitude or frequency of discharges from Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD-005, CSD-006, and CSD-007~~ Identify, based on the information generated under Tasks 3.a through 3.e~~d~~, above, and report on any improvements to be included into the Discharger's capital plan related to improvement of sensitive areas.~~, and the cost and performance considerations and financial capabilities analysis required by Task 4~~. The identification and scheduling of improvements may consider costs relative to water quality and other public benefits, the Discharger's financial capabilities, community affordability, related infrastructure needs, and other appropriate integrated planning considerations. Within 48~~2~~ months of this Order's effective date.
24	20	Table 7, Task 4	Deletion of this task is requested because the SFPUC proposes that the cost and performance considerations be incorporated into Task 3, Consideration of Sensitive Areas.	~~**4. Cost/Performance Considerations**~~ ~~The Discharger shall submit cost and performance considerations for each alternative considered in the Consideration of Sensitive Areas Report. The Discharger shall include within this evaluation an analysis that determines where the increment of pollution reduction achieved~~

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				~~diminishes compared to increased costs (i.e., the "knee of the curve") and an analysis of its financial capabilities using EPA's *Combined Sewer Overflows, Guidance for Financial Capability Assessment and Schedule Development* (EPA 832-B-97-004, February 1997) or other appropriate guidance.~~
25	21	Table 7, Task 5	The changes requested to this section will ensure that SFPUC provides the Regional Water Board and EPA the desired documentation of the engineering rationale behind the provisions in VI.C.5.c.iv. Evaluation of opportunities to modify operation of existing infrastructure to increase wet weather storage and treatment has been added to the list of strategies to be evaluated under the Consideration of Sensitive Areas task (Task 3). As Task 3 includes specific analyses using a model to evaluate control alternatives, and these alternatives include modifications to operations, it is more fitting for the operations parameters be evaluated in Task 3. As noted in an earlier comment, please remove all references to sewer overflows in the combined system in this section. The occurrence of sewer overflows is not related to the system's ability to maximize treatment and storage except to the extent that they may indicate a reduction of in-line (collection system) storage due to FOG or sediment accumulation. As noted in the fact sheet, the collection system comprises a small percentage (approximately 3%) of the system's daily wet weather storage capacity.	**5. Operational Plan** ~~a.~~ The Discharger shall submit ~~an~~ ~~Evaluation~~ Documentation of Wet Weather Operations Report that ~~evaluates whether changes to existing system operations can be made to maximize pollutant removal during and after each precipitation event, such as minimizing the frequency, volume, or duration of combined sewer discharges and sewer overflows from the combined sewer system. The Discharger shall~~ identifies ~~propose a~~ the set of operational parameters ~~to be~~ used as performance measures to ensure that wet weather operations maximize pollutant removal and minimize the frequency, volume, and duration of combined sewer discharges. The performance measures may include all or a portion of those listed in Provision VI.C.5.c.iv. ~~At a minimum, the Discharger shall evaluate whether each operational requirement listed in Provision VI.C.5.c.iv is still appropriate, and if so, the Discharger shall provide the technical basis for that conclusion. The Discharger shall also consider additional performance metrics.~~ ~~b. Within 90 days of receiving written concurrence from the Regional Water Board Executive Officer and EPA pursuant to Provision VI.C.5.c.iv, the Discharger shall update its Operation and Maintenance Manual with any new or revised wet weather operational strategies, as required by Attachments D and G sections I.C (Duty to Mitigate) and I.D (Proper Operation and Maintenance).~~ Within ~~12~~ 24 months of this Order's effective date.
26	21	Table 7, Task 7	Deletion of this task is requested because the SFPUC proposes that the schedule and related considerations be incorporated into Task 3,	~~**7. Implementation Schedule**~~ ~~The Discharger shall submit a draft Implementation Schedule with yearly milestones to implement the combined sewer system control~~

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			Consideration of Sensitive Areas. Because Task 3 contains in-depth analyses of potential control alternatives, this request will ensure all information relevant to identifying potential system improvements is included in a single document and will also reduce the number of deliverables.	~~selected based on the Consideration of Sensitive Areas Report. The duration of the implementation schedule shall be selected based on the results of the financial capability analysis required by Task 4. The implementation schedule may be phased based on the relative water quality benefits of the selected controls, the Discharger's financial capabilities, and other water quality-related infrastructure improvements underway.~~
27	21	Table 7, Task 8	The change requested is to clarify that changes to the existing post-construction monitoring program may not be needed. The current wording presumes that modifications to the current post-construction monitoring plan will be appropriate.	**8. Post-Construction Compliance Monitoring Program** The MRP contains post-construction compliance monitoring requirements. The Discharger shall submit a Post-Construction Compliance Monitoring Plan proposing modifications, as appropriate, to the MRP for the next permit term to verify compliance with applicable water quality standards and protection of designated uses, as well as to ascertain the effectiveness of combined sewer system controls. At a minimum, the Post-Construction Compliance Monitoring Plan shall evaluate whether any reduction or increase in monitoring, or alternative monitoring, is appropriate.
28	A-5	Sewer Overflow from the Combined Sewer System	The SFPUC requests these changes to reduce ambiguity and to bring the definition more explicitly into alignment with the definition of "excursion" in the Southeast Water Pollution Control Plant permit. Specifically, the changes requested clarify that "flow" is wastewater, and that SOCSS do not reach surface waters. Any discharge from the combined sewer system that reaches surface waters is and has always been reported under the requirements of Attachment G.	**Sewer Overflow from the Combined Sewer System** Release or diversion of ~~any flows~~ untreated or partially treated wastewater from the combined sewer collection system that does not reach surface waters. Sewer overflows from the combined sewer system can occur in public rights of way or on private property. Sewer overflows from the combined sewer system do not include: (i) releases due to failures in privately-owned sewer laterals, (ii) overflows resulting solely from storm events in excess of the system's design capacity where the system is otherwise operated as designed, or (iii) authorized combined sewer discharges at Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD-005, CSD-006, or CSD-007, or discharges covered by Attachment G.
29	E-2	I.C.	DMR-QA studies are currently electronically submitted by e-mail to the State Water Board QA Officer. SFPUC requests that this submittal option be recognized in the permit.	C. The Discharger shall ensure that results of the Discharge Monitoring Report-Quality Assurance (DMR-QA) Study or most recent Water Pollution Performance Evaluation Study are submitted annually by either sending an electronic copy to the State Water Board Quality Assurance Officer or to the State Water Board at the following address…

<table>
<tr><th>No.</th><th>Page</th><th>Section</th><th>Comment</th><th>Proposed Revisions</th></tr>
<tr><td>30</td><td>E-3</td><td>Table E-1</td><td>SFPUC requests that the clarification be added to monitoring location EFF-001D because it is commonly referred to among SFPUC staff as “decant”.</td><td>Table E-1. Monitoring Locations
<table>
<tr><th>Monitoring Location Type</th><th>Monitoring Location Name</th></tr>
<tr><td>⋮</td><td>⋮</td></tr>
<tr><td>Westside Transport/Storage Structure Effluent (wet weather) (previously identified as “decant”)</td><td>EFF-001D</td></tr>
<tr><td>⋮</td><td>⋮</td></tr>
</table></td></tr>
<tr><td>31</td><td>E-3</td><td>Table E-1</td><td>See detailed comments in Attachment D.</td><td>
<table>
<tr><th>Monitoring Location Type</th><th>Monitoring Location Name</th><th>Monitoring Location Description [1]</th></tr>
<tr><td>⋮</td><td>⋮</td><td>⋮</td></tr>
<tr><td>Combined Sewer Discharge Effluent</td><td>EFF-CSD-1</td><td>A monitoring location representative of combined sewer discharges from the Westside Transport/Storage Structure.</td></tr>
<tr><td>~~Combined Sewer Discharge Effluent~~</td><td>~~EFF-CSD-1~~</td><td>~~A representative monitoring location for all waste tributary to Discharge Point No. CSD-001.~~</td></tr>
<tr><td>~~Combined Sewer Discharge Effluent~~</td><td>~~EFF-CSD-2~~</td><td>~~A representative monitoring location for all waste tributary to Discharge Point Nos. CSD-002 and CSD-003.~~</td></tr>
<tr><td>~~Combined Sewer Discharge Effluent~~</td><td>~~EFF-CSD-7~~</td><td>~~A representative monitoring location for all waste tributary to Discharge Point Nos. CSD-005, CSD-006, and CSD-007.~~</td></tr>
<tr><td>⋮</td><td>⋮</td><td>⋮</td></tr>
</table></td></tr>
<tr><td>32</td><td>E-4</td><td>Table E-1</td><td>The correct longitude for offshore receiving water Station 4 is -122.59500°, not -122.59001°, as converted from the current Oceanside permit (i.e., -122° 35’ 42.00”).</td><td>
<table>
<tr><th>Monitoring Location Type</th><th>Monitoring Location Name</th><th>Monitoring Location Description [1]</th></tr>
<tr><td>⋮</td><td>⋮</td><td>⋮</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Page</th><th>Section</th><th>Comment</th><th>Proposed Revisions</th></tr>
<tr><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Offshore Receiving Water</td><td>Station 4</td><td>Offshore monitoring program station location. Longitude -122.~~59001~~59500°, Latitude 37.71167°</td></tr>
<tr><td>⁝</td><td>⁝</td><td>⁝</td></tr>
</table>
</td></tr>
<tr><td>33</td><td>E-6</td><td>Table E-2, $CBOD_5$ Monitoring</td><td>When testing $CBOD_5$, samples are diluted at different dilutions based on a predicted concentration range. Despite preparing samples at various dilutions, this testing method has the potential to result in invalid test results if the actual concentration is not within the predicted concentration range. Predicting a concentration range is particularly difficult during wet weather because it is difficult to estimate how much stormwater is contributing to the influent, and stormwater typically has much lower $CBOD_5$ concentrations than does wastewater.

SFPUC requests clarification from the Regional Board that it does not constitute a violation if the influent is sampled at the frequency specified and tested for CBOD, but the test results are deemed invalid or inconclusive due to $CBOD_5$ concentrations out of the expected range and SFPUC is not able to resample within the same week. SFPUC would report such results as invalid in the corresponding self-monitoring report cover letter.</td><td>N/A</td></tr>
<tr><td>34</td><td>E-6 – E-7</td><td>IV.A.1 and IV.A.2, Table E-3 and Table E-4</td><td>SFPUC requests the addition of a section and table for both dry and wet weather plant effluent monitoring for flow, $CBOD_5$, TSS and pH to clarify minimum sampling frequency for these parameters. Dry weather monitoring is currently separate from wet weather monitoring. It is SFPUC's interpretation that, even if there is a wet weather event in any given week, dry weather samples at Monitoring Location EFF-</td><td>1. Dry and Wet Weather. The Discharger shall monitor the plant effluent during dry and wet weather at Monitoring Locations EFF-001A and EFF-001B as follows:

Table E-3. Plant Effluent Monitoring
<table>
<tr><th>Parameter</th><th>Units</th><th>Sample Type</th><th>Minimum Sampling Frequency [3]</th></tr>
<tr><td>Flow [1]</td><td>MG/ MGD</td><td>Continuous</td><td>Continuous/D</td></tr>
</table>
</td></tr>
</table>

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			001A must be taken at the required minimum sampling frequency. However, SFPUC may not be able to comply with these frequencies at times because the requirements are weather-dependent. For instance, if a wet weather event lasts three days, there would not be enough days in the week to collect the minimum five samples required for TSS at Monitoring Location EFF-001A. SFPUC Laboratory staff currently schedule lab analyses for weekly monitoring parameters such as TSS, pH, and $CBOD_5$ randomly to better characterize the effluent. During the rainy season, there may be weeks in which TSS monitoring is scheduled for Monday-Thursday and Saturday, but if Friday and Saturday are wet weather days, TSS would have been monitored only four times instead of the required five times per week. Accordingly, SFPUC proposes the inclusion of a footnote similar to Table E-2, footnote [2], to clarify that the minimum sampling frequency is satisfied regardless of whether the results correspond to EFF-001A or EFF-001B. In addition, SFPUC requests the addition of a footnote to clarify that monitoring requirements in the new table may be used to satisfy similar EFF-001B monitoring requirements in Table E-4 of the Tentative Order. The suggested revisions shown are also consistent with Table E-4 of the Tentative Order in allowing use of COD in lieu of CBOD during wet weather.	(see below)

Proposed Revisions:

$CBOD_5$ [2]	mg/L	C-24	1/Week
TSS	mg/L	C-24	5/Week
pH	standard units	Continuous or Grab	1/Week

Abbreviations:
MG = million gallons
MGD = million gallons per day
mg/L = milligrams per liter

Sample Types and Frequencies:
Continuous = measured continuously
Continuous/D = measured continuously, and recorded and reported daily
C-24 = 24-hour composite
Grab = grab sample
1/Week = once per week
5/Week = five times per week

Footnotes:
[1] The following information shall be reported in monthly self-monitoring reports:
- Daily average flow (MGD)
- Total monthly flow volume (MG)

[2] The Discharger may monitor Chemical Oxygen Demand at Monitoring Location EFF-001B in lieu of $CBOD_5$ during wet weather.
[3] The minimum sampling frequency is the total number of effluent samples to be collected during the specified sampling period, including samples collected during dry and wet weather at Monitoring Locations EFF-001A and EFF-001B.

~~1~~2. **Dry Weather.** During dry weather, the Discharger shall monitor plant effluent at Monitoring Location EFF-001A as follows:

Table E-~~3~~4. Dry Weather Plant Effluent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency [3]
~~Flow [1]~~	~~MG/ MGD~~	~~Continuous~~	~~Continuous/D~~
~~$CBOD_5$~~	~~mg/L~~	~~C-24~~	~~1/Week~~
~~TSS~~	~~mg/L~~	~~C-24~~	~~5/Week~~
~~pH~~	~~standard units~~	~~Continuous or Grab~~	~~1/Week~~
⋮			

No.	Page	Section	Comment	Proposed Revisions
				(continued below)

Remaining Ocean Plan Table 1 Pollutants [~~2~~1]	µg/L	C-24 [~~3~~2]	1/Year

Abbreviations:
~~MG = million gallons~~
~~MGD = million gallons per day~~
…

Sample Types and Frequencies:
~~Continuous = measured continuously~~
~~Continuous/D = measured continuously, and recorded and reported daily~~
C-24 = 24-hour composite
Grab = grab sample
~~1/Week = once per week~~
~~5/Week = five times per week~~
…

Footnotes:
~~[1] The following information shall be reported in monthly self-monitoring reports:~~
- ~~Daily average flow (MGD)~~
- ~~Total monthly flow volume (MG)~~

[~~2~~1] The Discharger shall monitor for the pollutants listed in Ocean Plan Table 1, except chlorine, tributyltin, radioactivity, acute toxicity, and chronic toxicity.
[~~3~~2] For mercury and other parameters with analytical methods that require grab sampling, the Discharger may collect a grab sample instead of a 24-hour composite sample.

~~2~~3. **Wet Weather.** During wet weather, the Discharger shall monitor plant effluent at Monitoring Location EFF-001B as follows:

Table E-~~4~~5. Wet Weather Plant Effluent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency [3]
~~Flow [1]~~	~~MG/ MGD~~	~~Continuous~~	~~Continuous/D~~
Chemical Oxygen Demand [1]	mg/L	C-24	1/Month
TSS [1]	mg/L	C-24	1/Month
pH [1]	standard units	Grab	1/Month
⋮			

Abbreviations:

<table>
<tr><th>No.</th><th>Page</th><th>Section</th><th>Comment</th><th>Proposed Revisions</th></tr>
<tr><td></td><td></td><td></td><td></td><td>~~MG = million gallons~~
~~MGD = million gallons per day~~
mg/L = milligrams per liter
µg/L = micrograms per liter

Sample Types and Frequencies:
~~Continuous = measured continuously~~
Continuous/D = measured continuously, and recorded and reported daily
C-24 = 24-hour composite
Grab = grab sample
1/Month = once per month
1/Year = once per year

Footnotes:
[1] ~~The following information shall be reported in monthly self-monitoring reports:~~
• ~~Daily average flow (MGD)~~
• ~~Total monthly flow volume (MG)~~
Effluent monitoring conducted in accordance with Table E-3 may be used to satisfy Table E-5 wet weather effluent monitoring requirements.
…</td></tr>
<tr><td>35</td><td>E-7 – E-8</td><td>Table E-4, Footnote 2</td><td>SFPUC requests a minor revision to the reporting protocol for the volume and duration of primary-treated wastewater during wet weather blending events. The requested change is to report volume and duration of blending once per day rather than once per event. For small wet weather events, blending events can occur multiple times on a single day, since rain events may produce multiple flow peaks. For larger wet weather events, blending events have the potential to span multiple days. Binning the volumes and durations of these events into one value per day will reduce the potential for confusion in the reporting database.</td><td>Table E-4. Wet Weather Plant Effluent Monitoring
<table>
<tr><th>Parameter</th><th>Units</th><th>Sample Type</th><th>Minimum Sampling Frequency</th></tr>
<tr><td>Flow [1]</td><td>MG/ MGD</td><td>Continuous</td><td>Continuous/D</td></tr>
<tr><td>⋮</td><td></td><td></td><td></td></tr>
<tr><td>Duration of Blending [2]</td><td>minutes</td><td>Calculated</td><td>Continuous/D</td></tr>
<tr><td>Volume of Blended Wastewater Discharged [2]</td><td>MG</td><td>Calculated</td><td>Continuous/D</td></tr>
<tr><td>⋮</td><td></td><td></td><td></td></tr>
</table>
…
Footnotes:
…
[2] Blended wastewater is biologically-treated wastewater blended with wastewater diverted around biological treatment units at the Oceanside Water Pollution Control Plant. For each day on which blending occurs ~~event~~, the Discharger shall report the duration of blending and the volume of primary-only-treated wastewater blended.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Page</th><th>Section</th><th>Comment</th><th>Proposed Revisions</th></tr>
<tr><td></td><td></td><td></td><td></td><td>…</td></tr>
<tr><td>36</td><td>E-8 – E-10</td><td>IV.B.1. and IV.B.2.</td><td>Regarding discharge monitoring for the Westside Transport/Storage Structures, SFPUC requests that the language requiring a sample be collected within two hours of discharge commencement be relocated to avoid confusion. Sample collection staff may misinterpret the narrative language to indicate that samples must be collected for every discharge event. Moreover, the language conflicts with footnote [3] of Table E-5 where the former requires sampling within both two hours and the latter requiring a grab sample for discharges that last less than one hour. See Comment No. 38 for proposed revisions to Table E-5 footnote [3].</td><td>**Westside Transport/Storage Structure Effluent.** During wet weather, the Discharger shall monitor Westside Transport/Storage Structure effluent at Monitoring Location EFF-001D as shown in Table E-5. ~~The Discharger shall begin collecting aliquots or grab samples within two hours of commencing discharge from the Westside Transport/Storage Structure directly to Discharge Point No. 001.~~</td></tr>
<tr><td>37</td><td>E-8 – E-9</td><td>Table E-5</td><td>SFPUC requests this modification because decant discharges often last less than 24 hours and it is difficult to predict the duration of decant discharge. SFPUC requests flexibility in terms of sampling intervals and duration.</td><td>**Table E-5. Westside Transport/Storage Structure Effluent Monitoring**
<table>
<tr><th>Parameter</th><th>Units</th><th>Sample Type</th></tr>
<tr><td>Flow Volume [1]</td><td>⁝</td><td>Continuous</td></tr>
<tr><td>TSS</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Ammonia, total</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Arsenic</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Cadmium</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Copper</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Lead</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Nickel</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Selenium</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Silver</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Zinc</td><td>⁝</td><td>~~C-24~~ C-X [3]</td></tr>
<tr><td>Remaining Ocean Plan Table 1 Pollutants [2]</td><td>⁝</td><td>~~C-24~~ C-X [3,4]</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Page</th><th>Section</th><th>Comment</th><th>Proposed Revisions</th></tr>
<tr><td></td><td></td><td></td><td></td><td>Sample Types and Frequencies:
…
~~C-24 = 24-hour composite~~
C-X = composite sample comprised of individual grab samples collected at equal intervals of no more than one hour at least until sufficient sample volume for the required analyses are completed.</td></tr>
<tr><td>38</td><td>E-8 – E-9</td><td>Table E-5, Footnote 3</td><td>SFPUC requests revisions to the footnote for consistency with other monitoring requirements in the section. Removing the prescribed intervals between samples is consistent with the sample type modification proposed above (see Comment No. 37). The second sentence is removed and the requirement to collect a sample with two hours of discharge is added here per Comment No. 36.</td><td>[3] If the discharge lasts less than 24 hours, the Discharger shall sample at equal intervals for as long as possible ~~at equal one-hour intervals~~ and ~~report~~ record the duration. ~~If the discharge lasts less than one hour, the Discharger shall collect at least one grab sample.~~ The Discharger shall begin collecting aliquots or grab samples within two hours of commencing discharge from the Westside Transport/Storage Structure directly to Discharge Point No. 001.</td></tr>
<tr><td>39</td><td>E-9 – E-10</td><td>IV.B.2</td><td>See detailed comments in Attachment D for the request to designate a single CSD monitoring location, EFF-CSD, consistent with the current permit.

SFPUC requests that pH be deleted from Table E-6. The method hold time of 15 minutes cannot be realistically achieved because the occurrence of a CSD cannot be predicted and on-call staff will not be able to collect and analyze a sample under this hold time constraint. The installation of a continuous pH sensor is not practical because of the episodic nature of a CSD event; if left dry for extended periods of time, the analyzer will not function correctly.

SFPUC requests a modification to the "C-X" sample type because CSDs typically last less than 24 hours and it is difficult to predict the duration of the discharge. SFPUC requests flexibility in terms of sampling intervals and duration to maximize the likelihood of collecting sufficient volume for all required analyses in</td><td>**a.** During combined sewer discharge events, the Discharger shall monitor combined sewer discharge effluent at Monitoring Location EFF-CSD ~~Monitoring Locations EFF-CSD-1, EFF-CSD-2, and EFF-CSD-7~~ as follows:

Table E-6. Combined Sewer Discharge Monitoring
<table>
<tr><th>Parameter</th><th>Units</th><th>Sample Type</th><th>Minimum Sampling Frequency</th></tr>
<tr><td>TSS</td><td>mg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>~~pH~~</td><td>~~standard units~~</td><td>~~Grab~~</td><td>~~3/Year [4]~~</td></tr>
<tr><td>Ammonia, total</td><td>mg/L as N</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Arsenic</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Cadmium</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Copper</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Lead</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Nickel</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Selenium</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Silver</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
<tr><td>Zinc</td><td>μg/L</td><td>~~C-24~~ C-X [2]</td><td>3/Year [4]</td></tr>
</table></td></tr>
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<table>
<tr><th>No.</th><th>Page</th><th>Section</th><th>Comment</th><th>Proposed Revisions</th></tr>
<tr><td></td><td></td><td></td><td>light of the highly variable and uncertain duration of CSDs.

SFPUC requests edits to Table E-6 footnote [1] to exclude volatile organic compounds (VOCs), and hexavalent chromium. Field samplers utilize a peristaltic (vacuum) pump, which precludes our ability to follow the sample collection requirements (i.e., grab samples) in the required laboratory methods for VOCs. For hexavalent chromium, the method hold time is 24 hours, which may not be achievable during certain wet weather events. SFPUC prefers to monitor total chromium instead of hexavalent chromium.

SFPUC requests edits to Table E-6 footnote [2] because CSDs on the Westside typically do not last more than three hours. Aliquots collected at one-hour intervals are unlikely to generate sufficient sample volume for all required analyses.</td><td><table><tr><td>Remaining Ocean Plan Table 1 Pollutants [1]</td><td>µg/L</td><td>~~C-24~~ C-X [2,3]</td><td>1/Year [4]</td></tr></table>…

Sample Types and Frequencies:
~~C-24 = 24-hour composite~~
C-X = composite sample comprised of individual grab samples collected at equal intervals of no more than one hour at least until sufficient sample volume for the required analyses are completed.
…

Footnotes:
[1] The Discharger shall monitor for the pollutants listed in Ocean Plan Table 1, except chlorine, tributyltin, radioactivity, acute toxicity, ~~and~~ chronic toxicity, volatile organic compounds, and hexavalent chromium.
[2] If the discharge lasts less than 24 hours, the Discharger shall sample for as long as possible at equal ~~one-hour~~ intervals and ~~report~~ record the duration. If the discharge lasts less than one hour, the Discharger shall collect at least one grab sample.</td></tr>
<tr><td>40</td><td>E-12, E-13</td><td>V.A.3 and V.C</td><td>SFPUC asks that whole effluent chronic toxicity retesting or accelerated monitoring be required “as soon as possible,” the same requirement as the current permit, rather than “within seven days.” SFPUC performs chronic toxicity tests using wild-caught marine organisms provided by a commercial supplier in southern California. Test organisms are not always immediately available, depending on ocean and weather conditions, and wet weather days may preclude immediate retesting as EFF-001C reflects dry weather only. As a result, seven days is insufficient time to reliably begin a new test.</td><td>A. Methodology
…
3. If an effluent toxicity test does not meet all test acceptability criteria in the test methods manual, the Discharger shall resample and retest ~~within seven days~~ as soon as possible.
…
C. Accelerated Monitoring
1. If a chronic bioassay test indicates a violation of the chronic toxicity effluent limitation, the Discharger shall retest ~~within five days of receiving test results, or within seven days if the sample is contracted out to a commercial laboratory~~ as soon as possible. Accelerated monitoring shall consist of four toxicity tests conducted at approximately two-week intervals. The Discharger</td></tr>
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				shall return to routine monitoring if all four monitoring test results are "Pass."
41	E-15	V.F.4	SFPUC requests the removal of the requirement to conduct the screening study during consecutive months. The effluent limits for chronic toxicity only apply during dry weather, so the screening must also be conducted during dry weather. Removing the requirement to conduct the screening study during consecutive months will make it easier to schedule the test, which is already constrained by the availability of wild-collected marine organisms.	**b.** Stage 2 shall consist of a minimum of two test batteries ~~conducted monthly~~ using the three most sensitive species determined based on the stage 1 test results.
42	E-16	V.F.6	SFPUC requests a change in the maximum concentration of the dilution series stipulated for the chronic toxicity screening test, from 100% to 75% effluent. Conducting the test on marine organisms with 100% effluent will require adjusting the salinity using commercial-grade crystallized sea salt. In contrast, SFPUC's typical test procedure is to adjust the salinity using seawater brine made from Pacific Ocean water. Using locally-produced brine is preferable for three reasons: (1) Brine is more representative of the receiving water, (2), salt addition can create artificial toxicity, and (3) data for this test using sea salts are not available so using salt crystals instead of brine is considered provisional per EPA/600/R-95-136. The highest-concentration test that can be conducted using brine for salinity adjustment is 75% effluent. SFPUC believes that the 75% effluent solution will provide a satisfactory endpoint for assessing test organism sensitivity.	**6.** The Discharger shall conduct screening tests at ~~100~~ **75**, 20, 0.67, 0.37, and 0.17 percent effluent.

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<tr><td>43</td><td>E-16</td><td>Table E-10 and Table E-11</td><td>The Tentative Order includes monitoring requirements of three fecal indicator bacteria (FIB) for shoreline monitoring. SFPUC requests retaining the three FIB as in the current Oceanside permit - that is, replace fecal coliform with E. coli. Title 17 CCR § 7958 states the minimum protective bacteriological standards for waters adjacent to public beaches and public water-contact sports areas are based on single sample results for total coliform, fecal coliform, or enterococcus bacteria, indicating that any one of these parameters can be used an indicator of beach health. It is unclear why all three of these parameters need to be monitored.

In addition, the turnaround time for E. coli results is less than that for fecal coliform, allowing staff to make posting and de-posting decisions sooner. The Colilert test, which simultaneously detects and quantifies both total coliform and E. coli, provides final results within 18 hours. In contrast, the additional laboratory analysis (Multiple-Tube Fermentation) for fecal coliform will require further staff coordination, more laboratory staff time, and additional material costs, and final results are not available until 48-72 hours after the test. The long duration of the fecal coliform incubation period renders results of limited utility for beach posting decisions.</td><td>Table E-10. Ambient Shoreline Monitoring
<table>
<tr><th>Parameter</th><th>Units</th><th>Sample Type</th><th>Minimum Sampling Frequency</th></tr>
<tr><td>Enterococcus [1]</td><td>MPN/100 mL [2]</td><td>Grab</td><td>1/Week</td></tr>
<tr><td>~~Fecal coliform~~ E. coli</td><td>MPN/100 mL [2]</td><td>Grab</td><td>1/Week</td></tr>
<tr><td>Total coliform</td><td>MPN/100 mL [2]</td><td>Grab</td><td>1/Week</td></tr>
</table>
…
Table E-11. Post-CSD Event Shoreline Monitoring
<table>
<tr><th>Parameter</th><th>Units</th><th>Sample Type</th><th>Minimum Sampling Frequency</th></tr>
<tr><td>Enterococcus [1]</td><td>MPN/100 mL [2]</td><td>Grab</td><td>1/Day [3]</td></tr>
<tr><td>~~Fecal coliform~~ E. coli</td><td>MPN/100 mL [2]</td><td>Grab</td><td>1/Day [3]</td></tr>
<tr><td>Total coliform</td><td>MPN/100 mL [2]</td><td>Grab</td><td>1/Day [3]</td></tr>
<tr><td>Standard Observations [4]</td><td>---</td><td>---</td><td>1/Day [3]</td></tr>
</table></td></tr>
<tr><td>44</td><td>E-17</td><td>Table E-11, Footnote [4]</td><td>SFPUC requests minor modifications to the reporting requirements for post-CSD shoreline monitoring in Table E-11, Footnote 4. Standard observations for Beach and Shoreline monitoring are listed in Attachment G section III.B.3, not Attachment G section III.B.1. In addition, SFPUC notes that it is infeasible to estimate the spatial extent of wastewater present in the surf</td><td>[4] Standard observations are defined in Attachment G section ~~III.B.1~~ III.B.3 and shall include any apparent fish kills. The estimated size of the affected area is not required.</td></tr>
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<tr><td></td><td></td><td></td><td>zone. In lieu of estimating the size of the affected area, SFPUC will report the event duration and estimate volume of CSDs, as required by Attachment E section IV.2.b.</td><td></td></tr>
<tr><td>45</td><td>E-18</td><td>Table E-12</td><td>SFPUC requests removal of molybdenum, organic nitrogen, ammonia nitrogen, and total solids from this table, because monitoring of these constituents is not required under the pretreatment program. SFPUC will continue to monitor these constituents under the biosolids land application program.</td><td>Table E-12. Pretreatment and Biosolids Monitoring
<table>
<tr><th rowspan="2">Constituents</th><th rowspan="2">Influent INF-001A</th><th rowspan="2">Effluent EFF-001A [1]</th><th rowspan="2">Biosolids BIO-001</th><th colspan="2">Sample Type</th></tr>
<tr><th>Influent and Effluent</th><th>Biosolids [7a]</th></tr>
<tr><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td><td>⋮</td></tr>
<tr><td>~~Molybdenum~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td></tr>
<tr><td>~~Organic Nitrogen~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td></tr>
<tr><td>~~Ammonia Nitrogen~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td></tr>
<tr><td>~~Total Solids~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td><td>~~⋮~~</td></tr>
</table></td></tr>
<tr><td>46</td><td>F-3</td><td>Table F-1, Facility Contact, Title and Phone</td><td>Dale Miller’s phone number is (415) 242-2225.</td><td>Dale Miller, Operations Superintendent, Wastewater Enterprise, (415) ~~920-4600~~242-2225</td></tr>
<tr><td>47</td><td>F-4</td><td>II.A.2</td><td>Similar to Comment No. 5, SFPUC requests language clarifying that compliance with the State Water Board Order No. 2006-0003-DWQ as amended by Order No. WQ 2013-0058-EXEC is separate from the NPDES permit. The requested language is consistent with the recently adopted permits for West County Agency (R2-2019-0003) and City of Palo Alto (R2-2019-0015).</td><td>Collection System. The Discharger’s collection system is predominantly a combined sewer system with some limited separate sanitary sewers. The combined sewer system consists of approximately 250 miles of pipe, one major pump station (Westside Pump Station), six minor pump stations (four all-weather pump stations: Westside, Sea Cliff No. 1, Sea Cliff No. 2, and Pine Lake; and two wet weather pump stations: Sea Cliff No. 3 and Zoo Wet Weather Lift Station), and three large transport/storage structures (Westside Transport/Storage Structure, a 49.3-million-gallon box-like structure located beneath the Great Highway; Richmond Tunnel, a 12.0-million-gallon tunnel located to the north; and Lake Merced Tunnel, a 10.0-million-gallon tunnel located to the south). The separate sanitary sewer systems serve isolated areas and are ~~also~~ regulated separately under State Water Board Order No. 2006-0003-</td></tr>
</table>

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				DWQ as amended by State Water Board Order No. WQ 2013-0058-EXEC.
48	F-5	II.A.3.b	SFPUC requests that the clarification be added to the Fact Sheet that wet weather discharge from the Westside Transport/Storage Structure is commonly referred to among SFPUC staff as "decant".	In addition to pumping up to 65 MGD to the plant, the Westside Pump Station can also pump flow from the Westside Transport/Storage Structure to Discharge Point No. 001 during wet weather (commonly known as "decant").
49	F-5	II.A.3.b	SFPUC requests the edits to more accurately describe the design capacity of the Westside Pump Station wet weather pumps. SFPUC engineers working on the Westside Pump Station Reliability Improvements Project analyzed the pump performance curves for the wet weather pumps from the manufacturer and determined that the pump flowrates range from 98 to 133 MGD in three operating scenarios depending on two factors: (1) the quantity of pumps operating and (2) model/type of pumps selected to operate (as shown in the table below). The table values assume the same Net Positive Suction Head is available for all operating scenarios, and high water levels in the Transport/Storage Box (i.e., high hydraulic head). Each pump model has a rated flow capacity and total dynamic head. The two pump model numbers correspond to a high flow, low head Model CP 3501 pump (best suited to pump out flows to the ocean outfall) and a low flow, high head Model CP 3151 pump (best suited to pump to the Oceanside Plant in certain operating scenarios to maximize treatment.) The operating scenarios vary the number of pumps in operation and model numbers (corresponding flow and head capacities) of the pumps in operation, that then in turn vary the total wet-weather flow capacity for conveying flow out to the ocean outfall.	The design capacity of the Westside Pump Station wet weather pumps ranges from 98 to 133 MGD depending on the number and model of pumps operating when there is high hydraulic head, or high water levels, in the West Box (typically observed during wet weather operations). ~~is 110 MGD when three pumps are operating and up to 130 MGD when all four pumps are operating.~~

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<tr><th>Wet-Weather / West Pump Chamber Pump Configuration Operating Scenarios</th><th>Flowrate at High Box Level (Wet-Weather Operations)</th></tr>
<tr><td>3-High Flow Capacity - Model CP 3501
1-High Head Capacity - Model CP 3531</td><td>133 MGD</td></tr>
<tr><td>2-High Flow Capacity - Model CP 3501
1-High Head Capacity - Model CP 3531</td><td>98 MGD</td></tr>
<tr><td>3-High Flow Capacity - Model CP 3501</td><td>109 MGD</td></tr>
</table>
</td><td></td></tr>
<tr><td>50</td><td>F-5</td><td>II.A.4</td><td>While the Oceanside Plant has the capacity to produce Class A biosolids, it may not be able to consistently do so depending on a number of factors, such as a potential plant process upset. Moreover, the Oceanside Plant recently experienced a digester lining failure in January 2019 and has been producing Class B biosolids since that time.</td><td>**Sludge and Biosolids Management.** The Discharger uses temperature-phased anaerobic digestion, which is capable of producing ~~to produce~~ Class A biosolids. Primary sludge, waste activated sludge, and secondary scum are mixed and co-thickened using gravity belt thickeners prior to being fed to the anaerobic digestion system. The digestion system accepts hauled-in batches of primary and secondary sludge from the Treasure Island Wastewater Treatment Plant. Digested biosolids are dewatered using screw presses and stored in hoppers prior to being loaded into covered trucks for transport. During the wet season, the majority of biosolids are hauled to a landfill for storage and eventual use as interim cover, final cover, or landfill building material; a small percentage is reused for agricultural land application. During the dry season, biosolids are hauled offsite for agricultural land application.</td></tr>
<tr><td>51</td><td>F-6</td><td>II.B.2</td><td>SFPUC requests the changes to the fact sheet for consistency with Paragraph II.A3.b. on page F-5. During certain storms, such as those that are microclimatic or intense from either north or south portions of San Francisco, CSDs may occur when maximum capacity is reached in local transport/storage structures although maximum capacities may not have been reached at the Oceanside Plant and the Westside Transport/Storage Structure.</td><td>2. **Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD-005, CSD-006, and CSD-007.** During wet weather, when the Westside Pump Station capacity is exceeded, equivalent-to-primary-treated wastewater is discharged to the Pacific Ocean at Discharge Point Nos. CSD-001, CSD-002, CSD-003, and CSD-004~~,~~. Discharges of equivalent-to-primary-treated wastewater at Discharge Point Nos. CSD-005, CSD-006, and CSD-007 occur when the capacities of the corresponding pump stations (i.e., Sea Cliff No. 1 and Sea Cliff No. 2 Pump Stations) are exceeded. These discharge points are located within the territorial waters of the State.</td></tr>
<tr><td>52</td><td>F-10</td><td>III.C.2</td><td>SFPUC requests retaining language from the 2009 permit (pages F-11 and F-22) that references the 1989 bacteriological study as this language provides important background information.</td><td>On May 17, 1989, the Regional Water Board adopted Order No. 89-71, amending Order No. 88-106 to delete disinfection requirements for the effluent. The Regional Water Board action was based on the Discharger's technical report dated April 3, 1989, *Wastefield Transport and Bacteriological Compliance Studies of the San*</td></tr>
</table>

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				Francisco Ocean Outfall. The studies were conducted in 1987 and 1988. The findings indicated that the non-disinfected wastewater discharge from the Discharge Point 001 did not violate the Ocean Plan bacteriological body-contact standards. The Discharger now treats its wastewater to secondary treatment standards during dry weather. Regional Water Board staff used data from that study representing primary treatment to estimate the potential effects of discharging secondary-treated effluent (Regional Water Board staff memorandum, October 10, 2008). Estimated bacteria levels in federal waters were below Ocean Plan water quality objectives, so the Regional Water Board found that the deep water discharge could not affect bacteria levels in State waters.
53	F-14	III.D	The SFPUC requests more detail be included in the fact sheet regarding fecal indicator bacteria 303(d) listings.	This Order does not authorize any discharge to receiving waters on California's list of impaired waters. The Pacific Ocean at Fort Funston, Ocean Beach, Mile Rock and China Beach are not impaired for indicator bacteria. The Pacific Ocean at Baker Beach is no longer listed as impaired for indicator bacteria because the sixteen available lines of evidence show applicable water quality standards are not being exceeded.
54	F-18	IV.C.1	See explanation provided in Comment No. 2, related to the overly broad requirement to comply receiving water limitations, and Comment No. 20 related to the CSO Control Policy requirements applicable to cities that have implemented a long-term control plan (LTCP).	During wet weather, this Order imposes narrative effluent limitations at VI.C.5.c, not numeric limitations, on the Discharge Points identified in Table 2 of this Order. In accordance with the *Combined Sewer Overflow (CSO) Control Policy*, this Order requires the Discharger to implement and update its Long-Term Control Plan to reflect post-construction monitoring results and continued consideration of sensitive areas.
55	F-25	IV.C.5.b	See explanation provided in Comment No. 2.	**b. Wet Weather.** For wet weather discharges from Discharge Point No. 001 and CSD-001 through CSD-007 identified in Table 2 of this Order ~~the combined sewer discharge points~~, the Long-Term Control Plan required pursuant to the *Combined Sewer Overflow (CSO) Control Policy* and described in Provision VI.C.5.c of the Order serves as the ~~narrative~~ WQBELs in this Order that are necessary to achieve applicable water quality standards, including to protect existing and designated uses. For wet weather discharges from the Discharge Points in Table 2 of this Order, the terms at VI.C.5.c are the applicable WQBELs. The terms at V and G.I.1 do not apply.

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56	F-30	VI.C.5	Changes to the Fact Sheet are requested to align it with changes requested to the permit.	For sewer overflows from the combined sewer system, Provision VI.C.5.a.vii~~i(b)~~ requires the Discharger to ~~notify and~~ report SOCSS to the State's Online CIWQS database~~, consistent with the sanitary sewer overflow reporting requirements of State Water Board Order No. 2006-0003-DWQ, "Statewide General Waste Discharge Requirements for Sanitary Sewer Systems," as amended by State Water Board Order No. WQ 2013-0058-EXEC and any subsequent order updating these requirements~~. ~~Water Code sections 13267 and 13383, 40 C.F.R. section 122.41(h), and the *Combined Sewer Overflow (CSO) Control Policy* authorize the Regional Water Board and EPA to require information about releases of untreated or partially treated wastewater.~~ This information is ~~necessary~~ relevant to evaluating the efficacy of the Discharger's implementation of the Nine Minimum Control related to maximizing the use of the collection system for storage ~~combined sewer system performance, and operations and maintenance practices; to determine whether any diversions of untreated or partially treated wastewater result in a discharge to surface waters; to satisfy public notification requirements; to identify whether the public could be affected; and to establish whether sewer overflows from the combined sewer system result in a nuisance as defined by Water Code section 13050~~.
57	F-32	VI.C.7	SFPUC requests a more specific definition of "flame retardants," which in its broadest definition encompasses many classes of chemicals, not all of which would be expected in municipal wastewater or stormwater. Based on the precedent of other permitted discharges to the Pacific Ocean (such as Hyperion Treatment Plant) and the justification for the special study in the Tentative Order, SFPUC plans to focus the study on polybrominated diphenyl ethers (PBDEs) and chlorinated organophosphate flame retardants.	**7. Flame Retardant Special Study** This special study is necessary to evaluate the potential impacts of flame retardants (i.e., polybrominated diphenyl ethers and chlorinated organophosphate flame retardants) in receiving waters. During EPA consultation with the National Marine Fisheries Service pursuant to the Endangered Species Act and Magnuson-Stevens Act, the National Marine Fisheries Service expressed concern about the presence of flame retardants in plant effluent and flame retardant mass loadings to the Pacific Ocean because organophosphates have been widely detected in San Francisco Bay water, sediment, and aquatic life tissue, and because polybrominated diphenyl ether (PBDE) and tris(1,3-dichloro-2-propyl)phosphate (TDCP) concentrations in San Francisco Bay water have regularly exceeded predicted no effect concentrations for marine settings (*EPA Biological Evaluation*, April 2019). This special study is consistent with other NPDES permits that authorize discharge to the Pacific Ocean.

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58	G-2		Please see Attachment B for more detailed comments. If the Regional Water Board and EPA do not delete this standard provision and the broad requirement to comply with receiving water limitations, (see Comment No. 2, the SFPUC requests the edits specified in Comment Nos. 3, 54, and 55to more explicitly clarify the applicability of these provisions to dry weather discharges only.	**1.** Neither the treatment nor the discharge of pollutants shall create pollution, contamination, or nuisance as defined by California Water Code section 13050.

Attachment B – Supplemental CSO Control Policy Comments

1. **The generic, boilerplate narrative water quality-based permit terms must be deleted, limited in scope, or properly applied to the facts of the SFPUC.**

The generic, boilerplate narrative water quality-based permit terms are contrary to law and are unsupported by the available facts. The permit terms at issue are:

- V (Receiving Water Limitations) on pages 7-8 of the Tentative Order, which states, in relevant part:

> Discharge shall not cause or contribute to a violation of any applicable water quality standard (with the exception set forth in State Water Board Order No. WQ 79-16) for receiving waters adopted by the Regional Water Board, State Water Resources Control Board (State Water Board), or U.S. EPA as required by the CWA and regulations adopted thereunder.

- G.I.I.1 on page G-2 in Attachment G (Regional Standard Provisions), which states:

> Neither the treatment nor the discharge of pollutants shall create pollution, contamination, or nuisance as defined by California Water Code section 13050.

G.I.I.1 is applied to the SFPUC through permit term VI.A.2 (Standard Provisions) on page 8 of the Tentative Order, which states "[t]he Discharger shall comply with all applicable provisions of the 'Regional Standard Provisions, and Monitoring and Reporting Requirements' (Attachment G). . . ." The term "pollution," as used in G.I.I.1, is defined under state law to mean, in relevant part, "an alteration of the quality of waters of the state . . . which unreasonably affects . . . the waters for *beneficial uses*." Cal. Water Code § 13050(l) (emphasis added).

As explained below, V and G.I.I.1 are contrary to law and unsupported by the available facts and must be deleted, limited in scope, or properly applied to the facts of the SFPUC with corresponding findings in the permit.

a. The permit terms at V and G.I.I.1 should be deleted from the permit because they are inconsistent with applicable law and introduce unnecessary uncertainty regarding ongoing compliance with the permit.

The permit terms at V and G.I.I.1 are generic, boilerplate permit terms and they are neither SFPUC- nor pollutant-specific. The purpose and intent of the permit terms is unclear and, as a practical matter, they create uncertainty for the SFPUC associated with its permit obligations and how the agency can ensure that it is maintaining compliance with those obligations. Additionally, the permit terms at V and G.I.I.1 are inconsistent with NPDES permitting regulations, which require that applicable water quality standards be translated into permit effluent limitations.

Water quality-based effluent limitations ("WQBELs") are set forth in the WQBEL section of the Tentative Order at IV on page 9.[1] WQBELs "are designed to protect water quality by ensuring that water quality standards are met in the receiving water." EPA NPDES Permit Writer's Manual (2010) at 6.0. The permit terms at V and G.I.I.1 are not derived from the applicable water quality standards to "control those parameters to the extent necessary to achieve water quality standards in the receiving water." EPA NPDES Permit Writer's Manual at 6.1.3. The permit terms create uncertainty, to-be-determined liability, and apply circular and undefined logic where the SFPUC "must comply with water quality standards" by "complying with water quality standards." A permit term that references, but does not translate, applicable water quality standards is inappropriately bypassing the NPDES permitting process. *See NRDC v. EPA*, 16 F.3d 1395 (4th Cir.1993) ("[w]ater quality standards are a critical component of the CWA regulatory scheme because such standards serve as *a guideline for setting applicable limitations in individual discharge permits."*) (emphasis added); *American Paper Inst. v. EPA,* 996 F.2d 346 (D.C. Cir. 1993) ("[W]ater quality standards by themselves have no effect on pollution; the rubber hits the road when the state-created standards are used as *the basis for specific effluent limitations in NPDES permits."*) (emphasis added). When developing permit requirements for combined sewer systems to meet applicable water quality standards, "the permit writer, in conjunction with staff involved in water quality standards and the permittee, should identify the appropriate *site-specific considerations* that will determine the [CSD] conditions to be established in the permit." EPA NPDES Permit Writer's Manual at 9.2.3 (emphasis added). Appropriately derived WQBELs for the SFPUC should involve a site-specific evaluation of the discharge and its effect on the receiving water (*e.g.*, VI.C.5.c in the Tentative Order for wet weather discharges).

The permit terms are contrary to the NPDES regulatory framework for establishing WQBELs. For example, there is a well-established "standards-to-permits" process used to assess the need for and develop WQBELs. *See* NPDES Permit Writer's Manual at 6.0. The Regional Board and EPA did not follow this process in promulgating V and G.I.I.1. Further, if the Regional Board and EPA believe a discharge(s) of a pollutant(s) is inconsistent with applicable water quality standards, the appropriate next step is for the Agencies to develop and/or revise the applicable WQBEL(s) for that pollutant. *See* 40 C.F.R. § 122.44(d)(1)(i) and EPA NPDES Permit Writer's Manual at 6.4. Simply incorporating by reference applicable water quality standards via the permit terms at V and G.I.I.1 is especially inappropriate when the collection system is a combined sewer system and the State has declined to develop wet-weather-specific uses or objectives in the applicable water quality standards. *See e.g.,* State Water Board Order No. WQ 79-16 at 8-9 (Appendix).

As a practical matter, the permit terms at V and G.I.I.1 improperly and unnecessarily resurrect "causation" as a fundamental element of the NPDES permitting framework. This is regression to the pre-1972 CWA framework, before Congress "shifted the focus away from

[1] The Tentative Order places permit term V in a section called "Receiving Water Limitations." It is not clear to the SFPUC the distinction between a WQBEL and a "Receiving Water Limitation," if any, and the corresponding legal implications from the distinction. If there is a substantive distinction(s), the SFPUC requests the Regional Board and EPA provide an explanation of the difference(s).

water quality standards to direct limitations on the discharge of pollutants." *Friends of the Earth v. Gaston Copper Recycling Corp.*, 204 F.3d 149, 151 (4th Cir. 2000). This shift in the CWA's focus was purposeful so "[r]egulators no longer had to determine whether there was a causal link between the degradation of water quality and the pollutant in question." *Piney Run Preservation Ass'n v. County Com'rs of Carroll Cty*, 268 F.3d 255, 265 (4th Cir. 2001). Instead, regulators and permittees, like the SFPUC, "simply had to determine whether the entity was discharging more pollutant[s] into water than allowed" based on facility- and pollutant-specific technology-based and water quality-based effluent limitations identified by the permitting authority in the permit. *Id.* at 265-266. The permits terms at V and G.I.I.1 create uncertainty for the SFPUC and consistent with the NPDES permitting regulations the permit should create clear expectations in the permit. The SFPUC should know when the permit is issued whether it is in compliance with the terms of the permit.

Lastly, these permit terms are not necessary. There are already appropriate SFPUC-specific WQBELs in the Tentative Order. *See* VI.C.5.c and Section 1.b of these comments in Attachment B. The Tentative Order includes an explicit "reopener" provision that allows the Regional Board and EPA to modify or reopen the permit before expiration if, in relevant part, a "present or future investigations demonstrate that the discharges governed by this Order have or will have a reasonable potential to cause or contribute to . . . adverse impacts on water quality or beneficial uses of the receiving waters." *See* Tentative Order at VI.C.1.a.

The permit terms create uncertainty, to-be-determined liability, and apply circular and undefined logic. The permit terms do not address an existing impairment, they do not require any action by the SFPUC, but they do create uncertainty and potential liability, and the permit includes a mechanism to address any future concern with a discharge impairing receiving waters. As noted above, a permit term that references, but does not translate, applicable water quality standards is inappropriately bypassing the NPDES permitting process. The permits terms at V and G.I.I.1 should be deleted.

b. <u>If the permit terms at V and G.I.I.1 are not deleted from the permit, they must be properly limited in scope to dry weather discharges</u>.

If the Regional Board and EPA retain the permit terms at V and G.I.I.1 their application must be limited to dry weather discharges. Put another way, V and G.I.I.1 should not apply to wet weather discharges—notably combined sewer discharges ("CSDs")—because as explained below there are already wet weather-specific WQBELs in the permit. To be clear, the SFPUC believes the most appropriate course of action is deleting permit terms V and G.I.I.1 as requested in Section 1.a of these comments in Attachment B. However, if not deleted, we believe the next best course of action is adopting the clarifications proposed in this section of the comments. For readability, in the attached redline of the Tentative Order, the SFPUC did not delete V and G.I.I.1, but inserted revisions that align with the requests in this section of the comments. *See* Attachment A at [X].

The Tentative Order does include a provision in the WQBEL section of the permit (IV.B) that appears to align with the SFPUC's request in this section of the comments:

> During wet weather, the Discharger shall comply with the narrative water quality-based effluent limitations contained in Provision VI.C.5.c (Long-Term Control Plan).

However, there is still uncertainty associated with the intent and meaning of this permit term. The SFPUC requests the Regional Board and EPA confirm that the intent and meaning of the permit term at IV.B is that during wet weather the applicable WQBELs for the SFPUC, including for CSDs, are the LTCP provisions at VI.C.5.c. This interpretation of IV.B would align with the existing Oceanside NPDES permit and the CSO Control Policy. *See, e.g.*, Oceanside NPDES Permit, Fact Sheet at F-13 (Appendix) ("[t]he purpose of this long-term control plan is to comply with the CWA water quality requirements"); CSO Control Policy, 59 Fed. Reg. 18,688 (April 19, 1994) (The focus of the LTCP provisions are "attaining compliance with the CWA, including compliance with water quality standards and protection of designated uses.").

Assuming this is the Regional Board's and EPA's intent with IV.B, the SFPUC requests a few clarifying edits to the Tentative Order to avoid any future uncertainty with the meaning of the permit. First, the SFPUC requests the following text be added to IV.B to make it clear that the provision in IV.B applies to all of the discharge points in Table 2 of the Tentative Order, including CSD-001 through CSD-007.

> During wet weather, the Discharger shall comply with the narrative water quality-based effluent limitations contained in Provision VI.C.5.c (Long-Term Control Plan) <u>for the Discharge Points in Table 2</u>.

The SFPUC requests a corresponding revision be made in the Fact Sheet at page F-18 of the Tentative Order:

> During wet weather, this Order imposes narrative effluent limitations <u>at VI.C.5.c</u>, not numeric limitations, <u>on the Discharge Points identified in Table 2 of this Order</u>. In accordance with the *Combined Sewer Overflow (CSO) Control Policy*, this Order requires the Discharger to implement and update its Long-Term Control Plan.

The SFPUC also requests the Fact Sheet make clear that the WQBELs in VI.C.5.c are <u>*the*</u> WQBELs that apply during wet weather. Further, the SFPUC requests the permit make clear that compliance with the LTCP permit terms at VI.C.5.c – the applicable WQBELs – will result in attainment of applicable water quality standards. As EPA has made clear, WQBELs are by definition the effluent limitations in NPDES permits necessary for compliance with water quality standards. *See, e.g., In re City of Moscow, Idaho*, 10 E.A.D. 135 (EAB 2001) ("Water quality-based effluent limits . . . are designed to ensure that the applicable state water quality standards are met."). The SFPUC requests the Regional Board and EPA confirm that compliance with WQBELs results in compliance with the applicable water quality standards, including protecting beneficial uses. Lastly, since the LTCP permit terms at VI.C.5.c are the WQBELs for wet weather discharges, the permit terms at V and G.I.I.1 are unnecessary, redundant and the permit should make clear that V and G.I.I.1 do not apply to wet weather discharges, including CSDs. The Regional Board has taken consistent positions in the Oceanside NPDES permit, explaining that generic, boilerplate permit terms like V and G.I.I.1 are only applicable for problems that may arise that are not regulated by other <u>*more specific provisions contained in a permit*</u>*."* 2003

OSP NPDES Permit, Response to Comment 25. (emphasis added). The SFPUC requests that the points raised in this paragraph be reflected in the Fact Sheet at F-25 of the Tentative Order via the following revisions:

> **Wet Weather.** For wet weather discharges from Discharge Point No. 001 and CSD-001 through CSD-007 identified in Table 2 of this Order ~~the combined sewer discharge points~~, the Long-Term Control Plan required pursuant to the *Combined Sewer Overflow (CSO) Control Policy* and described in Provision VI.C.5.c of the Order serves as the ~~narrative~~ WQBELs in this Order that are necessary to achieve applicable water quality standards, including to protect existing and designated uses. For wet weather discharges from the Discharge Points in Table 2 of this Order, the terms at VI.C.5.c are the applicable WQBELs and the terms at V and G.I.I.1 are not applicable.

c. The Regional Board and EPA must include a finding in the permit that the CSDs are in compliance with those permit terms because it cannot issue a permit for activities that are inconsistent with the Clean Water Act and because a failure to include a finding is a substantial deviation from previous permits.

If the Regional Board and EPA retain the permit terms at V and G.I.I.1 and reject the requested clarifications to the permit in Section 1.b of these comments in Attachment B, the permit must include a finding that CSDs from CSD-001 through CSD-007 are in compliance with those permit terms. The substantive requirement in both V and G.I.I.1 is that discharges not impair the uses in the applicable water quality standards. Therefore, the permit must make a finding that the frequency and volume of CSDs, especially in the context of bacteria, are in compliance with those permit terms because the current frequency and volume of the CSDs do not impair uses.

As a matter of law, the Regional Board and EPA cannot reissue the permit, as currently written, if CSDs are impairing uses and, correspondingly, the SFPUC is not currently in compliance with the permit terms at V and G.I.I.1. *See, e.g.*, CWA Section 301(b)(1)(C). Any legal risk to the Regional Board and EPA is not applicable in this case because the SFPUC's discharges are in compliance with the permit based on the fact the CSDs are not impairing the uses in the applicable water quality standards. However, the permit must include this finding in the permit and, as detailed below, this finding that CSDs do not impair uses is consistent with the design of collection system, prior findings by the Regional Board and EPA and all available current information.

As a matter of fact, the SFPUC's collection system was designed to protect beneficial uses. State Water Board Order No. WQ 79-16 at 10-13. The collection system was designed for a long-term average of eight (8) CSDs, per year, from CSD-001 through CSD-007. *Id* at 6, 16. The Regional Board and EPA made a finding that eight (8) CSDs would protect beneficial uses. *Id* at 10-13. The design of the collection system on the Westside was not based on blind faith, but on modeling, monitoring, use assessments, cost and benefits comparisons and additional data and analyses and Regional Board and EPA findings made over the course of decades, including in the existing Oceanside NPDES permit. *Id*. at 1-6; *see also* San Francisco Bay Regional Water Quality Control Board, Order No. 79-12 (Jan. 16, 1979) (Appendix); Westside Wet Weather

Facilities Revised Overflow Control Study, Abstract Report and Request for Revised Overflow Frequency (December 15, 1978) (Appendix)

Based on the design of the collection system, the Regional Board and EPA have consistently concluded that the frequency and volume of CSDs are consistent with beneficial uses. *See, e.g.,* 1997 OSP NPDES Permit, pg. 10, finding 15 (The Regional Board "found that a long term average of [8] overflows per year would provide adequate overall protection of beneficial uses.") (Appendix) In fact, every Oceanside NPDES permit since the SFPUC completed the Westside collection system in 1997 has made it clear that the existing controls on CSDs protect beneficial uses, including recreation. *See, e.g.*, 2009 OSP NPDES Permit, Fact Sheet at F-34 (The collection system "would not compromise beneficial uses.") (Appendix); 2003 OSP NPDES Permit, pg. 10, findings 15, 30 (The LTCP "would provide adequate overall protection of beneficial uses;" "the exception [based on State Water Board Order No. WQ 79-16] will not compromise protection of ocean waters for beneficial uses") (Appendix); 1997 OSP NPDES Permit, pg. 8, finding 15(c) ("San Francisco has demonstrated compliance . . . during wet weather with water quality standards"). The SFPUC's collect system is performing as designed. In fact, it's performing better: the actual frequency of discharges from CSD-001 through CSD-007 has been and continues to be below the frequency that was determined to provide protection to beneficial uses. *See* Tentative Order, Table F-3, Fact Sheet F-9 and the discussion further below in this section, 1.c, of these comments in Attachment B.

As a result of a CSD, there may be a temporary increase in the level of bacteria in the receiving water. However, this fact does not mean beneficial uses are not protected. The fact that there may be a temporary increase in the level of bacteria was known to the Regional Board and EPA when the collection system was designed and when the Regional Board and EPA found the existing level of control of CSDs protects beneficial uses. For example, in 1994, the EPA directed studies of the collection system to determine if the performance would be consistent with the CSO Control Policy given the fact that the SFPUC was nearing completion of its implementation of its pre-CSO Control Policy LTCP and the construction of the Westside collection system. *See* The Cadmus Group, (Aug. 26, 1994) ("Cadmus Report") (Appendix). EPA concluded that frequency and volumes of CSDs result in "temporary elevation in bacteria levels immediately following an overflow event." Cadmus Report at 2-9. Nonetheless, EPA found "[t]he [SFPUC] has constructed a wastewater treatment system that protects both water quality and the beneficial uses of these receiving waters." Cadmus Report at 4-12. EPA explained that the bacteria levels "return to background levels within one to two tidal cycles" or less. Cadmus Report at 2-8. The Regional Board and EPA incorporated this understanding of the nature of CSDs and their relationship to beneficial uses—in the context of the Oceanside NPDES permit—when finding CSDs protect beneficial uses. *See, e.g.,* 1997 OSP NPDES Permit, pg. 6, finding 10 ("elevated bacteria levels . . . tend to decrease rapidly, typically within 15 to 40 hours").

The factual findings and legal conclusions in the prior Oceanside NPDES permits and other documents are consistent with more recent findings by the Regional Board and EPA. For example, under CWA § 303(d), the State of California is required to develop a list of receiving waters that are "impaired" (*i.e.*, those receiving waters that do not meet applicable water quality standards, including beneficial uses) and submit the list for EPA's review and approval. In order to establish and revise the CWA § 303(d) list of impaired receiving waters, the Regional Board is required to "assemble and evaluate all existing and readily available water quality-related data and information" 40 C.F.R. § 130.7(b)(5). The Regional Board and EPA have performed this assessment for the waters that receive discharges from CSD-001 through CSD-007 and concluded that the receiving waters are not impaired for bacteria.

The Regional Board and EPA found the receiving waters associated with CSD-001 through CSD-003 – the Pacific Ocean offshore Fort Funston and Ocean Beach – are not impaired for bacteria. *See* Clean Water Act Sections 303(d) and 305(b) 2016 Integrated Report for the San Francisco Bay Region, Decision ID Nos. 66036 (Pacific Ocean at Fort Funston), 65990 (Pacific Ocean at Ocean Beach) (Appendix). The CWA § 303(d) assessment for these receiving waters specifically examined bacteria data associated with CSDs and recreational uses. The data was collected during or just after storm events when CSDs were known to occur. Based on the available water quality-related data and information, including thirty lines of evidence for Ocean Breach and six lines of evidence for Fort Funston, the Regional Board determined that the receiving waters associated with CSD-001 through CSD-003 are not impaired by bacteria and beneficial uses are protected, including recreational uses.

While historically the receiving waters associated with CSD-005 through CSD-007 showed signs of impairment based on bacteria, on April 2017 the Regional Board finalized an action pursuant to CWA § 303(d) to de-list the receiving waters associated with Baker Beach regarding bacteria-caused impairment. *See* Clean Water Act Sections 303(d) and 305(b) 2016 Integrated Report for the San Francisco Bay Region Staff Report at Table 4, Decision ID No. 34385. (Appendix). The de-listing decision was based on sixteen lines of evidence and the Regional Board found that the receiving waters should be de-listed because "applicable water quality standards for [bacteria] *are not being exceeded.*" (emphasis added). On April 6, 2018, EPA approved the Regional Board's delisting of the receiving waters, concluding the de-listing was "due to *improved water quality.*" Letter from T. Torres, California 2014-2016 CWA Section 303(d) List of Impaired Waters at Enclosure 1 (April 6, 2018) (emphasis added) (Appendix) The Regional Board and EPA have concluded in just the last year, via this de-listing action, that the beneficial uses in the receiving waters are not impaired by bacteria.

The SFPUC requests the Regional Board and EPA confirm that the receiving waters associated with CSD-001 through CSD-007 are not impaired based on bacteria. Relatedly, the SFPUC requests the permit reflect the status of the receiving waters associated with CSD-001 through CSD-007 by including the following text in the section "Impaired Waters on CWA 303(d) List" in the Fact Sheet at F-14 of the Tentative Order:

> On April 6, 2018, U.S. EPA approved a revised list of California's impaired waters pursuant to CWA section 303(d), which requires identification of specific waters where it is expected that water quality standards will not be met after implementation of technology-based effluent limitations on point sources. Where it has not done so already, the Regional Water Board plans to adopt total maximum daily loads (TMDLs) for waters on the 303(d) list. TMDLs establish wasteload allocations for point sources and load allocations for nonpoint sources, and are established to achieve the water quality standards for the impaired waters. This Order does not authorize any discharge to

receiving waters on California's list of impaired waters. The Pacific Ocean at Fort Funston, Ocean Beach, Mile Rock and China Beach are not impaired for indicator bacteria. The Pacific Ocean at Baker Beach is no longer listed as impaired for indicator bacteria because the sixteen available lines of evidence show applicable water quality standards are not being exceeded.

The SFPUC requests the Regional Board and EPA confirm that the findings requested by the SFPUC to include in the Fact Sheet are factually correct. If yes, the requested findings are accurate, but the requested findings are rejected from inclusion in the Fact Sheet at F-14, the SFPUC asks the Regional Board and EPA to provide an explanation why factually accurate and relevant findings are rejected from the permit.

Other consistent findings by the Regional Board and EPA include those in the Basin Plan, which contains the applicable water quality standards for CSD-005 through CSD-007, and where the Regional Board found that "[w]et weather discharges [(i.e., CSDs)] from the City of San Francisco's combined sewer system . . . are not considered a significant source of bacteria. . . ." Basin Plan at 7.2.5.2. Further, the finding that CSDs do not impair beneficial uses is consistent with the conclusions by the Regional Board and EPA in the Total Maximum Daily Load and Implementation Plan for Bacteria at San Francisco Bay Beaches ("Bacteria TMDL"), which was adopted by the State Board on Aug. 30, 2016 and approved by EPA on Feb. 24, 2017. (Appendix). In the Staff Report to the Bacteria TMDL, the Regional Board found that CSDs "are not a significant source of [bacteria]" *See, e.g.*, Bacteria TMDL, Staff Report at pgs. 20, 24, 27, 47, and 49. (Appendix). The Staff Report identifies various other sources of bacteria, (*e.g.*, urban runoff, pets at the beaches, vessels, and wildlife, etc.), and the factors that drive bacteria build up and transport, such as temperature, moisture conditions, pH, exposure to sunlight, and nutrient availability. *Id.* at pg. 40. The Regional and State Board findings in the Bacteria TMDL were approved by EPA and in the Feb. 24, 2017 approval letter EPA Region 9 stated that the implementation of this TMDL—which does not include any additional controls on CSDs—will "*result in the attainment of the bacteria water quality objectives."* Letter from T. Torres to B. Wolfe, Approval of San Francisco Bay Beaches TMDL (Feb. 6, 2017) (emphasis added) (Appendix).

For decades, via multiple and varying administrative actions, the Regional Board and EPA have made conclusions based on the available information that the current frequency and volume of CSDs from CSD-001 through CSD-007 do not impair beneficial uses. Those findings were based, in part, on the design and performance of the collection system, the nature of the CSDs, and the uses. The collection system protects beneficial uses and if the Regional Board and EPA were to reach a contrary conclusion they would need to explain how such a finding can be explained in light of decades of fact-based conclusions and what new information supports a contrary finding(s).

The available information on the current performance of the collection system confirms the prior findings of the Regional Board and EPA that the frequency and volume of CSDs from CSD-001 through CSD-007 protects beneficial uses. *See, e.g.*, Technical Memorandum from the Program Management Consultant ("PMC"), Current Performance of the Westside Collection System During Wet Weather (Appendix). State Water Board Order No. WQ 79-16, which established the long-term average of 8 CSDs per typical year, found that 8 CSDs per typical year from the hydrologic segments of the Westside collection system would protect beneficial uses. State Water Board Order No. WQ 79-16 at 10-13. In making that finding, the Regional Water Board and State Water Board found that the average number of days that the receiving waters adjacent to the CSDs would exceed levels of bacteria for body contact recreation would be 25 days per typical year. *Id*. at 6. As explained in the PMC Technical Memorandum, based on current performance, the frequency of CSDs in each hydrologic segment of the Westside collection system will be within 8 per typical year with approximately 2 days per typical year in which the enterococcus bacteria concentrations in Westside receiving waters may be above 104 MPN/100mL. If the Regional Water Board and State Water Board found in State Water Board Order No. WQ 79-16 that 8 CSDs and 25 days in elevated bacteria concentrations protects beneficial uses, including recreational uses, it is reasonable for the SFPUC to conclude that 9 CSDs and 2 days in elevated bacteria concentrations protects beneficial uses, including recreational uses.

2. The “LTCP Update” (VI.C.5.d) is Contrary to Law and Unsupported by the Available Facts and Prior Agency Findings.

As explained in Section 1.b of these comments in Attachment B, the LTCP-permit terms at VI.C.5.c are the SFPUC-specific WQBELs for wet weather discharges. However, the Tentative Order also includes new permit terms at VI.C.5.d that is identified as an “LTCP Update” that mandate the SFPUC “update its LTCP” by implementing a long list of tasks in Table 7 of the Tentative Order on pages 19-21. The “LTCP Update” permit terms are contrary to law and unsupported by the available facts and prior agency findings. A critical issue is that the permit terms are not aligned with the legal requirements in the CSO Control Policy. The SFPUC has provided redline edits to VI.C.5.d and Table 7. *See* Attachment A at [X]. An overarching theme of the requested revisions is to ground the tasks in Table 7 to the objective to assess and update the LTCP to be consistent with the applicable provisions of the CSO Control Policy. As a practical matter, the intent and meaning of the permit terms in Table 7 are unclear – the SFPUC cannot assess and select alternative controls to protect beneficial uses if it no longer knows what it means to protect beneficial uses.

As a threshold matter, the SFPUC requests the Regional Board and EPA identify the federal and state statutory and regulatory legal authority for each task and sub-task in Table 7. The Tentative Order on page 19 states that the tasks are “. . . based on the nine elements described in the Combined Sewer Overflow (CSO) Control Policy. . . .” and the Fact Sheet of the Tentative Order at F-31 cites various authorities that the Regional Board and EPA state support the permit terms. However, it is not clear what element(s) is being cited and it is not clear what specific element or authority the Regional Board and EPA is relying on for the position they have the legal authority for each task and sub-task in Table 7. The SFPUC requests the Regional Board and EPA identify the specific legal authority that authorizes each task and sub-task in Table 7.

SFPUC began the design of its collection system in the 1970s and completed construction in 1997. The CSO Control Policy and II.C.1 were published in 1994. The CSO Control Policy at I.C includes provisions to account for collection systems, like the SFPUC, that were close to completing the construction of their collection system. In fact, I.C was included in the CSO Control Policy *because of* the SFPUC. The practical implication of I.C. is that the SFPUC was not—and is not—required by the CSO Control Policy to perform all of the tasks identified in II.C.1. Therefore, there is no legal authority to mandate the tasks in Table 7 of the Tentative Order. The Regional Board and EPA agree with this position in prior findings in the Oceanside NPDES permit. *See, e.g.,* 1997 OSP, pg. 6, finding 11 ("the City's program qualifies for the CSO Control Policy's classification under Section I.C. as being substantially complete *and exempt from the planning and construction requirements*.") (emphasis added). If the Regional Board and EPA disagree with this position, the SFPUC requests an explanation why, including their position on the practical implication of I.C as applied to the SFPUC. Relatedly, the SFPUC requests the Regional Board and EPA explain the demands in Table 7 in light of I.C and their prior findings that the SFPUC is exempt from most of the planning and construction requirements in the CSO Control Policy associated with the LTCP.

The SFPUC acknowledges there are ongoing and applicable requirement under the CSO Control Policy to review its LTCP and associated control measures, e.g., consistency with the sensitive area provisions. *See* CSO Control Policy I.C.2. As explained in more detail below, the SFPUC can accept appropriate permit terms that focus on ongoing obligations accompanied with clear objectives tied to the applicable statutory and regulatory framework. *See* Attachment A at [X].

The legal framework for the SFPUC that should be reflected in the permit is the assessment of CSDs into sensitive areas and the identification of any revisions to its LTCP, as necessary, based on the step-by-step legal framework at II.2.C.3 of the CSO Control Policy. Such an assessment would necessarily take into consideration appropriate financial capability analyses and data from the SFPUC's post-construction monitoring program. This legal framework has been included in prior Oceanside NPDES permits, including the existing permit. *See* Oceanside NPDES Permit at VI.C.7. The SFPUC has performed assessments pursuant to those permit terms and submitted analyses to the Regional Board and EPA. [Insert formal name for the Westside Sensitive Areas Report] (2011) (Appendix). The SFPUC requests the Regional Board and EPA confirm that for a combined sewer system like the SFPUC the applicable legal framework to assess whether any modification(s) are necessary to the LTCP is a sensitive areas analysis consistent with II.2.C.3. If the Regional Board and EPA disagree, the SFPUC requests they identify the alternative legal framework and cite the associated statutory and regulatory authority that mandates that alternative legal framework.

The first step in a sensitive area analysis is to determine, in relevant part, whether it is "physically possible and economically achievable" to "eliminate or relocate overflows that discharge to sensitive areas . . . except where elimination or relocation would provide less environmental protection than additional treatment." CSO Control Policy at II.2.C.3.b.i. The SFPUC does not object, in concept, to permit terms that require this assessment. Again, such permit terms would be similar to requirements in prior Oceanside NPDES permits. However, as currently drafted, the permit terms at VI.C.5.d assume there *will be* alternative control measures proposed by the SFPUC to eliminate or relocate CSDs because of the analyses required by Table 7. This assumption must be removed from Table 7. *See* Attachment A at [X]. It is inappropriate for the permit terms to presuppose the outcome of to-be-performed analyses. Further, it is

SFPUC understanding that the Regional Board and EPA define "elimination" of CSDs to mean the separation of the combined sewer system into distinct sanitary and storm sewer systems. The SFPUC requests the Regional Board and EPA confirm this understanding or explain their interpretation of "elimination." Given the likely financial impacts associated with "elimination," and resulting reduced environmental protection due to a resulting increase in the discharge of untreated stormwater, an assumption in the permit that there will be SFPUC proposed alternative controls for "elimination" of CSDs is inappropriate and contrary to law and available facts.

Further, the SFPUC understands "relocated" to mean CSDs would discharge in a receiving water that is not a "sensitive area." The Regional Board and EPA have not identified in the Tentative Order what receiving waters are sensitive areas. The SFPUC requests that the Regional Board and EPA identify what it believes are sensitive areas and the factual basis for that determination. Further, if the Regional Board and EPA identify all receiving waters as sensitive areas, the SFPUC requests an explanation how it is supposed to "relocate" CSDs from sensitive areas.

The second step in a sensitive areas analysis is, if elimination or relocation is not physically possible and economically achievable, "provide the level of treatment for remaining overflows deemed necessary to meet WQS for full protection of existing and designated uses." CSO Control Policy at II.2.C.3.b.ii. The permit terms in Table 7 are divorced from the substantive framework at II.2.C.3.b.ii. In Table 7, beyond the inclusion of "elimination" and "relocation," the Tentative Order includes permit terms that mandate analyses to "*reduce* the magnitude or frequency of discharges" and requires associated assessments and selection of control alternatives to "reduce" CSDs. *See, e.g.*, Tentative Order at Table 7, Task 3.e (emphasis added). The legal framework requires controls necessary to protect uses in applicable water quality standards, but the existing permit terms in Table 7 associated with "reduction" mandate reduction for the sake of reduction, not tied to what is necessary to protect beneficial uses. There is no statutory or regulatory legal basis to mandate the SFPUC "reduce" CSDs, especially "reduction" simply for the sake of reduction. The SFPUC asks the Regional Board and EPA to identify the legal authority that allows them to require in the permit that the SFPUC assess and select control alternatives for "reducing" CSDs. The permit terms in Table 7 must be revised to align with the statutory and regulatory framework. *See* Attachment A at [X].

Critically, even if revisions made in Table 7 explicitly link any "reduction" in CSDs to what is necessary to protect uses, as explained in Section 1.c of these comments in Attachment B, the existing control measures associated with the frequency and volume of CSDs from CSD-001 through CSD-007 *already* protect uses. Table 7 makes an assumption, similar to the one noted above for "elimination" and "relocation" that there *will be* SFPUC proposed alternative controls for the "reduction" of CSDs. This assumption is inappropriate and contrary to law and the available facts. The SFPUC can agree to a framework, in collaboration with the Regional Board and EPA, to assess the relationship between CSDs and receiving water quality in alignment with the statutory and regulatory authorities, including the CSO Control Policy. *See* Attachment A at [X]. The deliverables from the tasks in Table 7 can then be used to inform future permitting decisions, including the appropriate WQBELs for wet weather discharges in VI.C.5.c.

Lastly, even if the permit terms in Table 7 were consistent with the legal framework and/or had a factual basis, they are vague and fail to provide fair notice to the SFPUC on what is required by the terms of the permit. For example, as explained in Section 1.c of these comments in Attachment B, the Regional Board and EPA have for decades taken the position that the current frequency and volume of CSDs protects beneficial uses. If that consistent finding is no longer true, the SFPUC no longer knows what level of control would provide "full protection of . . . uses." CSO Control Policy at II.C.3.b.ii. The SFPUC cannot assess alternative controls to protect uses when it no longer knows what it means to protect uses. The SFPUC requests the Regional Board and EPA confirm that State Water Board Order No. WQ 79-16 establishes the meaning of protecting beneficial uses. Absent re-defining through appropriate administrative action what it means to protect uses—for the SFPUC, for CSDs, for bacteria—the SFPUC will not know what "reduction" alternative would "protect" uses as currently outlined in Table 7.

Appendix
to
Attachment B

San Francisco Public Utilities Commission Comments Regarding Tentative Order for Renewal of the NPDES Permit No. CA0037681 for the Oceanside Water Pollution Control Plant, Wastewater Collection System, and Westside Recycled Water Project

Marian

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Request for An Exception to the 1978 Water Quality Control Plan for Ocean Waters of California by the City and County of San Francisco for the Richmond Sunset Sewerage Zone Wet Weather Diversion Structures.	Order No. WQ 79-16

BY THE BOARD:

The City and County of San Francisco (dischargers) have a combined storm and wastewater collection system. When rainfall exceeds 0.02 inches per hour, untreated domestic wastewater mixed with stormwater runoff is discharged into the Pacific Ocean through any of eight wet weather diversion structures in the Richmond Sunset Sewerage Zone. These facilities are located on the West or Ocean side of the penninsula.

On March 16, 1976, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board) adopted Order No. 76-23, Waste Discharge Requirements for the wet weather diversion structures. Order No. 76-23 required the discharger to reduce the frequency of discharge from diversion structures from an average of 114 overflow events per year to an average of one overflow event per year and to undertake a study to better define the cost and water quality benefits of facilities designed to achieve various overflow frequencies. Upon completion and submittal of the study on

December 15, 1978, the discharger requested the Regional Board to consider an increase in the allowable frequency of the discharge for the wet weather diversion structures from an average of one overflow per year to an average of eight overflows per year.

Broadly speaking, the _1978 Water Quality Control Plan for Ocean Waters of California_ (Ocean Plan) prohibits the discharge or by-pass of wastewater to the ocean not conforming to the standards in the Ocean Plan. Exceptions to the standards contained in the Ocean Plan may be granted on a case by case basis. Untreated wet weather diversions require an exception to the Ocean Plan.1/

On January 16, 1979, the Regional Board adopted Order No. 79-12, amending Order No. 76-23 to allow an average of eight overflows per year. Based on the evidence presented at public hearing, the Regional Board determined that an exception to the Ocean Plan is warranted. By letter dated February 5, 1979, the Regional Board requested the State Water Resources Control Board (State Board) to review and approve exceptions to the Ocean Plan as recommended by Regional Board Order No. 79-12.

On March 16, 1979, the State Board held a public hearing to receive evidence pertaining to the request for an exception to the Ocean Plan.

1/ See discussion under II. Ocean Plan, page 7.

I. EXISTING WASTE COLLECTION AND DISPOSAL SYSTEM COMPARED TO THE PROPOSED SYSTEM.

San Francisco is the only city in California with a completely combined sanitary and stormwater system.[2] The City and County of San Francisco is comprised of three hydrographic sub-units and the plans for the collection and treatment of wastewater and stormwater runoff correspond to the sub-units. The Richmond Sunset Sewerage Zone corresponds to the most western sub-unit and may be defined, generally, as that portion of the County north of the San Francisco-San Mateo county line and draining the western slope of the coastal hills dividing the County. Currently, all sewered wastes are routed to the waste treatment plant situated in the western end of the Golden Gate Park. The plant provides primary treatment and chlorination to wastewater prior to ocean discharge. As indicated previously, when rainfall exceeds 0.02 inches per hour, untreated domestic wastewater mixed with stormwater runoff is by-passed from the sewer lines carrying wastewater and runoff to the treatment plant into the ocean through any of eight wet weather diversion structures. From south to north, the diversion structures are situated near Lake Merced, Vicente Street, Lincoln Way, Mile Rock and four are grouped on Bakers Beach.

2/ Water Quality Control Plan Report, San Francisco Bay Region, Chapter 16, page 73.

The outfalls range widely in size and discharge onto the Beach at or near the waters edge. For instance, the outfall at Lake Merced is about ten feet by eleven feet, the outfall at Vicente Street is two barrels about five feet in diameter and the smallest outfall, near Bakers Beach, is eighteen inches in diameter.

The discharger is proposing to construct storage, pumping, treatment and outfall facilities in the Richmond Sunset Zone to comply with waste discharge requirements including the requirement that (with the exception of an average of eight allowable overflows per year) the discharge of untreated waste is prohibited.3/

> "The concept which underlies all overflow alternatives in the Great Highway is an "intercepting system" whereby the sewer functions as a storage facility and as a transport conduit. By maximizing the continuous movement of sewage in a storage facility, excessive deposition of solids is prevented. The major storage facility (Westside Transport) is located under the Upper Great Highway between Fulton Street and the Westside Pump Station just south of Sloat Boulevard. The Richmond and Lake Merced area flows will be collected and directed to storage in the Westside Transport via tunnels.4/

3/ As amended by Order 79-12, Regional Board Order No. 76-23, Discharge Prohibition A.1 provides in part:

> Discharge of untreated waste to waters of the State is prohibited with the exception of allowable overflows as defined below. The City shall design and construct facilities for diversion structures No. 1-8 to achieve a long term average of 8 overflows per year from these facilities.

4/ <u>Abstract Report Westside Wet Weather Facility Revised Overflow Control Study</u>, December 1978, Section IV, page 4

"Storm flows would be by gravity to the Westside Transport for storage and transport to the Westside Pump Station, then pumped to the proposed Southwest Water Pollution Control Plant (SWWPCP) south of the Zoo for treatment. Effluent would be discharged into the ocean two miles offshore via a deep-water outfall. When storage and withdrawal rates are exceeded, by-passing would occur with some control through the Vicente and Lincoln Way Outfalls, Lake Merced and Bakers Beach (Richmond) Outfalls with possible selectivity into the Mile Rock Outfall... The existing Richmond Sunset Water Pollution Control Plant located in Golden Gate Park will be abandoned, thereby returning four acres of park land to recreational uses.

* * *

"The Mile Rock Outfall (shoreline discharge) now functions as both the effluent outfall for the Richmond Sunset plant and as a wet weather overflow discharge for flows originating in the westerly portion of the Richmond Sunset district. Upon relocation of the dry-weather treatment to the Southwest side, dry-weather discharges to Mile Rock would cease and wet weather discharges would be reduced to the specified frequency."5/

The proposed Southwest Water Pollution Control Plant referred to in the foregoing quotations would be located immediately south of the grounds of the Fleishhacker Playground and Zoo and Sloat Boulevard. As envisioned, currently, a storage facility designed for a rate of eight overflows/year would consist of a channel seventeen and one-half wide and twelve to forty-five feet deep, running along the Great Highway between Fulton to Lincoln Way. The discharger does not propose to make any physical alterations to the existing wet weather outfalls.

5/ Section IV, page 5 of report cited previously. (Note 4).

The following table abstracted from Finding 4 of Regional Board Order No. 79-12 provides a comparison between the performance of the existing facilities and the performance anticipated in a system designed for an average of eight overflow incidents annually.

Average Number of Overflows Per Year	Existing 114	Proposed 8
Minimum/maximum number of overflows per year	26/193	1/18
Percent of annual combined wastewater treated (avg.)	74.1	95.9
Percent of annual combined wastewater which overflows (avg.)	25.9	4.1
Volume of overflow (Million gallons/ year, avg.)	2870	449
Total hours of overflow per year (avg.)	372	32
Minimum/maximum hours of overflow per year	163/617	2/78
Average duration of overflow (hours)	3.3	4
Composition of overflows (avg.)		
Percent sewage	12	6.5
Percent storm water	88	93.5
Percent reduction in BOD_5 and Suspended Solids discharged from existing overflows (avg.)	base	84
Average number of days nearshore water adjacent to discharge points exceed coliform standards for body contact recreation		
days greater than 1000 MPN/100 ml	119	25
days greater than 10,000 MPN/100 ml	70	10

II. THE OCEAN PLAN

The Ocean Plan was adopted to protect a wide range of beneficial uses[6/], Order No. 76-23 indicates that to some degree the following beneficial uses are made of the ocean waters in the vicinity of the diversion structures: (1) Water Contact Recreation; (2) Non-contact Water Recreation; (3) Marine Habitat; (4) Commercial and Sport Fishing; (5) Fish Migration; and (6) Wildlife Habitat.[7/]

To protect beneficial uses, the Ocean Plan provides for the concurrent application of certain regulatory mechanisms (standards) to discharges into ocean waters. These mechanisms can be broadly identified as including:

1) Water Quality Objectives (Chapter II).
2) General Management Requirements (Chapter III).
3) Effluent Quality Requirements (Chapter IV).
4) Discharge Prohibitions (Chapter V).

6/ Chapter I, Ocean Plan.

7/ For definitions of these uses, see Chapter 4, pages 1-5, Water Quality Control Plan Report, San Francisco Bay Region.

Exception to the standards contained in Chapters II through V, is provided for in Section G, Chapter VI., which provides:

> "The State Board may, subsequent to a public hearing, and with the concurrence of the Environmental Protection Agency, grant exceptions to any provision of this Plan where the Board determines:
>
> 1) The existence of unusual circumstances not anticipated at the time of the Plan's adoption;
>
> 2) The exception will not compromise protection of ocean waters for beneficial uses; and
>
> 3) The public interest will be served.

To some degree, authorization of the continued use of the wet weather diversion structures will require an exception to each of these regulatory mechanisms.

A. CIRCUMSTANCES NOT ANTICIPATED

Examination of the record in this matter clearly indicates "[t]he existence of unusual circumstances not anticipated at the time of the Plan's adoption." One such circumstance arises out of the Ocean Plan's failure to address, directly, how it would regulate the by-passing of combined waste flows.

Referring to the record pertaining to the State Board's adoption of the 1978 amendments to the Ocean Plan, it is patently clear that it was realized it was inappropriate to apply Ocean Plan standards strictly to combined waste and stormwater discharges. The record indicates, further, that rather than address this problem in the 1978 Ocean Plan amendments, directly, it was decided to deal with such problems on a case-by-case basis via the exception mechanism. Plainly it was not considered possible to anticipate in what manner the Ocean Plan should be modified to deal with the circumstances that would be presented by particular combined wet weather discharges. Additionally, it was realized that the discharges in question here would, in all probability be the subject of an exception proceeding under the Ocean Plan.8/

Finally, it should be recognized that, with the exception of the planned eight overflow events, the City will be providing waste treatment to all stormwater runoff contained in the proposed system (about 86 percent). This contrasts, markedly, with the vast majority of communities that collect and discharge stormwater runoff without any treatment because runoff is not comingled with domestic waste flows. We conclude, therefore, that present in this request for an exception are unusual circumstances not anticipated at the time of the Ocean Plan's adoption.

8/ Position Paper 7, Proposed Amendment of Ocean Plan, December 29, 1977

B. PROTECTION OF WATERS FOR BENEFICIAL USES

No exception to the Ocean Plan may be granted if protection of ocean waters for beneficial uses will be compromised. Considering the testimony presented at the March 16, 1979, hearing and reviewing the Regional Board's record on this matter, it appears that those beneficial uses of concern are: contact and non-contact water recreation; marine habitat and sport fishing. The proposed wet weather diversions have three characteristics which may adversely affect these beneficial uses, that is, toxicity, coliform and floatables.

A wet weather diversion may contain toxic components which pose a threat to marine habitat and sport fishing. Table B of the Ocean Plan provides specific limitations for certain toxic materials.[9/] Relying upon the discharger's Abstract Report Westside Wet Weather Facility Revised Overflow Control Study, December 1978 (Abstract Report) the Department of Fish and Game[10/] testified that the discharger's investigation indicated that lead, copper and zinc would be present in the wastewaters by-passed in excess of permissible Table B concentrations.[11/]

9/ Chapter IV, Ocean Plan.

10/ Testimony by Mike Martin, Ph.D.

11/ Table V-3.

Although stormwater is initially high in concentrations of toxic materials, the concentrations are rapidly diluted by additional stormwater runoff. Averaging four hours in duration, the discharges are intermittent. Bioassays involving placement of three spine stickleback in undiluted combined effluent for 96 hours resulted in one hundred percent survival of the fish more than fifty percent of the time. Although this fish is more pollutant tolerant, no organisms in the marine environment would ever be exposed to undiluted overflow for more than a few hours.12/ It should be noted, additionally, that the Department indicated it had no specific information showing that marine habitat had been impaired from the many years of by-passing of these metals at high frequencies and concentrations. It is anticipated that the proposed system will provide waste treatment to about eighty-six percent of stormwater runoff. In the long run, therefore, the amount of toxic substances entering the ocean from the proposed system will be substantially less than from other communities that do not have a combined system. Under these circumstances, we do not conclude that the marine habitat and sport fishing beneficial uses will be compromised because of toxic concentrations of lead, copper and zinc. However, special provisions to reduce the concentration of toxic materials will be made a condition of the exception granted by this Order.

12/ Section V, page 4, Abstract Report.

Coliform are a group of bacteria predominantly inhabiting the intestines of man or animals. Coliform organisms are used as indicators of the possible presence of disease organisms. Of concern, to health officials are the diseases of Shigellosis, Salmonellosis and Hepatitis A. Provision A "Bacteriological Characteristics", Chapter II, of the Ocean Plan contains coliform standards intended to prevent the transmission of disease.

Wet weather discharges may contain coliform in concentrations that would make contact and non-contact recreation uses unsafe. Disease organisms may also contaminate shellfish, making harvesting unsafe for short periods of time. Coliform will be present in the wet weather discharges for which exception is sought due to the comingling of untreated domestic wastewater and stormwater runoff in the combined sewer system. Untreated wastewater will make up about 6.5 percent of the total volume of overflows if San Francisco implements the eight by-pass proposal.

Under current wet weather discharge conditions, the beach areas are posted as being unsafe for contact recreation from about October to April of each year due to high coliform concentrations. Twenty-five years of epidemiological data, however, shows no clinically confirmed cases of enteric disease from either recreational contact with ocean waters or the consumption of shellfish harvested from those waters.13/ It is estimated that the proposed facilities will result in coliform concentrations requiring posting of the beaches for an average of about twenty-five days per year.14/ In addition, based on

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13/ Section V, page 13, Abstract Report.

14/ Plate 7, Reference Plates, Abstract Report.

data contained in the Abstract Report it is reasonable to conclude that recreational uses of the beach areas and waters will be minimal and that shell fishing will be unlikely to occur during and immediately following the winter storms that will result in an overflow.15/ Given these circumstances, we do not believe that the elevated coliform concentrations for the time in question constitute a compromise of contact and non-contact recreational uses.

Floatables include fecal matter and other organic and inorganic substances. Such materials may shelter coliform and prolong coliform concentrations in the receiving water. Also, for aesthetic reasons, floatables may interfere with contact and non-contact recreation uses. Chapter III, B, requires that "[w]aste discharged to the ocean must be essentially free of: 1. material that is floatable...".

Current wet weather discharges contain substantial quantities of floatables. By installing a baffling system, it is anticipated that the proposed facilities will reduce the discharge of floatables as much as seventy to ninty-five percent from existing levels.16/ In addition, the storage capacity being built into the proposed facility will result in substantial reduction of the amount of settleable solids discharged. As noted under our previous discussion regarding coliform, epidemiological data does not indicate the existence of adverse public health problems associated with the current wet weather discharges. Considering the foregoing discussion, we do not conclude that the beneficial uses under consideration will be compromised by the proposed discharges.

15/ Plate 6, Reference Plates, Abstract Report.

16/ Section VII, page 2, Abstract Report.

C. PUBLIC INTEREST CONSIDERATIONS

Exemptions to the Ocean Plan cannot be granted unless the public interest will be served by granting such exemptions. Analysis of whether the public interest will be served in this matter necessarily involves protection of beneficial uses of ocean waters, the uniqueness of the discharger's sewer system, and economic impacts in terms of capital costs, operation and maintenance costs and user charges.

The discharger's sewer system is a combined system which collects and routes to the treatment plants both sanitary sewage and stormwater. Whenever rainfall exceeds 0.02 inches per hour, this combined wastewater by-passes the treatment plants and discharges to waters of the United States. This occurs on the average of 114 times per year from various overflow structures located throughout the treatment area. This totally combined system is unique and the only major system of its kind in the state of California. Consequently, when the discharger completes the projects and facilities discussed previously in this Order, presuming eight overflows, they will not only be treating ninty-nine percent of sanitary wastewater but will also be treating eighty-six percent of stormwater runoff. This combined treatment will substantially reduce pollutant loadings to the ocean from urban runoff, an accomplishment unique to the discharger's system. Unquestionably this serves the public interest.

We have previously discussed protection of beneficial uses. This is an integral part of serving the public interest. Further, the Central Coast Regional Coastal Commission (Regional Commission) has denied the discharger a required development permit based on one overflow in part based on the size and location of the transport necessary for a one overflow system. The Regional Commission's concerns related to future beach erosion, sewer exposure and seismic and groundwater problems. An allowance of eight overflows will allow a smaller transport system to be built. The State Commission has now assumed jurisdiction in this matter.

The cost impacts and savings of allowing eight overflows on the westside are enormous. Considerable evidence was introduced in the Regional Board record and at the hearing regarding these costs and savings. Capital costs of the Westside project assuming one overflow are $299,000,000 and $189,000,000 assuming eight overflows. Thus, an increase in the number of overflows from one to eight would result in a $110,000,000 capital cost saving. The annual operation and maintenance cost savings would be $10,000,000. Table IV-1 of the Abstract Report shows detailed cost comparisons for the various parts of the Westside project. Plate 5 of the Abstract Report tabulates the cost of suspended solid, BOD, and coliform benefits for different overflow levels. The testimony presented indicates substantially diminishing benefit returns per dollar spent as the number of overflows diminishes below eight. This is clearly demonstrated by the Regional Board graph dated January 15, 1979.

Considerable written and oral testimony was presented to the State Board and the Regional Board regarding citizen concern for user charges. This testimony included comments from The West of Twin Peaks Central Council, The Citizens Advisory Committee for Wastewater Management, The Hotel Employers Association, The Sunset Coalition, The Sunset-Parkside Education and Action Committee, Paul D. Berrigan, Brig. Gen. Retd., Descon Corporation, The San Francisco Bay Chapter Sierra Club, and The Parkside District Improvement Club, Inc.. The user charge based on eight overflows is more reasonable than for one or zero.

Based upon the factors above, we find the public interest will be served by granting the discharger an exemption to the Ocean Plan to allow an average of eight overflows per year.

III. EXCEPTION SUBJECT TO CONDITIONS

Subject to the following conditions, this Order excepts the proposed by-passes from the terms of the Ocean Plan.

1. The discharger shall perform a self-monitoring program in accordance with the specifications prescribed by the Regional Board as indicated in Provision 12 of Regional Board Order No. 79-12. All beaches affected by the wet weather overflows shall be posted with warning signs for the period of time beginning when the overflow commences and continuing until analysis indicates the water quality of the affected areas is meeting bacteriological standards for recreation.

   At all areas where shellfish may be harvested for human consumption warning signs shall be posted for the period of time beginning when the overflow commences and continuing until the City and County Health Department indicates that no further posting is required.

2. Excepting provision Chapter II. A., to the greatest extent practical, the discharger shall design, construct and operate facilities which will conform to the remaining standards set forth in Chapter II of the Ocean Plan.

3. To the greatest extent practical, the discharger shall design, construct and operate facilities that will comply with the conditions controlled by the requirements provided by Chapter III, Sections A and B of the Ocean Plan.

4. The discharger shall develop the conceptual proposals for the design to be used and the technologies to be installed in the facilities intended to assure compliance with conditions 2 and 3. The proposals shall be submitted to the State Board and the EPA for approval within sixty days following adoption of this Order.

5. Excepting an average of eight overflows per year, the discharger shall design and construct facilities that will contain all other stormwater runoff.[17/] The discharge of all other untreated waste to waters of the state is prohibited.

6. The State Board Division of Water Quality shall critically review the discharger's grant application and subsequent design and construction and the Regional Board shall review operating performance to assure compliance with conditions 1, 2, 3 and 5.

7. The discharger shall fully comply with any federal and state source control program in order to minimize the entry of toxic substances into the waste collection system from in-

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17/ For the purpose of this Order, allowable overflows are those overflows permitted by Discharge Prohibitions A.1., Order No. 76-23 as amended by Order No. 79-12. In addition, any two overflows within one storm or a series of storms, separated by six or more hours shall be considered two separate overflow events. This requirement for an average of eight overflows is based upon the 62 year period of rainfall record used by the City in developing its facility design.

dustrial dischargers. To the extent that Section 208 studies being conducted by ABAG conclude there are feasible measures for reducing the entry of toxic substances into the collection system from stormwater runoff, the discharger shall implement such measures in accordance with a plan approved by the Regional Board.

8. Notwithstanding this Order, if the Regional Board finds that changes in location, intensity or importance of affected beneficial uses or demonstrated unacceptable adverse impacts as a result of operation of the constructed facilities have occurred, it may require the construction of additional facilities or modification of the operation of existing facilities.

As noted earlier, the exception granted by this Order is subject to the concurrence of the EPA. The EPA may attach, independently, other conditions upon the discharger as a condition of granting an exception.

IV. ADDITIONAL CONSIDERATIONS

The discharger completed a final EIR/EIS for the Wastewater Master Plan in May 1974. The discharger completed a final EIR for the Westside Transport facility in July 1977, which addressed overflows from diversion structures Nos. 2 and 3. This EIR identified potential adverse water quality impacts from this project related to seismic activity and the project has been modified to mitigate this potential impact. This EIR will be amended by the discharger following adoption of this Order. The discharger has commenced preparation of a draft EIR for the Richmond Tunnel facility which will address overflows from diversion structures Nos. 4 through 8, and has indicated they will prepare an EIR for the Lake Merced Transport facility which will address overflows from diversion structure No. 1. Upon completion of the amendment to the Westside Transport facility EIR, the final EIR for the Richmond Tunnel facility, and the final EIR for the Lake Merced Transport facility, the State Board will review any adverse impacts identified, and if necessary, make appropriate revisions of this Order.

V. CONCLUSIONS

After review of the record and for the reasons heretofore expressed, we have reached the following conclusions:

1. Subject to the conditions set forth in "III. EXCEPTION SUBJECT TO CONDITIONS," the proposed wet weather discharges by the City and County of San Francisco from the eight diversion structures in the Richmond Sunset Sewerage Zone are excepted from the requirements of the Ocean Plan.
2. Revisions may be made to this Order upon completion of the amendment to the Westside Transport facility EIR, the final EIR for the Richmond Tunnel and the final EIR for the Lake Merced Transport facility.

VI. ORDER

IT IS HEREBY ORDERED that the discharger's request for an exemption is granted subject to the conditions contained in "III. EXCEPTION SUBJECT TO CONDITIONS". Revisions may be made to this Order upon completion of additional environmental documents.

Dated: March 23, 1979

W. Don Maughan

W. Don Maughan, Chairman

William J. Miller

William J. Miller, Member

L. L. Mitchell

L. L. Mitchell, Member

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 79-12

NPDES PERMIT NO. CA0038415

AMENDING ORDER NO. 76-23 REGARDING
CITY AND COUNTY OF SAN FRANCISCO
RICHMOND SUNSET SEWERAGE ZONE
WET WEATHER DIVERSION STRUCTURES

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. The City and County of San Francisco, hereinafter called the discharger, presently discharges untreated domestic and industrial wastewater mixed with storm water runoff, all containing pollutants, into the Pacific Ocean, a water of the United States, through any of eight (8) wet weather diversion structures in the Richmond Sunset Sewerage Zone. These discharges occur only when rainfall exceeds 0.02 inches per hour.

2. Order No. 76-23 required the discharger to reduce the frequency of discharge for diversion structures No. 1 through 8 to an average of one overflow event per year and to undertake a citywide overflow control study to better define the cost and water quality benefits of facilities designed to achieve various overflow frequencies.

3. The discharger has undertaken an overflow control study and has requested the Regional Board to consider an increase in the allowable frequency of discharge for diversion structures No. 1 through 8 from an average of 1 overflow per year to an average of 8 overflows per year.

4. The following table provides a comparison of improvement obtainable by reducing the average overflows from diversion structures No. 1 through 8 to eight (8), four (4) and one (1) overflow per year compared to the existing average of 114 per year. Data was derived from the discharger's predictive computer model and are therefore approximations.

Westside

Average Number of Overflows Per Year	Existing 114	8	4	Order No. 76-23 1
Minimum/maximum number of overflows per year	26/193	1/18	0/11	0/4
% of annual combined wastewater treated (avg.)	74.1	95.9	98.1	99.53
% of annual combined wastewater which overflows (avg.)	25.9	4.1	1.9	0.47
Volume of overflow (Million gallons/ year, avg.)	2870	449	213	52
Total hours of overflow per year (avg)	372	32	15.4	3.5
Minimum/maximum hours of overflow per year	163/617	2/78	0/42	0/18
Average duration of overflow (hours)	3.3	4	3.9	3.5
Composition of overflows (avg)				
% sewage	12	6.5	6.5	6.2
% storm water	88	93.5	93.5	93.8
% reduction in BOD_5 and Suspended Solids discharged from existing overflows (avg)	base	84	92.5	98
Average number of days nearshore water adjacent to discharge points exceed coliform standards for body contact recreation				
days greater than 1000 MPN/100 ml	119	25	13	4
days greater than 10,000 MPN/100 ml	70	10	6	1
Cost of facilities (millions of dollars)				
Capital cost (total)	base	189	242	299
Storage		150	161	182
Pumping		13.5	21.5	25.5
Treatment/outfall		25.5	59.1	91.6
Annual cost	base	14	19	24

5. Overflows will occur from storage structures which will be designed to provide for additional removal of settleable and floatable solids. Removal of these solids will provide further mitigation of the aesthetic and public health impacts over and above the mitigation provided by reduction in the frequency of overflows.

6. The discharger completed a final EIR/EIS for the Wastewater Master Plan in May 1974. The discharger completed a final EIR for the Westside Transport facility in July, 1977, which addressed overflows from diversion structures Nos. 2 and 3. This EIR identified potential adverse water quality impacts from this project related to seismic activity and the project has been modified to mitigate this potential impact. This EIR will be amended by the City following adoption of this order. The discharger has commenced preparation of a draft EIR for the Richmond Tunnel facility which will address overflows from diversion structures Nos. 4 through 8 and has indicated they will prepare an EIR for the Lake Merced Transport facility which will address overflows from diversion structure No. 1. Upon completion of the amendment to the Westside Transport facility EIR, the final EIR for the Richmond Tunnel facility, and the final EIR for the Lake Merced Transport facility, the Board will review any adverse water quality impacts identified, and if necessary, make appropriate revisions of this Order. The issuance of waste discharge requirements for this project is exempt from the provisions of Chapter 3 (commencing with Section 21000) of Division 13 of the California Public Resources Code (CEQA) in accordance with Water Code Section 13389.

7. The Board has notified the discharger and interested agencies and persons of its intent to amend Order No. 76-23 and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

8. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

9. The combined sewer collection system of San Francisco, designed to transport both sanitary and storm flows, presents a unique problem regarding total compliance with the Basin Plan prohibition against the discharge of untreated waste. The Basin Plan recommends that exceptions to compliance be allowed for wet weather discharges, provided that beneficial uses are not adversely affected; however, a specific exception clause was not included. It is clear that the intent of the Basin Plan is to allow exceptions and this Board will consider inclusion of a specific exception clause during the next Basin Plan updating.

10. Based upon the presently available planning information contained in these findings and evidence presented at the public meeting concerning the cost differences of facilities necessary to achieve specific overflow frequencies and the water quality benefits derived from construction of those facilities and considering the location and intensity of existing beneficial uses; a long term average of eight (8) overflows per year for diversion structures No. 1 through 8, will provide adequate overall protection of beneficial uses; provided however that further study to comply with the discharge prohibitions No. A.2 and A.3 is required by the discharger especially where existing discharge points are located in areas which do not have adequate exchange with ocean water and may not provide adequate protection of adjacent nearshore beneficial uses. Further mitigation may be required in the future, after facilities are placed in operation, if it is determined that beneficial uses are not adequately protected.

11. The Federal Water Pollution Control Act and amendments thereto require that point source discharges comply with appropriate standards by July 1, 1977. The discharger has not started construction of facilities to comply with the prohibitions and provisions of Order No. 76-23 as amended by this Order. The Board will consider an appropriate enforcement order which will include a time schedule for compliance with Order No. 76-23 as amended by this order within 90 days of the date of this order.

IT IS HEREBY ORDERED, that Order No. 76-23 is amended as follows:

A. Finding No. 1, page 1, is amended to read:

1. The City and County of San Francisco, hereinafter called the discharger, presently discharges untreated domestic and industrial wastewater mixed with storm water runoff, all containing pollutants, into the Pacific Ocean, a water of the United States.

B. Finding No. 8, page 2, is deleted.

C. Finding No. 9, page 2, is amended to read:

9. The beneficial uses of the Pacific Ocean in the vicinity of these diversion structures are:

Water contact recreation
Non-contact water recreation
Marine habitat
Commercial and sport fishing
Fish migration
Wildlife habitats

D. Discharge prohibition A.1, page 3, is amended to read:

1. Discharge of untreated waste to waters of the State is prohibited with the exception of allowable overflows as defined below. The City shall design and construct facilities for diversion structures No. 1-8 to achieve a long term average of eight (8) overflows per year from these facilities. These long term overflow frequencies shall not be used to determine compliance or noncompliance with the exception. Allowable overflows from these facilities are defined as those discharges which occur when all of the following criteria are met:

a. All storage capacity within a storage facility is fully utilized; and

b. Maximum installed pumping capacity or some lower rate based on limits of downstream transport or treatment capabilities is being utilized to withdraw flows from the storage facility; and

c. All citywide treatment facilities, excluding the Golden Gate Park reclamation facility, are being operated at capacity or at some lower rate consistent with the maximum withdrawal and transport rates; and

d. Overflow occurs from a facility employing baffles or other equivalent means to reduce the discharge of floatables.

Overflows which occur when criteria a, b, c, and d are not being met shall be considered violations of this discharge prohibitions.

E. Provision B.3.a., page 3, is amended to delete the following:

"(1)[1/] Reduce frequency of discharge for diversion structures No. 1 through 8 to an average [2/] of one overflow event per year.

[1/] This Board will consider amendment of this order to further reduce frequency of discharge after review of the information requested in Provision B.4. below.

[2/] Method of computing average to be developed in self-monitoring program."

F. Provision B.3.a is amended to add the following on page 5:

Task	Completion Date
"(d) Full compliance with Discharge Prohibition A.1.	by July 1, 1977"

G. Provision B.3.b. is amended to add the following on page 5:

Task	Completion Date
"(3) Full compliance with Discharge Prohibition A.2. and A.3.	by July 1, 1977"

H. Provision B.3.c. is amended to add the following on page 6:

Task	Completion Date
"(2) Full compliance with Provision B.1.	by July 1, 1977"

I. Provisions No. B. 10., 11., and 12. are added on page 7 as follows:

"10. The City and County of San Francisco is required to submit to the Regional Board by the first day of every month a report, under penalty of perjury, on progress towards compliance with this Order. Said report shall include the status of progress made toward compliance with all tasks of this Order. If noncompliance or threatened noncompliance is reported the reasons for noncompliance and an estimated completion date shall be provided.

11. The long term average overflow frequency prescribed in this Order is based on information available at the time of adoption of this Order. If the Board finds that changes in the location, intensity or importance of affected beneficial uses or demonstrated unacceptable adverse impacts as a result of operation of the constructed facilities have occurred they may require the construction of additional facilities or modifications of the operation of existing facilities.

12. The City and County of San Francisco shall perform a self-monitoring program in accordance with the specifications prescribed by the Executive Officer of the Regional Board. The City and County's Health Department is requested to post warning signs on all beaches affected by the wet weather overflows for a period of time commencing with the day of overflow and continuing until the water analyses indicate the water quality of the affected areas have recovered and are meeting bacteriological standards for water contact sport recreations in the beach areas."

I, Fred H. Dierker, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 16, 1979.

FRED H. DIERKER
Executive Officer

Attachments:
Reporting Requirements 8/8/73
Standard Provisions 8/8/73

SAN FRANCISCO WASTEWATER PROGRAM

CITY AND COUNTY OF SAN FRANCISCO

WESTSIDE WET WEATHER FACILITIES
REVISED OVERFLOW CONTROL STUDY

Abstract Report
and
Request for Revised Overflow Frequency

DECEMBER 1978

TABLE OF CONTENTS

SAN FRANCISCO WASTEWATER PROGRAM

City and County of San Francisco, 150 Hayes Street, San Francisco, California 94102, Telephone (415) 558-2137

December 15, 1978

Regional Water Quality
Control Board
1111 Jackson Street
Oakland, California 94607

WESTSIDE WET WEATHER FACILITIES
REVISED OVERFLOW FREQUENCY

Ladies and Gentlemen:

The City and County of San Francisco has been designing its wet-weather facilities under existing RWQCB Orders #76-22, #76-23, and #76-24, which established in 1976 specific numbers of wet-weather combined sewer overflows for the Southeast, Westside, and North Shore zones respectively. These permits allow for an average of one to four overflows City-wide but for Westside, specifically, only one overflow is allowed. On November 28, 1978, the City requested and the Regional Water Quality Control Board granted, a revised overflow frequency level for the Northshore by amending Order No. 76-24 to provide an average of four overflows per year.

The purpose of this letter is to petition the Regional Board to amend RWQCB Order #76-23 (the Westside Zone) to allow an average of eight wet-weather combined sewage overflows per year for the Westside.

Currently, the Westside is permitted only one overflow annually. The Regional Board Orders require the City, if it requests a revision on overflow frequencies, to develop and submit the information that could form the basis of Board amending action. The City has recently developed this information primarily through work currently in progress for the Southwest Water Pollution Control Plant Facility Plan, including the Environmental Impact Report for that facility. Additional data has been gathered by the City staff, some of which is included in this report and some of which will be submitted during the coming weeks as it is refined.

The City is petitioning the Regional Board for eight overflows on the Westside at this time for the following reasons:

1. The State Water Quality Control Board is urging the City to award the Westside contracts as rapidly as possible. In order to proceed with advertising the control level must be established. Each month's delay causes an inflationary cost of approximately 1.5 million dollars per month.

Regional Water Quality Control Board
December 15, 1978
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2. The California Coastal Commission has denied the City a required development permit based on one overflow along the Great Highway in part because of concern for the size/location of the transport necessary for a 1 overflow system. Key to developing a new permit application is the selection of a final alignment for Westside facilities, for which a decision on overflow frequencies is required. Only after the alignment is established can the City proceed to obtain the Coastal Commission Permit necessary to construct the facilities.

3. The Citizens of San Francisco have become extremely sensitive to the tremendous increases to the sewer service charge and are demanding that Wastewater quality be improved at a substantially reduced cost level than the current NPDES permit allows. The 1977 amendment to the Federal Clean Water Act parallels citizen concern on this point and underscores the need to consider cost-effectiveness of Wastewater plans.

While the petition before the Regional Board now is for a reduction in overflows for Westside only, Westside is only one component of the entire City-wide waste water system. To understand the full extent of the potential cost benefits to San Francisco of reduced overflows, the City is providing the Regional Board with updated information pertinent to the City-wide system as well as to the Westside. This will assist the Board in making sound judgments regarding costs vs water quality benefits, judgments which are of concern to all governmental agencies and citizens.

The bulk of the data relevant to an overflow frequency decision is included in this Abstract Report delivered, as requested by the RWQCB staff, on December 15. Additional information addressing primarily Public Health & Fish & Game concerns, as well as refined financial data will be forwarded to the Board during the coming weeks to assist in the determination.

The information is submitted on eight plates and a back-up report as follows:

Plate 1: City Map Delineating the Westside Zone.
Plate 2: City-wide - Overflows vs Capital and Annual Cost Vs Accomplishments.
Plate 3: Tabulation of Base Data.
Plate 4: Westside Zone - Wastewater Generated and Percentage Treated.
Plate 5: Westside Zone - Tabulation/Overflows vs Accomplishments.
Plate 6: Westside Zone - Distribution of Estimated Daily Beach Users.

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Plate 7: Westside - Cost Benefit Analysis Based on Recreational Beneficiaries.
Plate 8: Westside - Statistical Summary Wet Weather Overflows

Abstract Report: Westside Wet Weather Facilities Revised Overflow Control Study.

Plate 1: Delineates the Westside Zone.
Plate 2: Compares the cost benefit effect of various overflow levels City-wide. This plate contains updated values from those presented in the North Shore report, and demonstrates that the shift from the earlier NPDES overflow level to four (4) overflows effectuates a savings of $80 million in capital costs and $6 million in annual costs (ammortization and maintenance and operation costs) while increasing the overflow hours by only 3%, mass emissions by only 3% for suspended solids and 2% for BOD.
Plate 3: Is the base data used for the above Plate 2.
Plate 4: Addresses Westside specifically and identifies the amount of dry and wet-weather flow generated and treated.
Plate 5: Compares the differences between the existing NPDES requirements and a requirement of eight (8) overflows for the westside along the lines of cost vs benefits including mass emission and coliform reduction and hours of overflow. It is noted that there is a $110 million capital cost-savings, equivalent to a $10 million annual cost-saving at a slight reduction in benefits. The NPDES level of control reduces wet-weather mass emissions from existing conditions by 98%. A control level of eight (8) overflows per year reduces wet-weather mass emissions from existing conditions by 84%. This difference constitutes a reduction of only 14%. The differences in percent reductions for coliform and for hours of overflow are in the same order of magnitude, ranging from 8 to 18 percent.
Plate 6: Show beach usage for the Westside Zone. The plate shows the (estimate) number of people engaged in various beach activities such as swimming and fishing along the shoreline from Thornton Beach State Park to the Golden Gate Bridge.
Plate 7: Shows dollar costs related to additional person exposure based on probability of rainfall and overflow. It is estimated that on a typical day following overflow, approximately 2,500 people would be in and near the water, but only 165 of them would actually swim, surf, or wading above waist deep. There are approximately 21

additional days of high coliform levels between the 1 and 8 overflows levels. The annual cost aspect of increased exposure due to an increased overflow level from 1 to 8 per year is as follows:

Wading and Swimming

$10,000,000 (annual cost differential)

$165 x 21 (people/day) x 21 (days differential) = $2,886. It costs the Sewer Service Charge users $2,886 more per person swimming at the one (1) overflow than at the eight (8) overflow level.

In or Near the Water

$10,000,000 (annual cost differential)

2,500 x 21 (people/day) x 21 (days differential = $190. It cost the Sewer Service Charge users $190 more per person on the beach at the one (1) overflow level than at the eight (8) overflow level.

Plate 8: Presents comprehensive data requested by the staff of the Regional Board. This Plate provides detail and confirmation of the data summarized above.

In addition to providing statistical data covering costs and benefits of different levels of overflows, it should be further noted that the Director of the Bureau of Disease Control of the City of San Francisco states that there have been no reported cases of illness from sewage discharge in the City of San Francisco during the past 25 years. Although major infectious diseases are water-borne, there has been no definite link established between occurrence of disease and the use of beaches during overflows.

Finally, it should be noted that the overflows which will occur in the future will be of better quality water than those which presently occur. The raw mass emission data tabulated in the detailed report does not reflect the fact that material which will overflow will have been stored for a considerable time, allowing settlement of a portion of the pollutants. Model tests indicate that the proposed baffling devices will reduce floatable material in the overflows by as much as 75%.

Additional mitigating measures such as screening and outfall extensions could be taken in the future if required and shown to be cost-effective. It is prudent to construct and operate the facilities before determining if such additional mitigating measures are warranted.

Regional Water Quality Control Board
December 15, 1978
Page Five

In summary, the City respectfully requests the Regional Board to increase the number of allowable overflows for Westside from the present NPDES level of one (1) to a new level of eight (8). The City views this increase in allowable overflows as an environmentally sound and prudent way to serve the citizens of San Francisco and the Bay Area. It provides large capital and maintenance savings at only a slight reduction in water quality. The data generated by the City addresses in a comparative fashion for one (1) and eight (8) overflows for Westside, beach use, public health concerns, fish & game concerns, operation and maintenance costs, capital costs, and water quality. It sets the Westside permit request into the context of City-wide potential economies. The City believes that the present permit request is consistent with the Regional Board's desires for high water quality standards.

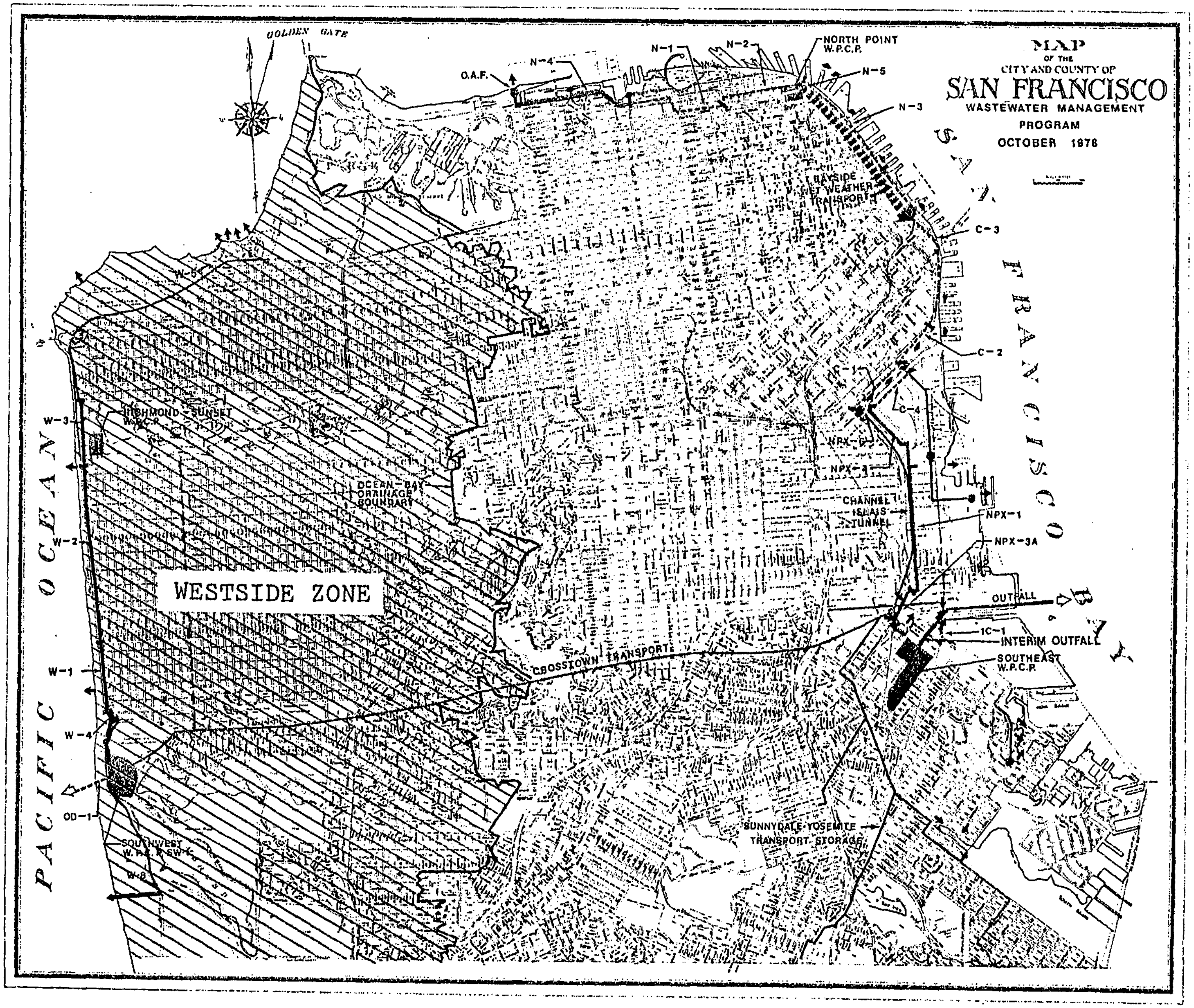
Mr. Sklar and other staff members will be in attendance at the Regional Board's meeting on January 16, 1979 to make a brief presentation. If there are any questions in the meantime, please contact me at 558-2137.

Very truly yours,

Thomas F. Landers

for A. O. Friedland
Deputy Director
Wastewater Program

REFERENCE PLATES



LEGEND

- UNDER DESIGN
- DESIGNED
- UNDER CONSTRUCTION
- CONSTRUCTED
- TENTATIVE CONCEPTS*
- ALTERNATE TENTATIVE CONCEPTS*
- OUTFALLS
- PUMPING STATION

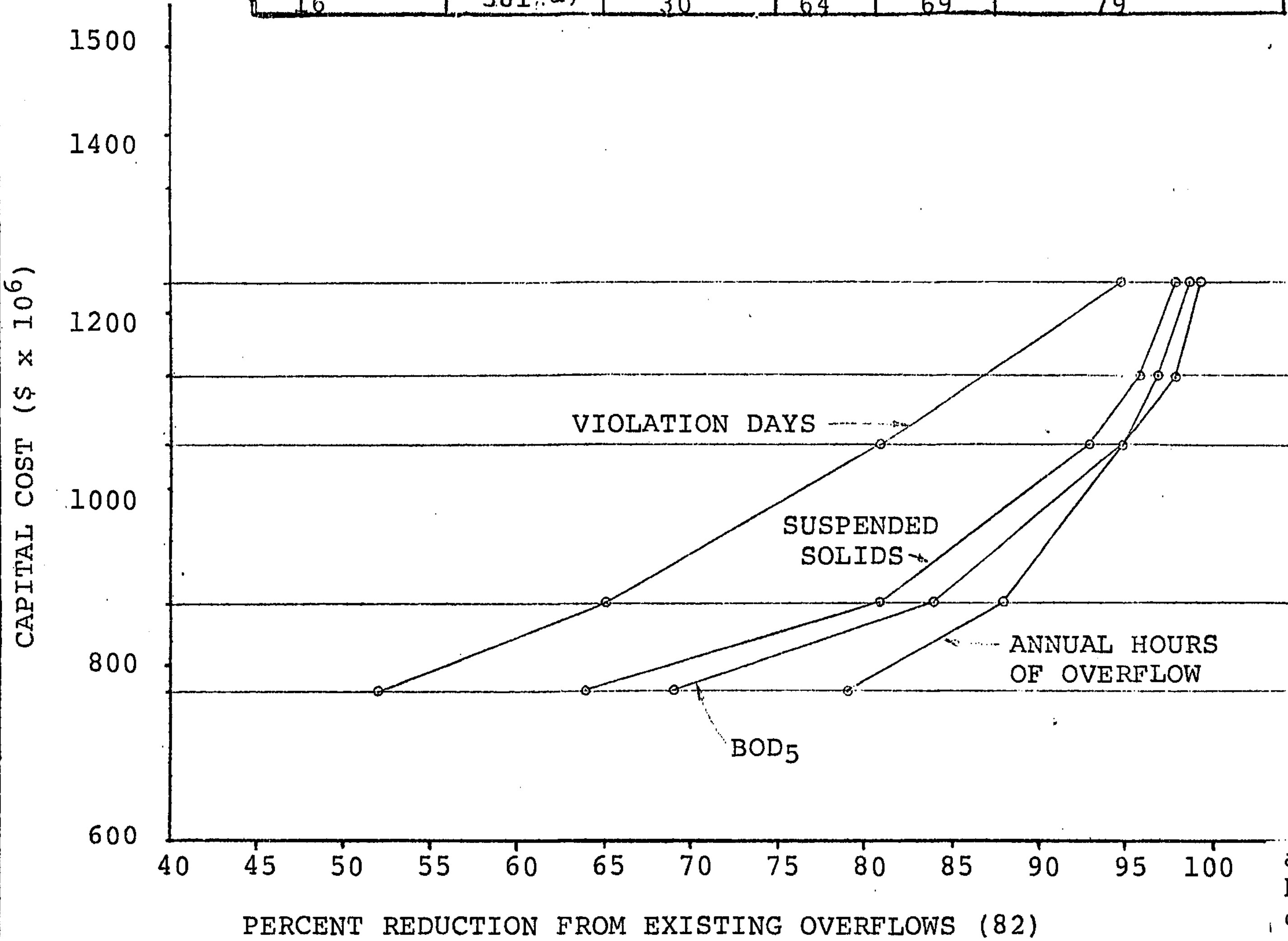
MAP REF.	PROPOSED CONSTRUCTION CONTRACTS AND SUPPORTING DOCUMENTS
	NORTH POINT CROSSTOWN
NPX-1	INDIANA STREET FORCE MAIN
NPX-3A	FORCE MAIN EVANS TO ARMY
NPX-3B	FORCE MAIN
NPX-4	FORCE MAIN, PUMP STATION TO INDIANA
NPX-6	CHANNEL PUMP STATION
NPX-6A	FORCE MAIN, PUMP STATION TO HOWARD
	NORTH SHORE OUTFALLS CONSOLIDATION
N-1	FORT MASON TUNNEL
N-2	NORTH POINT STREET
N-3	NORTH EMBARCADERO
N-4	MARINA
N-5	NORTH SHORE PUMP STATION
	CHANNEL OUTFALL CONSOLIDATION
C-1	BERRY
C-2	KING
C-3	SOUTH EMBARCADERO
C-4	SOUTH SIDE
	ISLAIS CREEK OUTFALLS CONSOLIDATION
IC-1	ISLAIS CREEK SOUTH SIDE
	WEST SIDE TRANSPORT
W-1	PUMP STA. TO SANTIAGO
W-1	SANTIAGO TO NORIEGA
W-2	NORIEGA TO LINCOLN
W-3	LINCOLN TO FULTON
W-4	WST PUMP STA. & F.M.
W-5	RICHMOND TRANSPORT
W-8	LAKE MERCED TRANSPORT (TUNNEL)
OD-1	S.W. OCEAN OUTFALL
SE-4	S.E. WATER POLLUTION CONTROL PLANT
SW-1	S.W. WATER POLLUTION CONTROL PLANT

*The transport facilities indicated in red are tentative concepts. Route alignment designations have yet to be determined.

Plate 1

CITY WIDE

NUMBER OVERFLOWS	SAVINGS ($x10⁶) BASED ON NPDES		MASS EMISSIONS: PERCENT REDUCTION FROM EXISTING		
	CAPITAL	ANNUAL	S.S	BOD_5	ANNUAL HOURS OF OVERFLOW
NPDES (c)			96	97	98 (b)
4	80	9 (a)	93 (b)	95	95
8	261 (a)	23 (a)	81	84	88
16	361 (a)	30	64	69	79



NUMBER OF OVERFLOWS	WET WEATHER CITY-WIDE COST ($x10⁶)	
	CAPITAL (1)	ANNUAL (2) (3)
1	1232 (a)	96 (a)
PRESENT NPDES (c)	1129 (b)	91
4	1049 (a)	82 (a)
8	868 (a)	68 (a)
16	768 (a)	61

a) updated costs to 12/78
b) typo correction
c) Does not reflect change in NPDES #CA 003 8407

(1) Includes cost of projects under construction. Construction costs based on (ENR 3200) Dec.'77. Sludge and reclamation costs not included. Sales and purchase of treatment plant land included.
(2) Annual cost is equal to equivalent capital cost plus O&M. Equivalent capital cost based bond payoff of 20 years at 6 5/8% interest, adjusted to (ENR3200) Dec.'77.
(3) O&M based on 20-year period, 8%/yr. inflation and 6 5/8%/yr. interest, adjusted to (ENR 3200).

CITY - WIDE

TABULATION OF BASE DATA

OVERFLOWS	COST ($ MILLION)		COST SAVING ($ MILLION) BASED ON NPDES		PERCENT REDUCTIONS BASED ON EXISTING							
					SUSP.SOLIDS		BOD_5		HOURS OVERFLOW		VIOLATION DAYS[2]	
	CAPITAL	ANNUAL	CAPITAL	ANNUAL	$lbx10^6$	%RED.	$lbx10^6$	%RED.	HOURS	% RED.	Days	% RED.
EXIST(82)	93[1]	7[1]	---	---	8.35	BASE	3.47	BASE	268	BASE	197	BASE
16	768	61	361	30	3.04	64	1.08	69	56	79	94	52
8	868	68[3]	261	23[3]	1.61	81	0.54	84	31	88	69	65
4	1049	82[3]	80	9[3]	0.57	93	0.18	95	14	95	37	81
NPDES (a)	1129	91	BASE	BASE	0.36	96	0.11	97	5.5	98	N/A	N/A
1	1232[3]	96.2[3]			0.17	98	0.06	98.5	3.5	99	10	95

(1) Includes costs of the wet-weather transport-storage facilities under construction as of October 1978

(2) Days of coliform levels greater 1000 MPN/100ml

(3) Numbers reflecting updated costs as of 12/78

(a) Does not reflect Regional Board decision of 11-21-78 changing overflow level in North Shore Zone to four (4).

WESTSIDE ZONE

WASTEWATER GENERATED AND PERCENTAGE TREATED

	Generated (Mill. Gal./Yr)	Percentage Treated				
		Existing	16 O'flows	8 O'flows	4 O'flows	1 O'flows
Sanitary	8040	95.8	99.02	99.63	99.82	99.96
Urban Runoff	3030	16.9	66.3	86.1	93.4	98.4
Total Wastewater	11070	74.1	90.1	95.9	98.1	99.53

PLATE 4

WESTSIDE

TABULATION OF OVERFLOWS VS COST VS ACCOMPLISHMENTS

No. of Overflows	COST ($ MILLION)		Susp. Solids & BOD % Reduction from Existing	Coliform				Overflow	
				> 10,000		> 1000			
	Capital	Annual		Days	% Reduction	Days	% Reduction	Hrs.	% Reduction
Existing	-	-	-	70		119		372	
16	$167	$12	62	23	67	49	59	85	77
8	189	14	84	10	86	25	79	32	91
4	242	19	93	6	91	13	89	15.4	96
1(NPDES)	299	24	98	1	99	4	97	3.5	99+

PLATE 5

DISTRIBUTION OF ESTIMATED DAILY BEACH USERS

BEACH ACTIVITY SURVEY

Estimates of Daily Winter Time Usage (1)

ACTIVITY	Baker Beach	Phelan Beach	Lands End	North of Fulton	Fulton to Lawton	Lawton to Santiago	Santiago to Sloat	Ft. Funston	Thornton Beach	Totals (2)
Swimming	5	10	nil	5	5	5	5	5	5	25 - 50
Surfing	5	5	nil	30	10	15	25	5	nil	90
Fishing	20	5	10	nil	nil	6	5	5-10	5	60
Shell fishing	?	5	?	nil	nil	nil	nil	nil	nil	? (4)
Wading below waist	15	5	neg.	30	25	20	15	5	5	120
Wading above waist	5	5	neg.	5	5	5	5	5	5	25
Non-contact usage	250	60	50 (3)	600	430	220	260	300	35	2,165

(1) Based on Wastewater Program, December 1978 surveys

(2) Less than 5 counted as 2½ for total

(3) Considers only people on the several small pocket beaches in this area

(4) See text

WESTSIDE COST-BENEFIT ANALYSIS

BASED ON RECREATIONAL BENEFICIARIES

Design No. of O'flows/yr	Days of coliform MPN >1000	Days		Annual Cost $\$x10^6$	Cost Diff. $\$ \times 10^6$	Per Diem Costs x $1000		Cost($) per beneficiary	Incremental Costs($) Per Addtl. Beneficiary
		from exist	between levels			from exist	between levels		
EXISTING	119								
			70		12		171		68
16	49	70		12		171		68	
			26		2		77		31
8	25	94		14		149		60	
			12		5		417		167
4	13	106		19		179		72	
			9		5		555		222
1	4	115		24		200		80	

NOTES: A beneficiary is a beach user (includes swimmers and surfers) that enjoys cleaner water (i.e. coliform MPN 1000) as a result of the elimination of overflows.

2500 people per day assumed visiting beaches after overflows in the Westside zone between the Golden Gate Bridge and Thornton Beach (from Table V-1)

PLATE 7

WESTSIDE

STATISTICAL SUMMARY WET-WEATHER OVERFLOWS

CONTROL LEVELS

Yearly O'flow Totals	Unit	Existing Min	Existing Ave	Existing Max	16 per year Min	16 per year Ave	16 per year Max
No. of Overflows	Event	26	114	193	6	16	31
% Reduction			Base			86	
Hours of Overflow	Hour	163	372	617	16	85	148
% Reduction			Base			77	
Total Wastewater	$Gal.x10^6$	926	2,870	5,030	151	1,100	2,360
% Reduction			Base			62	
Sanitary Discharge	$Gal.x10^6$	149	341	566	15	78	136
% Reduction			Base			77	
Urban Runoff	$Gal.x10^6$	774	2,520	4,450	136	1,020	2,220
% Reduction			Base			60	
Composition of Discharge (% Sanitary)	%		12			7.0	
Days Receiving Waster (near outfalls) coliform Levels exceed;							
(1) 10,000 MPN/100ml	Days	41	70	103	10	23	46
% Reduction			Base			67	
(2) 1,000 MPN/100ml	Days	67	119	147	23	49	90
% Reduction			Base			59	
BOD_5	$lbs.x10^3$	394	1,220	2,140	64	468	1,000
% Reduction			Base			62	
Suspended Solids	$lbs.x10^3$	3890	12,100	21,200	635	4630	9,930
% Reduction			Base			62	

PLATE 8.

WESTSIDE

STATISTICAL SUMMARY WET-WEATHER OVERFLOWS

(continued)

CONTROL LEVELS

Yearly O'flow Totals	Unit	8 per year Min	8 per year Ave	8 per year Max	4 per year Min	4 per year Ave	4 per year Max	1 per year Min	1 per year Ave	1 per year Max
No. of Overflows	Event	1	8	18	0	4	11	0	1	4
% Reduction			93			96.5			99	
Hours of Overflow	Hours	2	32	78	0	15.4	42	0	3.5	18
% Reduction			91			96			99+	
Total Wastewater	$Gal.x10^6$	15	449	1070	0	213	563	0	52	265
% Reduction			84			92.5			98	
Sanitary Discharge	$Gal.x10^6$	1.8	29	72	0	14	39	0	3.2	17
% Reduction			91.5			95.7			99+	
Urban Runoff	$Gal.x10^6$	13	420	998	0	198	524	0	49	248
% Reduction			83			92			98	
Composition of Discharge (% Sanitary)	%		6.5			6.5			6.2	
Days Receiving Waster (near outfalls) coliform Levels exceed;										
(1) 10,000 MPN/100ml	Days	2	10	23	0	6	16	0	1	6
% Reduction			86			91.4			98.6	
(2) 1,000 MPN/100ml	Days	6	25	51	0	13	31	0	4	14
% Reduction			79			89			96.6	
BOD_5	$lbs.x10^3$	6.4	191	460	0	91	239	0	22	113
% Reduction			84			92.5			98	
Suspended Solids	$lbs.x10^3$	63.1	1890	4550	0	896	2360	0	219	1,110
% Reduction			84			925			98	

PLATE 8 - Continued

ABSTRACT REPORT

REVISED CITY WIDE OVERFLOW CONTROL STUDY - ABSTRACT REPORT WESTSIDE FACILITIES

SECTION 1

PURPOSE AND ORGANIZATION OF STUDY

The purposes of this study are to: (1) Respond to the Basin Plan recommendations and NPDES requirements for a revised benefit-cost analysis, including the investigation of measures such as outfall extensions, screening and disinfection to reduce the adverse impacts of overflows; (2) Respond to citizens' concerns about the high cost of the wet-weather overflow control facilities relative to the benefits derived; (3) Respond to EPA funding guidelines requiring cost-effective evaluations of combined sewer overflow projects.

This City-wide overflow study has been divided into three reports due to the need to reach an early agreement on the overflow frequencies for Westside and Northshore projects in order to avoid excessive delays in the scheduled advertising dates, and the need for additional field studies to address the potential for localized problems in pH, & dissolved oxygen levels in three confined bodies of water south of the Bay Bridge.

Each report will be published in two versions. A short abstract written in lay language, and covering only the salient issues is being prepared for use by the decision-makers on the Regional Board and the City's Board of Supervisors. A full report containing all the supporting technical studies will be prepared and submitted to the technical staffs of the SWRCB, RWQCB, and EPA.

A draft of portions of the full report for the Northshore & Westside areas was submitted to the RWQCB staff in October 1978. Additional technical material will be submitted as it is developed. The tentative schedule for completing the remaining reports is as follows:

Abstract Report Northshore Outfalls - Completed Nov. 21, 1978

Abstract Report Westside - December 15, 1978

Full Report Northshore and Westside (combined) - January, 1979

Abstract & Full Report - May, 1979
Southeast Sector

Basin Plan Recommendations & NPDES Requirements For This Study

The 1975 Basin Plan discusses the "...difficult problem of wet weather control" presented by the combined sewer system in San Francisco and acknowledges the fact that any solution would be "inherently costly" and concludes with the recommendation "that a revised benefit-cost analysis be performed by the City for each zone, especially those areas which incur high recreation usage".

In March of 1976 the RWQCB issued NPDES Permits CA 0038415 and CA 0038407 for the wet-weather diversion structures in the Richmond-Sunset (Westside) and North Point sewerage zones.

Both permits contain identical language requiring the City to undertake the revised-benefit-cost analysis recommended in the Basin Plan and both permits contain the rather disturbing clause "that the Regional Board will consider amendment of this Order to further reduce frequency of discharge after review of the information requested in Provision B-4 above" (Reference to B-4 above is to the revised benefit-cost analysis). However, at a meeting early this year RWQCB staff indicated to the City officials that they would be amenable to recommending a relaxation of the permitted overflow frequencies if the City's benefit-cost analysis so justifies.

Both permits mandate the Basin Plan recommendations against discharges into dead-end sloughs or discharges with less than 10:1 initial dilution, and both permits contain a clause to the effect that they will consider exceptions to these requirements.

Public Concerns

There is considerable public concern about the tremendous costs of the facilities needed to achieve compliance with the present discharge requirements. The City's 12½% share of the construction costs and the entirety of the operation and maintenance costs will be financed by the sewer service charge. This charge now averages $6 for a typical single-family residence per month and is expected to increase to $15 per month (assuming continuance of the same cost-proration formulae). Costs for the wet-weather facilities will amount to 60% to 70%, (depending on overflow frequency) of the total equivalent annual costs of the Master Plan facilities.

EPA Funding Guidelines for Combined Sewer Overflow (CSO) Projects

The Environmental Protection Agency (EPA) guidelines for funding projects to control combined sewer overflows are contained in their Program Guidance Memorandum-61. This Memorandum requires that planning for CSO projects consider "The benefits to the receiving waters of a range of levels of pollution control during wet-weather conditions" and further requires as a condition for project approval that the final alternative selected satisfy the criterion that "The marginal costs are not substantial compared to the marginal benefits."

II - BACKGROUND

Existing Conditions

Because of limited treatment capacity and a lack of storage inherent in the existing system, overflows occur whenever rainfall exceeds 0.02" per hour, (a heavy drizzle). On the average these overflows occur 82 times a year. The excess flow is discharged through 39 shoreline overflow structures distributed around the priphery of the City. The composition of these overflows can range from approximately equal parts sanitary flow and runoff to greater than 50 parts runoff to one part sanitary and duration of the overflows can range from a few minutes to a few days. California Administrative Code standards for receiving water bacteriological quality are exceeded approximately 170 days a year (citywide average), due to sewer overflows.

Under the existing condition of 82 overflows per year approximately 97.5% of the City's sanitary flow and roughly 30% of the urban runoff receives treatment and primary disinfection.

Master Plan Recommendations

Studies for the control for wet-weather overflows were initiated in 1967. In 1971 the City published the comprehensive Master Plan containing recommendations for the construction of a series of upstream retention basins, transport-storage tunnels and a single wet-weather treatment plant, all for the purpose of limiting wet-weather overflows to a frequency of eight per year. Subsequent revision to the Master Plan deleted a majority of the upstream retention basins in favor of shoreline outfall consolidation structures.

Basin Plan Recommendation For Overflow Frequency

The authors of the Basin Plan recommended that wet-weather overflow limitations be based on beneficial uses of the affected shoreline and specifically recommended overflow frequencies of 0.2 overflows per year to eight overflows per year. The Basin Plan authors also recommended the wet-weather overflows receive coarse screening to remove large visible floatable material, be discharged through outfalls designed to achieve a 10:1 initial dilution, be removed from dead-end slough and channels, and be discharged away from beaches and marinas. However, earlier in their discussion of wet-weather overflow problems, the authors stated that "The approach presented is conceptual and should not be interpreted as rigid numerical objectives. The specified control levels are based on available information and should be evaluated by the Regional Board and other agencies prior to the designation of such levels for each area." (emphasis ours)

Present NPDES Overflow Frequency Requirements

In 1976 the RWQCB issued NPDES permits for the wet-weather diversion structures. Permit CA 0038415 mandates the more stringent of the two Basin Plan recommended frequencies for the Westside portion, namely one overflow per year.

NPDES Permit CA 0038407 incorporated in RWQCB Order 76-24 for the North Point Sewerage Zone mandated one overflow per year for outfalls 9 through 17 and 4 overflows per year for outfalls 18 through 28.

RWQCB Order 78-102 dated November 21, 1978 amended order 76-24 to change the overflow frequency for outfalls 9-17 from one to four per year.

The Permit for the Southeast Zone, CA 0038423, established an overflow frequency of 4 per year for certain of the structures discharging into Islais Creek. No overflow frequencies are set for the balance of this zone apparently due to the uncertainties as to the nature and extent of the shellfish beds located in this zone.

SECTION III

City-wide Considerations

The planning for control of combined sewer overflows is a two-tiered effort. A City-wide evaluation is required, and is in progress, to determine the most cost-effective overflow flow management options (e.g single wet-weather plant versus several wet-weather plants) to achieve a particular level of wet-weather control and to evaluate the potential for any region-wide or long-term adverse effect of the total wet-weather overflow discharges. Once the City-wide level of effort and wet-weather flow management scheme is established, a zone-by-zone cost-benefit analysis can be made to maximize the benefits that would be derived from the overall expenditure levels. As part of the planning for the Southwest Treatment Plant, tasks were included to perform the City-wide element of the required revised cost-benefit analysis. The analysis confirms the cost-effectiveness of the original Master Plan concept of a single wet-weather plant in the Southwest portion of the City and the bulk of the Master Plan flow routing concepts. Cost and mass emission data developed during this analysis will serve as the basis for the following discussion of the City-wide cost-benefit considerations. However the discussions and conclusions are the City's.

City-wide Cost-Benefit Considerations

City-wide wet-weather costs have been compared with the expected benefits, i.e. reduction in pollutants discharged for City-wide overflow control frequencies of 16, 8, 4 and 1 overflows per year and the existing NPDES permit specified frequencies. An overflow frequency of four per year was assumed for those overflow diversion structures in the southeast zone that do not have NPDES permit frequencies specified. These comparisons are tabulated in Tables III-1 and III-2 and displayed graphically on Figure III-1.

Traditionally, cost-benefit analysis has consisted of plotting a cost-benefit curve with the expectation that a pronounced "knee of curve" will develop to suggest that optimal level of effort. This "text book" approach is difficult to apply to the City-wide overflow level for two reasons: 1) in this case, as in most real-world cases, no pronounced "knee of curve" appears. Rather, as indicated, the subject curves have a gradual curvature through the range of frequencies under consideration 2) In the cost-benefit analysis, the benefits are being measured indirectly. In effect, decreased emissions are being measured, not increases in the beneficial uses and productivity of the receiving waters.

Nevertheless, the curves do confirm the classic "law of diminishing returns" concept, that is, more stringent levels of overflow control require a greater number of dollars be expended to remove incrementally less pollutants.

City-wide Impacts of Overflows

The estimated yearly citywide discharge of various pollutants to San Francisco Bay from combined sewer overflows has been compared to total yearly loadings of these pollutants into the Bay from tributary areas and the results tabulated in Table III-3. With the possible exception of coliforms, San Francisco wet-weather overflows contribute less than 1% of the total pollutant loads to the Bay for any of the pollutants evaluated. Comparisons of pollutant loadings for individual heavy metals and chlorinated hydrocarbons (herbicides, pesticides, etc.) have not been attempted due to the lack of both City data and total region-wide data for these pollutants.

We have no reason to believe that concentrations of any of these other pollutants would be unusually high in combined sewer overflows and would constitute more than a small percent of the total discharge to the Bay of these pollutants. It is concluded that even complete elimination of San Francisco wet-weather discharges would not result in any measurable permanent reduction, in the background Bay concentrations of any of these pollutants.

Because of the highly confined nature of certain waters in the Southeast portion of the City (i.e. Channel, Islais Creek, and Yosemite Channel/South Basin) there exists the possibility that wet-weather overflows could result in some very localized adverse impacts on the marine environment. Field studies will be undertaken this winter to determine the magnitude and durations of these localized impacts.

CITY - WIDE

TABULATION OF BASE DATA

OVERFLOWS	COST ($ MILLION)		COST SAVING ($ MILLION) BASED ON NPDES		PERCENT REDUCTIONS BASED ON EXISTING							
	CAPITAL	ANNUAL	BASED ON NPDES		SUSP.SOLIDS		BOD_5		HOURS OVERFLOW		VIOLATION DAYS(2)	
			CAPITAL	ANNUAL	$lbx10^6$	%RED.	$lbx10^6$	%RED.	HOURS	% RED.	Days	% RED.
EXIST(82)	93(1)	7(1)	---	---	8.35	BASE	3.47	BASE	268	BASE	197	BASE
16	768	61	361	30	3.04	64	1.08	69	56	79	94	52
8	868	68(3)	261	23(3)	1.61	81	0.54	84	31	88	69	65
4	1049	82(3)	80	9(3)	0.57	93	0.18	95	14	95	37	81
NPDES (a)	1129	91	BASE	BASE	0.36	96	0.11	97	5.5	98	N/A	N/A
1	1232(3)	96.2(3)			0.17	98	0.06	98.5	3.5	99	10	95

(1) Includes costs of the wet-weather transport-storage facilities under construction as of October 1978

(2) Days of coliform levels greater 1000 MPN/100ml

(3) Numbers reflecting updated costs as of 12/78

(a) Does not reflect Regional Board decision of 11-21-78 changing overflow level in North Shore Zone to four (4).

Table III-1

CITY-WIDE COST-BENEFIT ANALYSIS

BASED ON RESREATIONAL BENEFICIARIES

Design Number of Overflows	Days of coliform MPN 1000/100ml	Days from exist	Days between levels	Annual Costs $x106	Cost Diff. Diff. $x106	Per Diem cost $x106 from exist.	Per Diem cost $x106 between levels	Cost($) per beneficiary*	Costs ($) costs per addtl. beneficiary*
EXISTING(1)	171			---		0		0	
			117		61		0.52		173
16	54	117		61		0.52		173	
			24		7		0.29		97
8	30	141		68(2)		0.48		160	
			15		14		0.93		310
4	15	156		82(2)		0.53		177	
			11		14		1.27		423
1	4	167		96(2)		0.57		190	

(* A "beneficiary" is a beach user, including swimmers and surfers, that enjoys cleaner water, i.e. coliform MPN 1000, as a result of the elimination of overflows.

Costs are based on Metcalf & Eddy data.

3000(3) per day, assumed visitors to beaches after overflows City-wide plus San Mateo Coast, projected from CLER data, ocean waiver data, and Thornton Beach State Park data.

(1) For purposes of this plate, "Existing" denotes condition before any wet weather control projects constructed.
(2) Reflects updated costs as of 12/78
(3) Updated per beach surveys.

TABLE III-2

COMPARISON OF COMBINED SEWER OVERFLOW LOADINGS WITH TOTAL BAY LOADING (POINT & NONPOINT)[a]

10^6 lbs./year

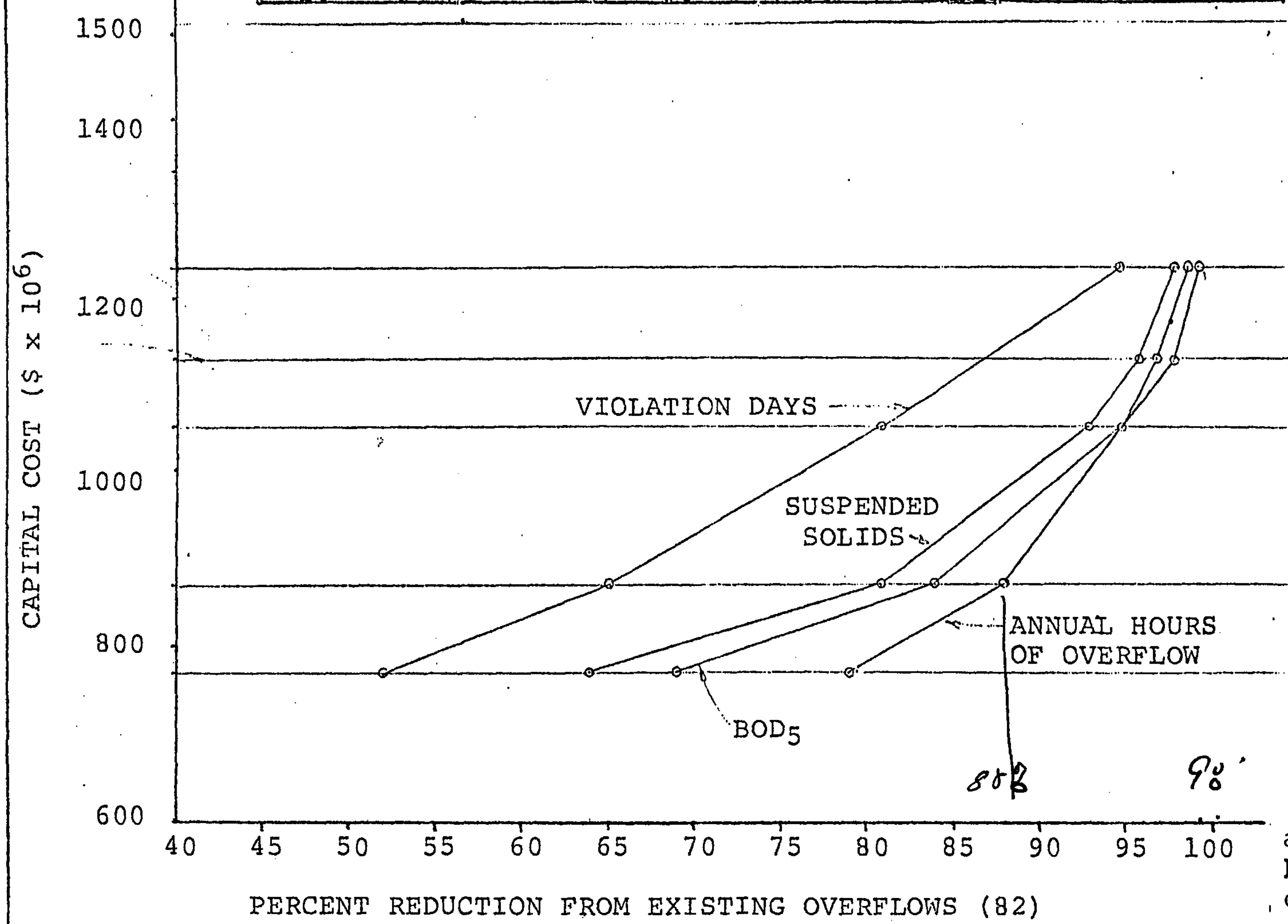
DESCRIPTION	SS	BOD	N	P	THM[f]
DELTA OVERFLOW	5100[b]	40	25	Unk.	5
BAY BASIN[c]	150	13	27	Unk.	5
SAN FRANCISCO TREATED EFFLUENT[d]	4	3	5	2	0.1
SAN FRANCISCO COMBINED SEWER OVERFLOWS[e]	13	0.7	0.14	Neg.	0.07
TOTAL	5213	60	60	Unk.	10
COMBINED SEWER OVERFLOWS % OF TOTAL LOADING	0.3	0.7	0.2	Neg.	0.7

a. Assuming secondary treatment of Bay Basin & San Francisco values the reduction percentages are as follows: suspended solids 90%, BOD 90%, N 90%, P 25%.
b. Average of values from Basin Plan, ABAG and Ocean Waiver application (after krome)
c. Treated effluent & Urban Runoff values from ABAG and Basin Plan. (does not include San Francisco discharges)
d. does not include values from Richmond-Sunset WPCP
e. Bayside Loadings only existing conditions
f. THM = Total Heavy Metals

TABLE III-3

CITY WIDE

NUMBER OVERFLOWS	SAVINGS ($x10^6) BASED ON NPDES		MASS EMISSIONS: PERCENT REDUCTION FROM EXISTING		
	CAPITAL	ANNUAL	S.S	BOD_5	ANNUAL HOURS OF OVERFLOW
NPDES (c)			96	97	98 (b)
4	80	9 (a)	93 (b)	95	95
8	261 (a)	23 (a)	81	84	88
16	361 (a)	30	64	69	79



NUMBER OF OVERFLOWS	WET WEATHER CITY-WIDE COST ($x10^6)	
	CAPITAL (1)	ANNUAL (2) (3)
1	1232 (a)	96 (a)
PRESENT NPDES (c)	1129 (b)	91
4	1049 (a)	82 (a)
8	868 (a)	68 (a)
16	768 (a)	61

a) updated costs to 12/78
b) typo correction
c) Does not reflect change in NPDES #CA 003 8407

(1) Includes cost of projects under construction. Construction costs based on (ENR 3200) Dec.'77. Sludge and reclamation costs not included. Sales and purchase of treatment plant land included.

(2) Annual cost is equal to equivalent capital cost plus O&M. Equivalent capital cost based bond payoff of 20 years at 6 5/8% interest, adjusted to (ENR3200) Dec.'77.

(3) O&M based on 20-year period, 8%/yr. inflation and 6 5/8%/yr. interest, adjusted to (ENR 3200).

Fig. III-1

SECTION IV WESTSIDE (OCEANSIDE) WET WEATHER FACILITIES

Background

Previously impounded Federal funds were released in early 1975 and almost simultaneously an accelerated program for pollution control facilities was announced by the Governor and the State Water Resources Control Board for the dual purpose of reducing pollution and providing construction employment during a period of high unemployment in this industry. The City immediately organized a crash program to contract pollution control facilities which included Westside Transport Project.

The Regional Water Quality Control Board issued Order No. 74-164 to cease discharging treated primary effluent from the Richmond-Sunset Water Pollution Control Plant through the Mile Rock Outfall and Order No. 74-162 requiring the City to implement Stage I of the Master Plan to "most expeditiously and economically give impetus to the State Board's direction to implement a solution to the wet-weather problem in the West side of the City."

The City's Analysis of Alternatives report of December 1975, recommended four (4) overflows per year for the Westside Transport, which included the Richmond and Sunset areas of the Westside District. The recommended project alignment was a tunnel and cut-and-cover tunnel in 42nd Avenue through a residential neighborhood. This alignment was adamantly rejected by the public.

Following a request from the State Water Resources Control Board the City prepared the Control Level Eligibility Report (June 1976) which established the cost-effectiveness of locating the consolidation sewer under the Upper Great Highway and reducing overflows to one (1) overflow per year ("C" level). This alignment is predominantly in public property, has adequate space for open-cut construction thereby allowing for economical construction benefits. The State concurred with this assessment and agreed to fund the redesign of the surface and roadway elements into an improved parkway as a mitigating measure.

However, the Central Coastal Commission (Regional) rejected the City's application for the required Coastal Commission Permit at their September 7, 1978 meeting due to concerns which we feel are exaggerated, regarding future beach erosion, sewer exposure, seismic and groundwater problems.

Following the City's request, the State Coastal Commission assumed jurisdiction from the Regional Commission and, pending a January 1979 overflow decision, is expected to act on the construction permit sometime in early 1979.

In the event that the Coastal Commission rejects the City's application, then a new alignment or storage concept will require evaluation. This would entail a complete redesign, probably greater costs, would require a new EIR and delay implementation of the project by at least one year.

A Lower Great Highway alignment or a more inland alignment would present major problems in developing sufficient storage volumes for the one overflow per year control level, and still be subject to considerable community opposition. Because of our belief that the cost consequences of the overflow frequency decision on a more inland route would be as large if not larger than the cost consequences for the Upper Great Highway, and the major uncertainties about the location of any acceptable alternative to the Upper Great Highway route the project description and cost-benefit analysis in this report will be restricted to the Upper Great Highway alternative.

PROJECT

The concept which underlies all overflow alternatives in the Great Highway is an "intercepting system" whereby the sewer functions as a storage facility and as a transport conduit. By maximizing the continuous movement of sewage in a storage facility, excessive deposition of solids is prevented. The major storage facility (Westside Transport) is located under the Upper Great Highway between Fulton Street and the Westside Pump Station just south of Sloat Boulevard. The Richmond and Lake Merced area flows will be collected and directed to storage in the Westside Transport via tunnels. Tunnel economics dictate the smallest tunnel to be approximately 9' in diameter. Therefore, those elements are approximately the same for most overflow frequencies.

An increase in the number of permitted overflows would result in a reduction in the size of the consolidation sewer and may result in a reduction in the size of the required Westside Pump Station and Southwest Water Pollution Control Plant. Metcalf & Eddy, as part of the SWWPCP facilities plan, has further evaluated storage/treatment overflow combination encompassing the entire Oceanside district. The values in table IV-1 are adaptations of their City-wide cost evaluation. Because these combinations are of a palnning level, of accuracy, further refinements are expected.

Storm flows would be by gravity to the Westside Transport for storage and transport to the Westside Pump Station, then pumped to the proposed Southwest Water Pollution Control Plant (SWWPCP) south of the Zoo for treatment. Effluent would be discharged into the ocean two miles offshore via a deep-water outfall. When storage and withdrawal rates are exceeded, bypassing would occur with some control through the Vicente and Lincoln Way Outfalls, Lake Merced and Baker's Beach (Richmond) Outfalls with possible selectivity into the Mile Rock Outfall.

Upon completion, the SWWPCP control plant will be the city-wide wet-weather treatment facility and the dry-weather treatment facility for the Westside District. The existing Richmond-Sunset Water Pollution Control Plant located in Golden Gate Park will be abandoned, thereby returning four acres of park land to recreational uses.

The Mile Rock Outfall (shoreline discharge) now functins as both the effluent outfall for the Richmond-Sunset plant and as a wet-weather overflow discharge for flows originating in the westerly portion of the Richmond-Sunset district. Upon relocation of the dry-weather treatment to the Southwest site, dry-weather discharges to Mile Rock would cease and wet-weather discharges would be reduced to the specified frequency. The elimination of the continuous dry-weather discharge of 20 MGD would in all probability be more significant than the reduction of wet-weather discharges in restoring presently depressed shoreline marine biota to more normal levels.

The Westside Transport, as presently designed for one overflow per year, consists of a rectangular transport storage structure, with a single 25-foot-wide channel from Fulton to Lincoln Way and two(2) 25-foot channels from Lincoln Way to the Westside Pump Station. All overflow alternatives require a large bypass structure at Lincoln Way and a smaller bypass facility at Vicente to control the overflow operation through the existing outfalls.

For 4 overflows per year the consolidating sewer in the Great Highway is reduced to a single 25-foot channel with a 1,300 foot and 1,200 foot long bypass structures at Lincoln Way and Vicente Street, respectively. Richmond and Lake Merced facilities would remain the same. Though the SWWPCP wet weather treatment remains at 640 MGD, that portion attributable to the Oceanside area is reduced from 240 MGD to 160 MGD.

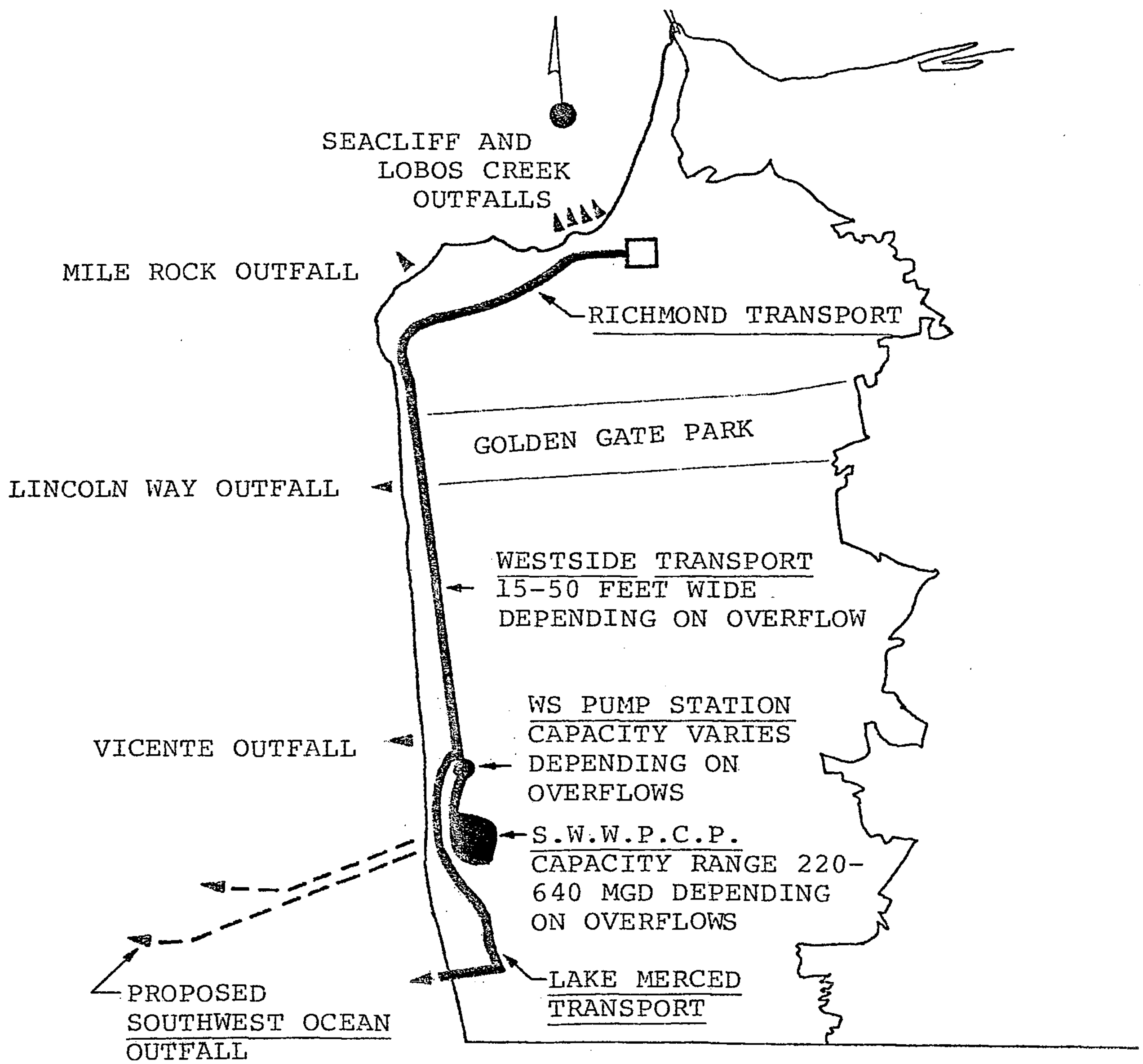
For 8 overflows/year the single channel reduces to a 17.5 foot width, the Lincoln Way structure remains at 1,300 feet but the Vicente structure is approximately 50 feet long. The SWWPCP wet weather plant is now reduced to 400 MGD, that portion attributable to the Oceanside area is reduced from 160 MGD to 80 MGD.

While this report contains cost estimates for the above frequencies and 16 overflows per year, general assumptions were made and results should be used for planning comparison only. As the overflows are increased, the existing sewere system storage capacity becomes a more significant part of the operation. A detailed analysis of that operation is beyond the time and scope of this report.

The present design of the Westside Pump Station as approved by the State for one overflow per year could be modified to provide the reduced dewatering requirements to approach four (4) overflows per year. The eight (8) overflow/year reduction would require a more significant modification of the station.

Assuming an overflow decision by January 15, 1979, the advertising date for a system for one or four overflows with the alignment in the Upper Great Highway could be approximately June 1979 which includes completion of the permit process and an EIR amendment. A system for eight (8) overflows per year may require a full EIR amendment extending the advertising date to November of 1979.

A schematic of the system and system cost breakdowns are shown on Figure IV-1 and Table IV-1, respectively.



WESTSIDE FACILITIES

FIGURE IV - I

WESTSIDE COSTS FOR VARIOUS OVERFLOWS

COSTS ($\$ \times 10^6$)

ELEMENTS	OVERFLOW FREQUENCY			
	1	4	8	16
LAKE MERCED TRANSPORT (1)				
SIZE (M. GAL.)	7.9	7.9	7.9	7.9
CAPITAL COSTS	$ 50.6	$ 50.6	$ 50.6	$ 50.6
AMORTIZATION	3.7	3.7	3.7	3.7
O & M	NIL	NIL	NIL	NIL
EQUIV. ANNUAL	3.7	3.7	3.7	3.7
RICHMOND TRANSPORT (1)				
SIZE (M. GAL.)	9.6	9.6	9.6	9.6
CAPITAL COSTS	39.3	39.3	39.3	39.3
AMORTIZATION	2.9	2.9	2.9	2.9
O & M	NIL	NIL	NIL	NIL
EQUIV. ANNUAL	2.9	2.9	2.9	2.9
WESTSIDE TRANSPORT				
SIZE (M. GAL.)	82.5	56.4	47.5 (2)	25.5
CAPITAL COSTS	92.2	70.5	60.0	37.0
AMORTIZATION	6.7	5.2	3.6	2.7
O & M	NIL	NIL	NIL	NIL
EQUIV. ANNUAL	6.7	5.2	3.6	2.7
TOTAL WS VOL. (M. GAL.)	100.0	74.0	65.0	43.0
SUB-TOTAL COSTS				
CAPITAL	$ 182	$ 161	$ 150	$ 127
AMORTIZATION	13	12	10	9
O & M	NIL	NIL	NIL	NIL
EQUIV. ANNUAL	13	12	10	9

(1) Includes 0.5×10^6 Ft.^{3} upstream basins.

(2) Hydraulic Modelling is required to verify the 17.5 feet width.

TABLE IV-1

WESTSIDE COSTS FOR VARIOUS OVERFLOWS
(Continued)

Costs ($x10^6$)

ELEMENTS	OVERFLOW FREQUENCY			
	1	4	8	16
WESTSIDE P.S. (W.W.)				
SIZE (MGD WW)[5]	290	210	130	110
CAPITAL COST	$ 25.5	$ 21.5	$ 13.5	$ 11.3
AMORTIZATION	2.2	1.8	1.2	0.97
O & M	0.2	0.2	0.1	0.07
EQUIV. ANNUAL	2.4	2.0	1.3	1.04
SWWPCP (WW)				
SIZE (MGD)	240	160	80	60
CAPITAL COST[3]	91.6	61.4	30.7	23.0
AMORTIZATION	7.5	5.0	2.5	1.9
O & M[4]	0.6	0.4	0.2	0.2
EQUIV. ANNUAL	8.1	5.4	2.7	2.1
SWOOP (PRO-RATA)				
SIZE (MGD)	640	560	480	460
CAPITAL COSTS	Base	-2.3	-5.2	-5.9
AMORTIZATION	Base	-0.25	-0.39	-0.44
O & M	←	constant		→
EQUIVALENT ANNUAL	Base	-0.25	-0.39	-0.44
TOTALS				
CAPITAL COSTS	$299	$ 242	$ 189	$167
ANNUAL AMORTIZATION	23	18 20	14	12
O & M	0.8	0.6	0.3	0.1
EQUIVALENT ANNUAL	24	19	14	12

(3) 0.384×10^6/MGD

(4) Treatment O & M prorated from SWWPCP Facility Plan Values on the basis of westside flow to the total flow

(5) Pump station capacity will be increased by some amount for optimum system operation

TABLE IV-1(Continued)

SECTION V

IMPACTS OF OVERFLOWS ON BENEFICIAL USES

Areas Impacted by Wet Weather Overflows from the Westside (Oceanside Area)

A series of dye studies and float studies was run on the Corps of Engineers' hydraulic model of S. F. Bay, located in Sausalito (BayDelta Model) for the purpose of determining the area and temporal extent of the impacts from wet-weather overflows.

Data analysis of these tests is in progress. A preliminary analysis of the North Shore dye and float releases has been made. The analysis indicates that the shoreline areas most heavily impacted by overflows extend from the Golden Gate Bridge to Thornton Beach State Park. The discharge field from the Mile Rock Outfall will move inside of the Golden Gate Bridge on the flood tide. The only shoreline areas inside of the Golden Gate that may be contacted by the Mile Rock field are the Southeasterly tip of Angel Island and the northerly shore of Alcatraz Island. The possibility exists that under conditions of a strong northerly wind the field could come ashore along the northerly waterfront of the City. However, the Model test results suggest that the field would be highly diluted (1000:1) when and if it contacted a shoreline area within the Bay.

Results from the Corps' Model tests are questionable. It is believed that the Model gives reasonably accurate current patterns at the entrance to the Golden Gate and within the Bay. However, the the dispersion results and the currents along Ocean Beach have not been confirmed. We know of only one field study of shoreline releases on the Westside. This was a 1908 planning study for the Mile Rock Outfall and consisted of the tracking of floats released under varying tidal conditions at the Mile Rock site and at what was then called "X" Street (approximately Fleishacker Pool). As best as we can determine from the very sketchy published report of said study (1909 Report of the Board of Public Works) the results of the Model studies are in general agreement with the 1908 field study.

<u>Beneficial Uses of the Ocean Shoreline -</u>
<u>Golden Gate Bridge to Mussel Rocks in San Mateo County</u>

The entirety of this shoreline is under the jurisdiction of the California Coastal Commission. The Golden Gate National Recreation Area (GGNRA) has legal ownership and administrative responsibilities for the San Francisco portion of the shoreline. The California Department of Parks and Recreation has similar responsibilities for the Thornton Beach State Park portion of the affected San Francisco shoreline. There is legal public access to the entirety of this shoreline, though physical access to the water's edge is difficult in the

Land's End, and Golden Gate Bridge areas due to the steep terrain. The only beneficial uses are fish and wildlife habitat and non-water contact recreation. Industrial and maritime uses of the shoreline do not now exist nor are they likely to be created in the foreseeable future.

Effects on Marine Life

The evaluation of the effects of combined sewer overflows on the marine biota requires considerations of both the acute effects on the intertidal macro-fauna living in close proximity to the outfall and long-term effects on the total marine environment. Unfortunately almost nothing is known about either. A preliminary literature search and a field reconnaissance (Sutton, December 1978 draft) suggest that the sandy beach areas are relatively barren. Intertidal macro-fauna consists of primarily amphipods (sand fleas), isopods (a small sessile custacean), polychaete worms and mole craps. The limited number of shell fragments suggest the possibility that the straight horse mussel, gaper clam?, the rough piddock and the horseneck clam may also be present. Sand dollars are present in the offshore area. The relatively depauperate nature of the beaches may be due to natural conditions as relatively few species are adapted to open coast, sand, beach environments. The rocky areas (Lands End, Mussel Rocks, Fort Point) contain gooseneck barnacles, California mussels, limpets, litturine snails sea anemones, ochie sea stars algae and sea grasses. The attached fauna is noticeably depressed in the vicinity of the Mile Rock outfall. This probably is most attributable to the year round discharge of primary effluent which is chlorinated but, until very recently, not dechlorinated rather than to the wet-weather overflows that also occur through this outfall.

Static 96 hours toxocity tests have been run on undiluted samples of wet-weather overflows using the three spine stickleback. 100% survival occurred in over half of the 61 samples tested.

Many marine biologists consider three spine stickleback tests as non-representive of waste discharge toxicity because the stickleback is a pollution tolerant species. It is also true that few, if any organisms in their natural setting would ever be exposed to any where near 96 hours of undiluted overflow.

The long-term benefits to the Marine environment that would result from the reduction, or ever complete eliminating in heavy metals, and trace organics discharged during overflows is impossible to quantify.

Heavy metals, and trace organics (herbicides pesticides etc.) are the most significant pollutants discharged of wet-weather overflows. Data on trace organics in wet-weather flows is non-existent. Data on metals is limited to lead, chrome, iron, copper & zinc (see table V-3). Lead, presumably from vehicle emission fallout, is the only metal that has a higher concentration in wet-weather flows. Estimates of yearly mass emissions of lead for existing conditions and for overflows of 16, 8, 4, 1, & 0 per year are shown in Figure V-1. As indicated even complete elimination of westside wet-weather overflows would not completely eliminate discharges of lead.

Two important points in this regard are (1) that by having a combined system will be removing a notable significant percentage of contaminates, such as lead, that originate from urban runoff and (2) In terms of Total Heavy Metal discharged to the Bay, San Francisco's wet-weather overflows (existing conditions) constitute less than 1% of the total. In conclusion it is problematical whether even complete elimination of wet weather overflows would result in a measurable reduction in the concentrations of heavy metals found in either in the receiving water or sediments other than perhaps in the immediate proximity of the overflow discharge points.

SECTION VII

POSSIBLE MEASURES TO MITIGATE THE ADVERSE IMPACTS OF OVERFLOWS ON THE RECREATIONAL USE OF THE RECEIVING WATERS

Four possible measures to mitigate the adverse impacts of overflows on recreational use of the receiving waters are:

Baffling of Overflows to reduce floatables

Screening of overflows

Extended overflow outfalls

Disinfection of overflows

Our preliminary analysis of the costs, merits, and operational aspects of these measures is as follows:

Baffling and Screening of Floatables

Solid materials in combined sewer flows that could degrade the appearance of beaches if washed ashore include: rags, fecal material, toilet tissue, paper towels, tampon applicators, sanitary napkins, condoms, dead rats, candy and cigarette wrappers, and cigarette filter tips. In addition to these coarse solids, combined sewage flows can contain a considerable quantity of natural vegetable material, including leaves and twigs. Therefore, the feasibility of providing baffling and screening (bar racks, fixed and mechanically cleaned and Rotostrainers) was examined.

Existing Recreational Uses

Approximately 80% of the 11 miles of affected or possibly affected shoreline is sandy beach. The balance of the area has steep cliffs dropping directly to the sea (Land's End and the areas on either side of Baker's Beach). Water-contact recreation in the cliff areas is essentially confined to fishing and some shellfishing. Recreational usage of the principle beach areas follow. These areas are depicted on Figure V-2.

Baker's Beach

Use of this beach includes surf fishing (especially in the morning), sunbathing, jogging, picnicking, walking, and possibly some collection of mussels along the rocks to the northeast. Swimming is discouraged from this beach by the GGNRA, and is infrequent. A shark attack several years ago has also discouraged swimming. The beach and water are frequented by family groups; children find the surf an inviting playground. This beach receives use from nearby residents. During sunny days, visitor levels increase dramatically. The vehicle counts by the Park Service at the Baker's Beach road include people coming to use the forested picnic grounds and vollyball court uphill from the beach.

Phelan Beach

This small beach is used primarily for volleyball, swimming, sunbathing (mainly on the sundeck of the beach house), and picnicking. Swimming is encouraged here by the GGNRA because the waters are relatively sheltered from strong shoreline currents. However, counts by wastewater personnel and information received from a regular swimmer suggest that wintertime swimming is limited to about ten swimmers each day. The area is regularly used by local residents, who gather there almost every day. The beach is too short to be used by joggers. Fishing and mussel collecting occur in the rocky areas on either side of the beach. Sunny days bring more people to this beach, but because of its remote location within a residential area, and limited parking, use is restricted mostly to local residents.

Kelly's Cove

Kelly's Cove is the stretch of Ocean Beach from Cliff House to Lincoln Way. It is a favorite year-round surfing spot and jogging area. It is very accessible to sightseers because of parking availability along the Great Highway. Swimming is discouraged here by the GGNRA (Park Service) by signs warning of strong rip tides, undertows, and the potential risk of drowning. On sunny days, picnickers sit along the beach wall; wading occurs frequently under these ideal weather conditions, especially on weekends. Swimming may occur frequently on hot summer days, but is relatively light (only a few people per day) throughout most of the year. Fishing is infrequent.

Ocean Beach - Lincoln Way to Vicente

Ocean Beach between Lincoln Way and Vicente Street is used primarily by local residents because it does not have nearby parking. Major access is through rather dark, uninviting pedestrian underpasses. Sunbathing, jogging, and walking are the primary activities along this stretch. Some fishing, wading, surfing, horseback riding and swimming occur. The four drownings in the last three years have occurred along this stretch of beach.

Ocean Beach - South of Vicente

Ocean Beach between Vicente Street and Mussel Rock contains Fort Funston (GGNRA) Beach and Thornton State Beach. However, it is composed of four very different sections of beach. These are: 1) The Overlook Parking area (heavily used for many activities), 2) the Fort Funston sea cliffs (remote from parking and lightly used), 3) Thornton State Beach (accessible and moderately heavy use), and 4) the remainder of the beach to Mussel Rock (remote from parking and lightly used).

The proximity of the Zoo and the two overlooking parking lots along the Great Highway make the stretch of beach between Sloat Boulevard and the Fort Funston sea cliffs easiliy accessible. It is heavily used on weekday afternoons and weekends. Surfing, swimming, picnicking, walking, jogging, and fishing are all popular activities here. Usually 20 to 30 children from the Recreation Center for the Handicapped come here for swimming, wading, and playing on the beach each week during the year.

The less accessible stretch of Fort Funston Beach beneath the seacliffs is used by walkers, joggers, horseback riders, sunbathers, and hang-gliding activity.

Thornton State Beach is used by picnickers, joggers, remote-control model airplane flyers, fishermen, and an occasional swimmer. Picnic benches and other facilities here are well above the beach, making it unlikely that all Park visitors actually go down to the beach.

Estimates of Beach Usage

Available data on average daily beach usage is very limited and consists of estimates based on car counts multiplied by an average vehicle occupancy factor (GGNRA and California Parks and Recreation data) self-monitoring program data and two one-time surveys of beach usage undertaken by the Wastewater

Program (CLER Report - 1975 and Ocean Waiver Application 1978). The car count data provides no indication of the people that actually go onto the beach (a small percent of the total in some areas) nor what recreational activities are pursued by these people. The 1975 CLER estimates were extrapolated from two one-day comprehensive counts made in the fall of that year and were limited in both coverage (Sloat Boulevard to Kelly's Cove) and recreational activities that were classified. The plant monitoring data consists of spot observations at selected points, usually about noon, but contains little weekend data and provides no indication of daily totals.

The Ocean Waiver data, while comprehensive in area coverage and types of activities tabulated, was based on summer spot counts (morning, noon, and afternoon) over two separate weeks, during the summer.

In addition to the above, the Wastewater Program had environmental consultants prepare an assessment of recreational beach use (Recreational Usage Along the San Francisco Waterfront, Part I, Bay Bridge to Mussel Rocks, November 1978). Because of public health considerations, emphasis was placed on swimmers and surfers. This report relied extensively on interviews with GGNRA personnel. Apparently, the information provided by GGNRA in some cases, reflected peak (warm weather weekend) rather than average daily swimmers. In addition, our consultant applied very conservative assumptions to the GGNRA information in making their projections, with a result that the estimates of swimming activity outside of the Golden Gate appear to be quite high.

Because of the great disparity in ocean side estimates of swimmers, we undertook a combination of spot and continuous counts of ocean side recreational activities during the first two weekends in December. The results of these counts are shown on Table V-I.

Because of the atypical nice weather on the first weekend of the survey, the decision to place primary emphasis on surfing and swimming during the second weekend of the survey, and the fact that conservative assumptions (high) were used in resolving conflicts in counts and filling gaps in the data, the data and in particular the non-contact data, should be considered as soft. Ratios between weekend and weekday usage established during 1975 and the July 1978 survey wereused used to compute average daily estimates from the weekend data. As indicated by Table V-I the estimates for oceanside swimming (25-50) is greater than one order of magnitude lower than the estimate contained in the November report. However, the estimates for surfers are in general agreement. We and the project manager for our consultant believe that the November Report estimate of wintertime average daily swimmers is signigicantly in error for the oceanside. Several observations made of swimming in Aquatic Park confirm the

November report estimate for Aquatic Park, which was based on information received from the Dolphin Club and South End Rowing Club Officials.

It must be noted that the proposed Great Highway redesign to a parkway will likely change and redistribute beach usage from that observed at this point.

The most serious public health problem posed by combined sewer overflows is probably viral contamination of shellfish (molluscs). This is unfortunately the most difficult activity to survey due to the multiplicity of access points to the mussel areas, the steep terrain in the area, and considerable day-to-day variation in this activity because shore access to some of the areas is contingent upon the tides. Clamming in the sandy beach areas is virtually non-existent as there is no known population of clams in this area. Harvesting of mussels does occur in the Phelan Beach - Land's End area as evidenced by the sighting of one family returning with approximately 5 gallons of mussels and by Department of Public Health data showing several reported cases of paralytic shellfish poisoning resulting from consumption of mussels harvested in this area. (Paralytic shellfish poisoning is caused by the naturally occurring marine bio-toxin contained in the dinoflaggelates responsible for the formation of red-tides). However, the fact that several of the most accessible mussel-supporting rocks have essentially intact populations of large mussels suggest that mussel harvesting is not extensively practiced.

Public Health Considerations

The protection of public health is frequently advanced as a justification for the expenditures of the large sums of money needed to control combined sewer overflows. Unfortunately the available epidemiological data does not support this justification. Information received by our Department of Public Health (Appendix A) shows no clinically confirmed cases of enteric diseases from either recreational contact with Bay or Ocean waters or the consumption of shellfish harvested from these waters in 25 years of records. Information received from the California Department of Health Services confirms this negative finding (Appendix C). Because the etiology of particular cases of disease is often difficult to establish, a comparison was made of the reported disease rates for wet, dry and normal rainfall years (Appendix B). No disease rate-rainfall correlations were evident.

The above findings are not surprising when one considers that transmission of disease through swimming in fecally contaminated natural bodies of water is not a major vehicle of enteric disease transmission. In fact, the only swimming related reported outbreak of disease in the United States during 1977 occurred in a swimming pool (Journal Water Pollution Control Federation June 1978). It should be pointed out that public health statistics do not reflect minor illnesses as most people do not seek medical assistance for such illnesses or if they do, the diagnosis is frequently not confirmed by clinical testing.

Since the public health statistics show negative (i.e. no reported cases), unreported cases are impossible to quantify for purposes of cause-effect evaluations. Predictable methods require a lot of assumptions and are at best rough approximations of baterial diseases and non-existent for enteroviral diseases (Professor Robert Cooper/ESA November 1978). Therefore indirect methods of evaluating the public health benefits, i.e. reduction in disease, must be sought.

One way to indirectly measure the benefits derived from reducing the occurrance of sewer overflows is to estimate the reduction on the number of days during which the receiving water coliform levels exceed regulatory agency standards (violation days). The problem with this approach is that there are three numerical coliform standards that apply to water used for body-contact recreation. These standards were developed for monitoring of dry weather discharges of more or less uniform quality and are supposed to be essentially equivalent. Application of the three standards to wet-weather overflows yield three appreciably different estimates of the number of violation days caused by a given overflow. Because of this and an interpretation problem with the 30-day, 20 percentile greater than 1000 standard, a clarification from the California Department of Health Services has been requested. Therefore, for the purposes of the cost-benefit analysis only, the following criterion is used: any day with an estimated coliform MPN of 1000/100 ml or less will be considered as acceptable and days with higher coliform values will be considered as unacceptable.

Aesthetics

The problem of aesthetic degradation of the beaches due to floatables of sewage origin (feces, toilet tissue, condoms, sanitary napkins, tampon applicators, etc.) is virtually impossible to quantify. The available information is very limited and in some respects, contradictory.

A 1967 study of particulate floatables in the waters immediately offshore of Baker Street found that 98% of these floatables following an overflow were of non-sewage origin (twigs, animal debris, etc.) As part of the City's self-monitoring program, plant personnel make subjective observations of the amount of sewage solids on the beach, and they have observed that the deposits are usually light. However, GGNRA personnel have noted heavy deposits of sewage solids on the beach after an overflow. Scattered observations made by various Wastewater Program personnel are inconsistent. Observations made at Lincoln Way, Bakers Beach & Phelan Beach after the first two overflows of this winter indicate that leaves, twigs and cigarette filter tips were the dominant material in the overflow debris line. Feces were present, typically in well rounded 3/4" diameter pieces with a density of 4-6 pieces per 100' of debris line, tampon applicators averaged 4 per 1000', no sanitary napkins were noted and only one condom and one dead rat (at Bakers Beach) was found. These observations may not be representative of average conditions as both overflows were relatively small and possibly contained a disproportionately high percentage leaves & twigs & other street and yard debris that had accumulated through the rainless summer months.

Doubtless tidal currents and wind induced current dictate the amount of sewage solids that will be deposited on a given beach after a storm overflow. Another complicating factor is the heavy presence of dog feces which are present on many San Francisco beaches year round and are frequently indistinguishable from human feces. These factors and the highly subjective nature of any observer comments can explain the inconsistencies in the observations. The length of time that these solids will remain on the beach can vary from perhaps less than a day to two weeks, depending on tide, and wind conditions. These considerations make it presently impossible to develop an appropriate yardstick of visual pollution for use in a cost-benefit analysis.

BEACH ACTIVITY SURVEY

Estimates of Daily Winter Time Usage (1)

ACTIVITY	Baker Beach	Phelan Beach	Lands End	North of Fulton	Fulton to Lawton	Lawton to Santiago	Santiago to Sloat	Ft. Funston	Thornton Beach	Totals (2)
Swimming	5	10	nil	5	5	5	5	5	5	25 - 50
Surfing	5	5	nil	30	10	15	25	5	nil	90
Fishing	20	5	10	nil	nil	6	5	5-10	5	60
Shell fishing	?	5	?	nil	nil	nil	nil	nil	nil	? (4)
Wading below waist	15	5	neg.	30	25	20	15	5	5	120
Wading above waist	5	5	neg.	5	5	5	5	5	5	25
Non-contact usage	250	60	50 (3)	600	430	220	260	300	35	2,165

(1) Based on Wastewater Program, December 1978 surveys

(2) Less than 5 counted as 2½ for total

(3) Considers only people on the several small pocket beaches in this area

(4) See text

Table V-1

TABLE V-2

MONTHLY DISTRIBUTION OF AVERAGE ANNUAL
COMBINED SEWER OVERFLOW EVENTS ON WESTSIDE

Overflow	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Treatment Rate: 0.06 in./hr												
16: Number	3.56	2.79	1.88	0.75	0.37	0.12	0	0.02	0.13	0.82	1.96	3.24
% of Annual	22.8	17.9	12.0	4.80	2.35	0.75	0	0.09	0.85	5.27	12.5	20.7
8: Number	1.96	1.32	1.00	0.29	0.13	0.03	0	0	0.09	0.44	0.94	1.69
% of Annual	24.8	16.8	12.7	3.72	1.68	0.37	0	0	1.12	5.59	11.9	21.4
4: Number	1.12	0.62	0.44	0.15	0.04	0	0	0	0.06	0.18	0.51	0.81
% of Annual	28.5	15.7	11.2	3.75	1.12	0	0	0	1.50	4.49	13.1	20.6
1: Number	0.25	0.13	0.12	0.06	0	0	0	0	0.02	0.04	0.12	0.25
% of Annual	25.4	13.4	11.9	5.97	0	0	0	0	1.49	4.48	11.9	25.4

TABLE V-3

Representative Wet & Dry Weather Concentrations for

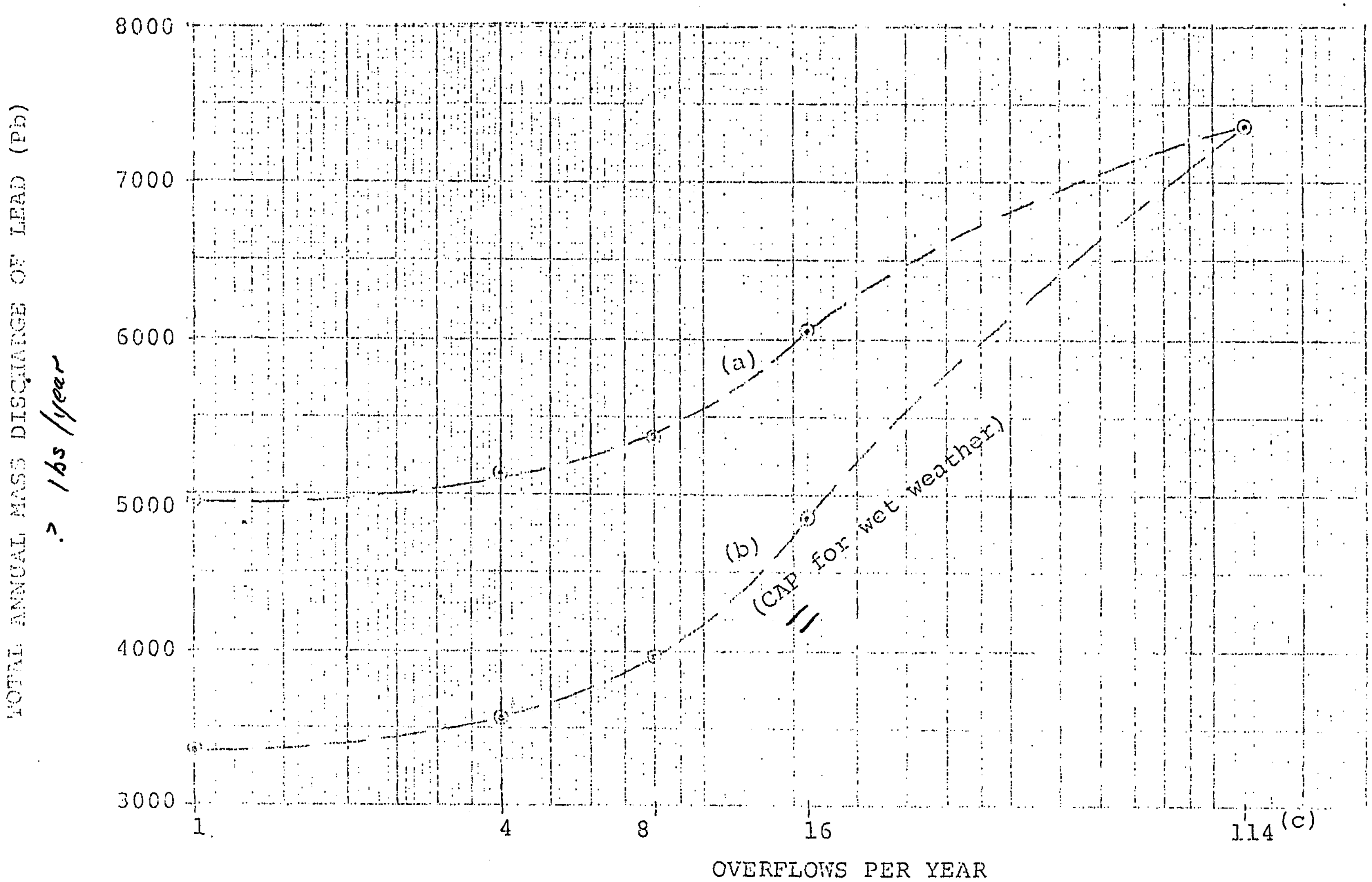
selected Metals

Units = Mg/kg

	Wet	Dry
Lead	0.1 to 1.2	0.1
Chromium	> 0.4	0.03
Iron	> 0.4 to 11.0	I.D. *
Copper	> 0.4 to 0.6	0.7
Zinc	0.06 to 0.6	0.2
Silver	I.D. *	0.012
Arsenic	I.D. *	0.001
Cadmium	I.D. *	0.004
Mercury	I.D. *	0.0015
Nickel	I.D. *	0.090

* ID = Insufficient Data

WESTSIDE
TOTAL ANNUAL MASS DISCHARGE OF LEAD VS. OVERFLOWS PER YEAR

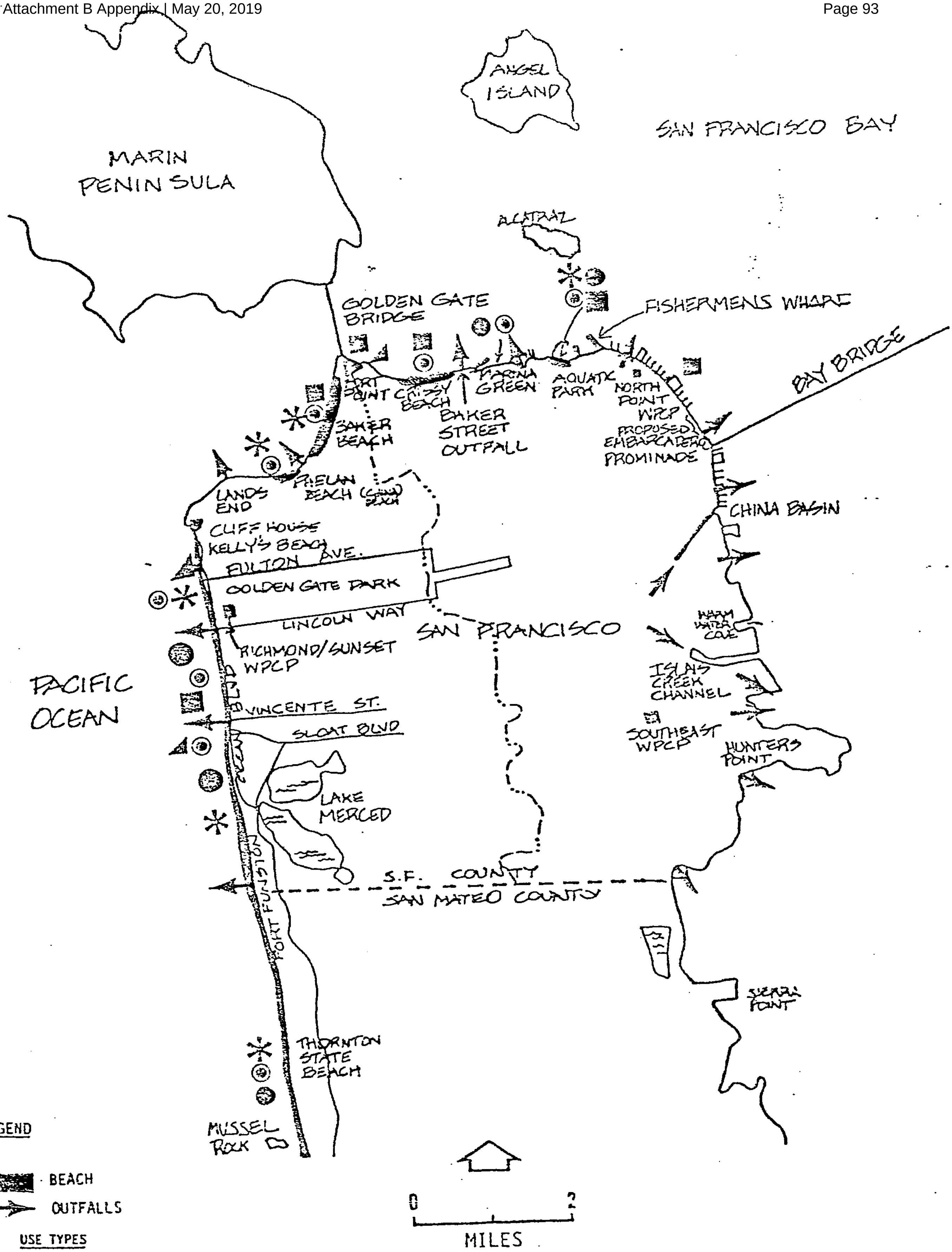


a) In Case #1 it was assumed that dry weather treatment provided 75% removal of lead and wet weather treatment provided 30% removal of lead.

b) In Case #2 it was assumed that both wet and dry weather treatment provided 75% removal of lead. In both cases overflow was assumed to provide 0% removal. CAP = Chemically assisted primary.

c) Assumes Dry-weather upgraded to 75% removal.

Figure V-1



LEGEND

BEACH

OUTFALLS

USE TYPES

SWIMMING

SURFING

FISHING

WALKING/JOGGING/WADING

PICNICKING/SUN BATHING

SHORELINE LENGTH	(MILES)
S.F. COUNTY LINE TO CLIFF HOUSE	= 4.8
CLIFF HOUSE TO G.G. BRIDGE	= 3.6
G.G. BRIDGE TO FISHERMEN'S WHARF	= 3.35
FISHERMEN'S WHARF TO BAY BRIDGE	= 2.2
	13.95

FIGURE V-2 BEACH USE AND OVERFLOW LOCAT

SECTION VI

Cost-Benefit Analysis

Traditionally cost benefit analysis in sanitary engineering has focused on coliform, suspended solids (ss), BOD_5 (a measure of oxygen demanding material, and nutrients. Costs versus overflows versus benefits (% reduction in discharge due to overflows and days of coliform levels greater than 10,000 and 1000 MPN) are tabulated in Table VI-2. Table V-4 in the previous section provided a comparison of overflow frequency versus total Westside mass emissions (treated and treated) for lead,the metal of perhaps greatest concern during wet weather conditions. Cost benefit analysis based on emissions,while useful,have a limitation in that they do not provide any measure of what is happening in the receiving waters thereby making the real benefits of the reduction in overflow very difficult to establish

For example the intermittent discharge of suspended solids and BOD_5 into the surf zone of the Pacific Ocean probably has no great significance as wave action would be more than enough to prevent either sludge accumulation or depressed dissolved oxygen levels from occurring. The receiving water benefits, in terms of reduced long-term concentrations, that would be achieved by the reduction in the discharges of heavy metals and trace organics discharged through overflows would be difficult if not impossible to establish.

Therefore the discussion of costs versus benefits will focus on the reduction in the number of overflows (esthetics degradation) and the number of days that receiving water coliform concentrations exceed acceptable levels (public health implications). As noted in Figure VI-1 the slope costs curves (both capital and equivalent annual) have a change in slope in the area between 6 & 12 overflows. This area of the curve which is centered at approximately 8 overflows per year best represents the 'knee of the curve' marginal costs-marginal benefit analysis required by the EPA funding guidelines (PGM-61). Table VI-4 Cost Benefit Analysis Based on Recreational Beneficiaries confirms this 'knee of curve'. As indicated the cost per beneficiary (a beach user that enjoys cleaner beaches and receiving water) is $31 per individual resulting from the reduction in overflows from 16 to 8 per year. The costs per beneficiary jumps dramatically to $167 per individual as overflows are further reduced to 4 per year and further increase to $222 per individual between 4 and 1 overflow per year. Recent discussions between Wastewater Program officials and EPA officials in Washington indicate that the EPA is very concerned about the high nationwide costs of wet-weather overflow control and would be perhaps unwilling to fund overflow control facilities beyond that indicated by the PGM-61 'knee of curves cost-benefit analysis.

Baffling

Much of the above listed material may float to the surface in the consolidation structure and could be trapped by a suspended baffle extending several feet below the water surface. A series of physical model tests were run to evaluate the feasibility of baffling. In October 1978 the evaluation of the floatable reduction efficiencies of suspended baffles was done on a 1.48 scale model of the proposed Westside Transport Facility. These tests indicated that a well-designed baffling system can result in a 70% to 95% or more reduction in floatables discharged.

Costs to install the baffle walls will run about $150 per linear foot of baffle wall. Assuming a total of 5,000 feet of baffle wall required for that project, costs for baffling will be approximately $750,000. This appears to be cost-effective and the decision has been made to proceed with implementation of this mitigating measure wherever feasible.

Screening

Because non-floatable sewage solids could underflow a baffle, we have evaluated the feasibility of screening. Roto-strainers (TM) were rejected from further consideration on the basis of high costs, hydraulic head requirements and uncertainties about their operational reliability under highly intermittent operations. Mechanically cleaned, treatment plant bar racks were rejected because of expense, uncertain operations and vertical clearance problems under the streets or beach areas. Coarse racks, with clear spacing greater than 1 inch, probably have minimal potential for clogging. However, they would entrap little in the way of sewage solids, other than dead rats and sanitary napkins. Racks fine enough to trap tampon applicators (5/8") or cigarette filter tips (5/16") may be prone to serious clogging with a resultant loss of hydraulic capacity and the potential for upstream flooding of basements. There is a major concern as to whether the benefits derived will offset the costs and potential for upstream flooding.

Because of the very real concern for flooding, we recommend that the decision on screening be deferred until such time as the project is completed and the effectiveness of the baffling can be evaluated. If the baffled flow still contains substantial quantities of objectionable sewage solids, then a test installation of various size bar racks could be retrofitted for evaluation.

<u>Extended Outfalls</u>

The City had the design consultants for the Southwest Ocean Outfall Project (SWOOP) prepare a feasibility study of an extended outfall for the Ocean beach area. This analysis was predicated on an assumed flow of 1,100 CFS (cubic feet per second), which is the rate approximating the one-year peak hourly overflow in the westside system. (This rate is very preliminary and is subject to revision). The conclusions reached by this 'desk top' study are as follows:

1. The Lincoln Way site appears to be a better location than

the Vicente Street site for a short outfall.

2. The 3,000-foot long outfall is a better length than a 1,000 or 5,000-foot long outfall.

3. Gravity flow can be obtained in an outfall system consisting of:

   - A single conduit 15 feet in diameter or a double pipe 11 feet in diameter;

   - A 660-foot long diffuser perpendicular to the predominant current;

   - Four risers 8 feet in diameter;

   - Thirty-two ports, each 2 feet in diameter (eight ports per riser)

4. An average initial dilution of 10:1 can be obtained.

5. The plume may surface or remain submerged depending upon the stratification of the receiving water.

6. The wastefield has a low probability of reaching shore.

7. The construction, operation and maintenance of the intermittent flowing outfall will be more difficult and present more risk than the SWOOP wet weather outfall. Generally any site this close to shore is exposed to problems caused by severe bottom movement, sediment suspension, wave action, etc. While the outfall probably can be designed, constructed and maintained at this site, it must be realized that maintenance problems will occur.

Schematics and expected performance data are shown on Figures VII-1 to VII-4 and Table VII-1. Costs for this proposal are estimated at $36,000,000 (1978 costs-includes 35% mark-up for headworks, design and construction engineering contingencies etc.) Operation & Maintenance costs are unpredictable but could be considerable as underwater maintenance problems will occur and underwater maintenance work is expensive.

Disinfection of Overflows

The feasibility of disinfection was evaluated assuming treatment plant performance objectives and separate contact basins. This proved not to be feasible because of the extensive volume of the required contact basins needed to achieve the desired 30-minute contact time. An alternative approach would be to utilize the Westside Transport structure proper as the contact chamber. An evaluation of this alternative requires the assumption of the following:

1. The volume of water to be treated ranges from 0 to 700 MGD (1 year overflow rate) and is totally dependent on the weather.

2. The City is committed to using liquid sodium hypochlorite for disinfection until a more cost effective alternative is developed during ongoing studies.

3. The wet weather disinfectant demand is variable and nearly impossible to predict in advance.

4. Dechlorination by sodium bisulfite will be necessary to eliminate the toxic effects of chlorination.

5. Thirty minute contact time is necessary for effective disinfection.

6. A central chemical storage side is used.

The science of properly disinfecting wastewater discharges is complicated by the fact that there is no reliable means by which to predict the quantity requirements of the selected disinfectant. In the case of Westside wet weather discharges, the problems which must be overcome to adequately achieve the desired effect (elimination of pathogenetic organisms) is complicated by the following:

1. Disinfection chemicals must be on hand at all times to treat the "worst case" requiring year round storage of large quantities of disinfectant. In the case of sodium hypochlorite, this chemical deteriorates with time reducing its effectiveness and is not always commercially available on short term demand.

2. Disinfection dosage is usually controlled by wastewater flowrate and demand is determined by periodic analysis. In the case of an overflow, demand cannot be quickly determined and serious overdoses or underdoses may occur due to improper control. Both situations incur undesirable results, underdosing meaning inadequate disinfection requirements and overdosing, release of toxic materials to the aquatic environment.

3. Dechlorination facilities require as careful design as chlorination facilities and due to the lack of control of effluent flow, disinfectant dosage could be subject to severe dosage control problems thereby negating its intended purpose i.e. eliminating chlorine residual.

4. The cost of chlorination and dechlorination chemicals is high and if they are not applied efficiently would result in a wasteful practice.

5. Storage of large quantities of chemicals which would require replenishment in the westside area may cause problems due to delivery by large vehicles.

6. On a theoretical basis the volume of the structure is sufficient to provide a 59-minute contact time for the one-year design flow. However, the storage transport system is not designed as an efficient contact basin and considerable short-circuiting will occur due to the multiple inflow and outflow points. It may be possible to do some baffling to eliminate the most severe short-circuiting problems while retaining acceptable hydraulic transport operation. Even so, the assumption must be made that considerable short-circuiting would still exist and a significant percentage of the flow would receive for less than adequate contact time.

7. The only practical way to inject the disinfectant would be in the influent sewers several hundred feet upstream of the consolidation structure. As there are six major influent

sewers distributed along a 8-mile length of the total westside system, at least 8 miles of piping from a central disinfectant distribution station would be required.

8. The performance of any such system to disinfect combined sewer flows is open to question. The fact that much of the flow would receive less than adequate contact time coupled with difficulties in establishing proper dosage rate could result in very poor performance as far as kills of highly resistant viruses especially hepatitis.

Due to uncertainties about the performance of this system, the considerable operational headaches attendant with the multiplicity of injection points, the fact that available public health statistics suggest that combined sewer overflows are not presently a serious public health problem, it is our conclusion that disinfection is not a viable mitigating measure.

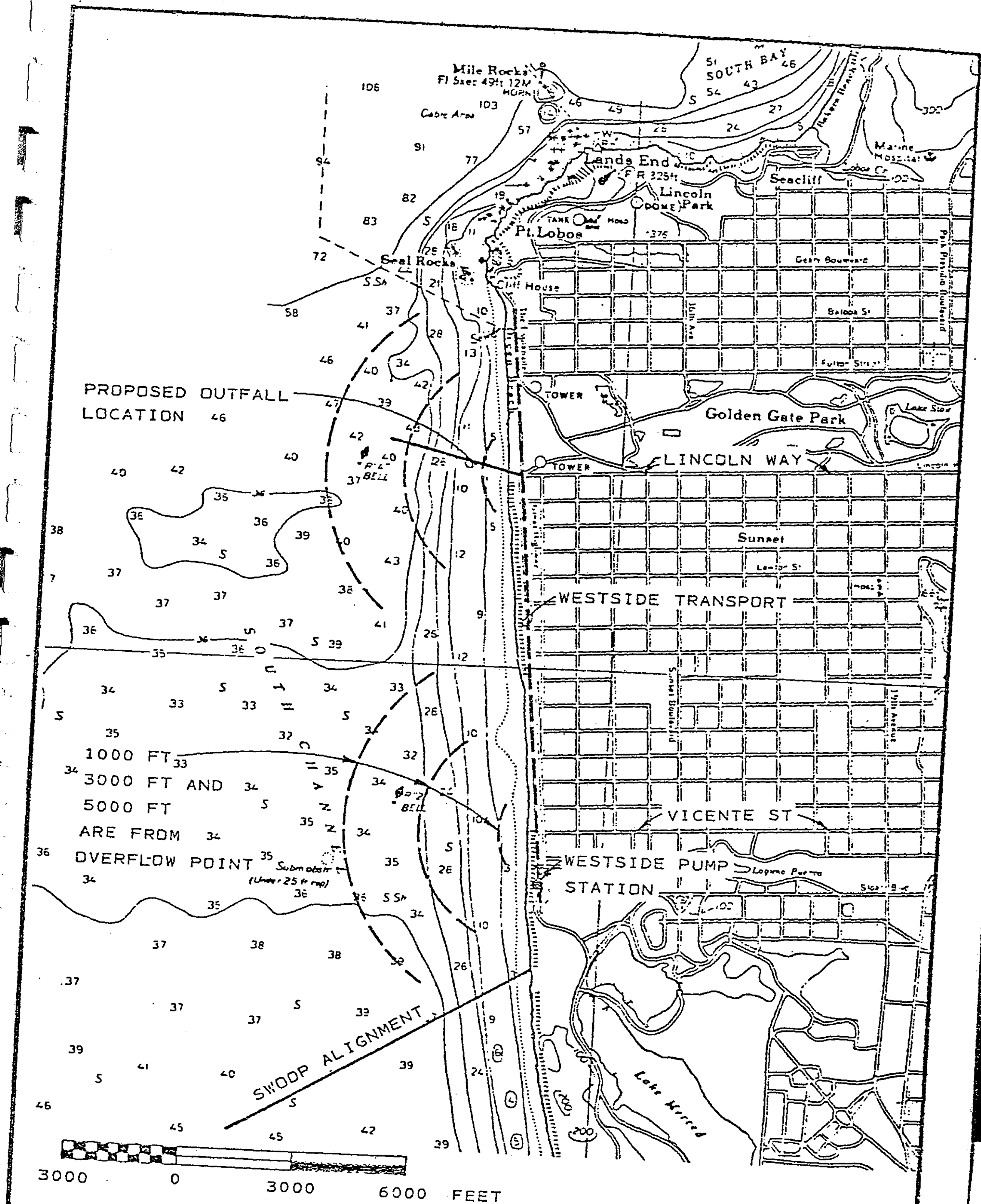


FIGURE 1
VICINITY MAP
REVISED OVERFLOW CONTROL STUDY

SOUNDING IN FEET BELOW MLLW

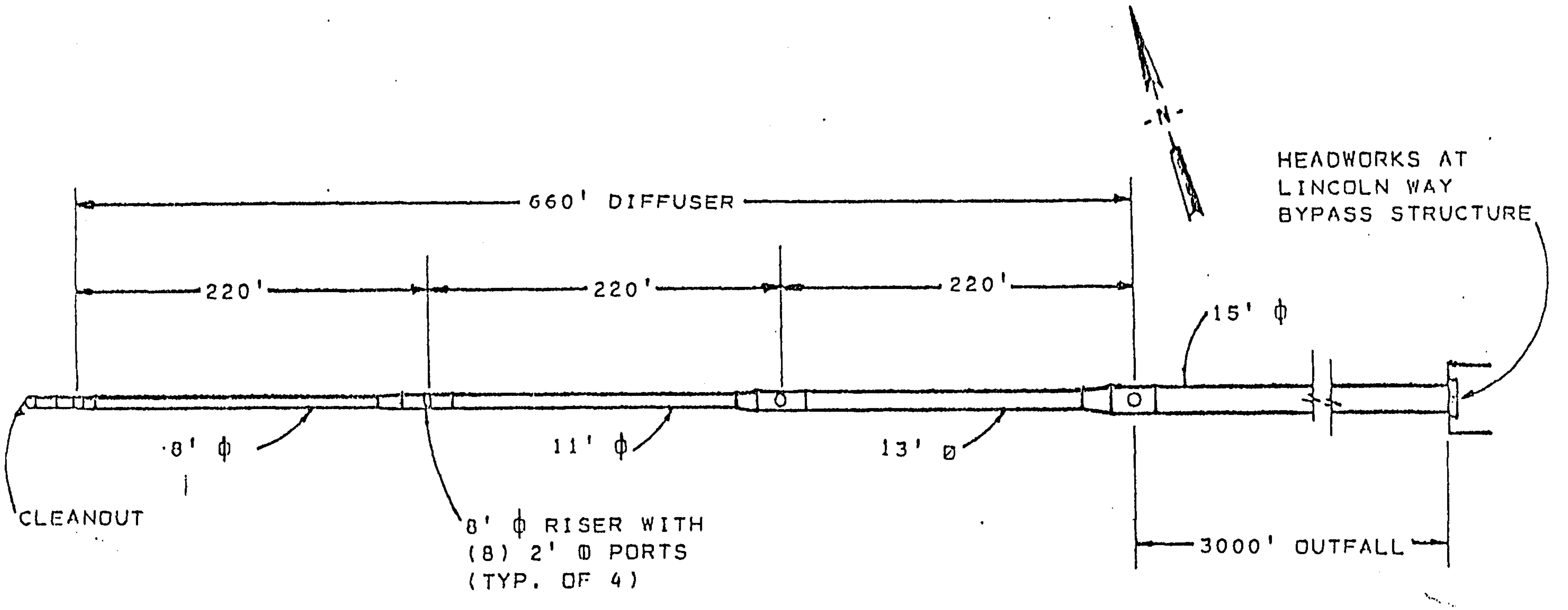


FIGURE 10
PLAN VIEW OF OUTFALL
REVISED OVERFLOW CONTROL STUDY

CH2M HILL

Figure VII-2

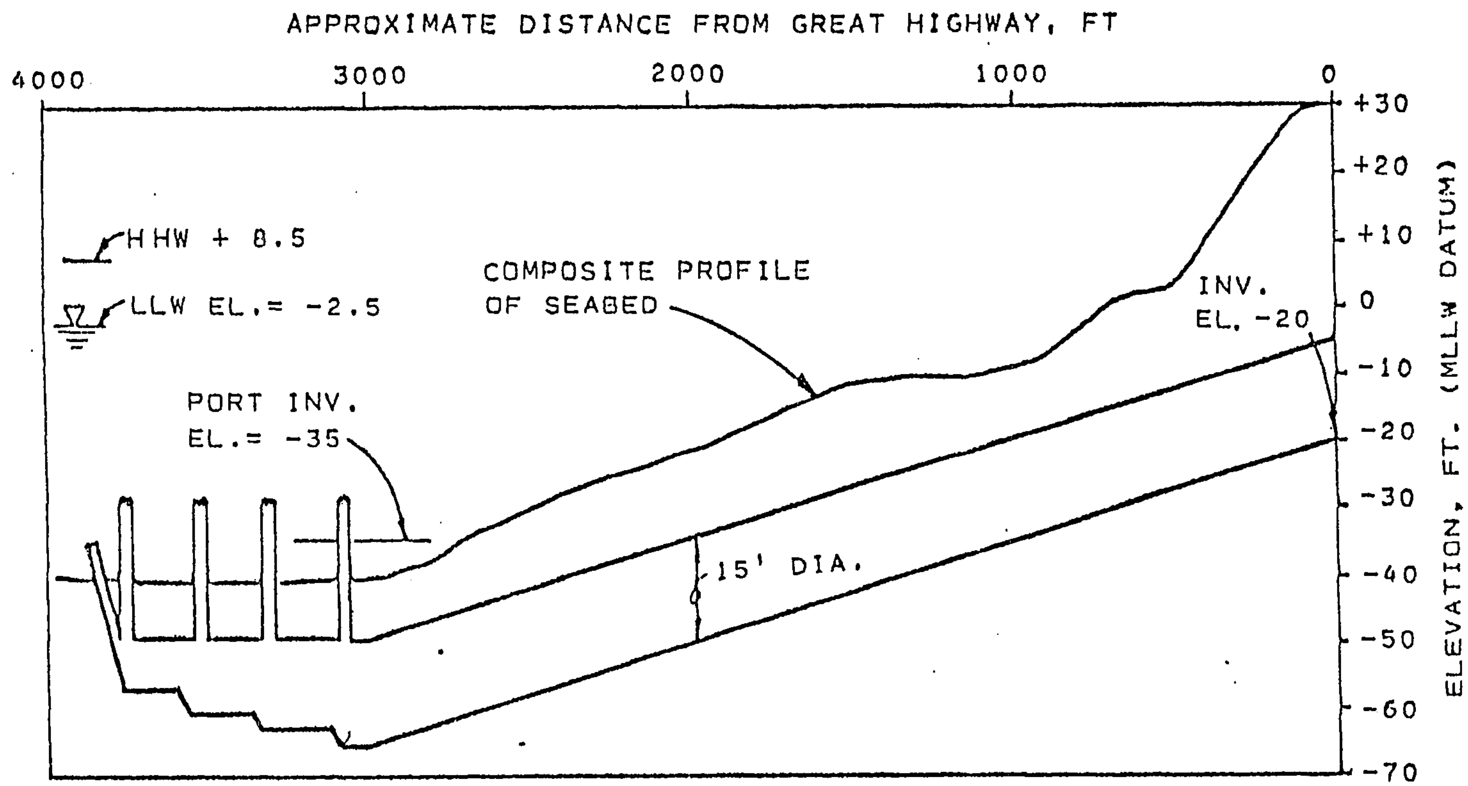
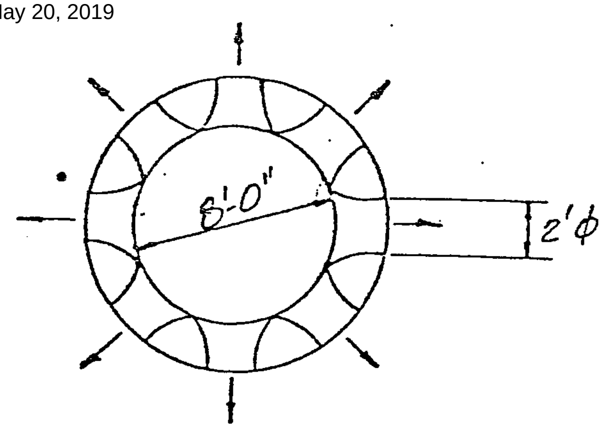


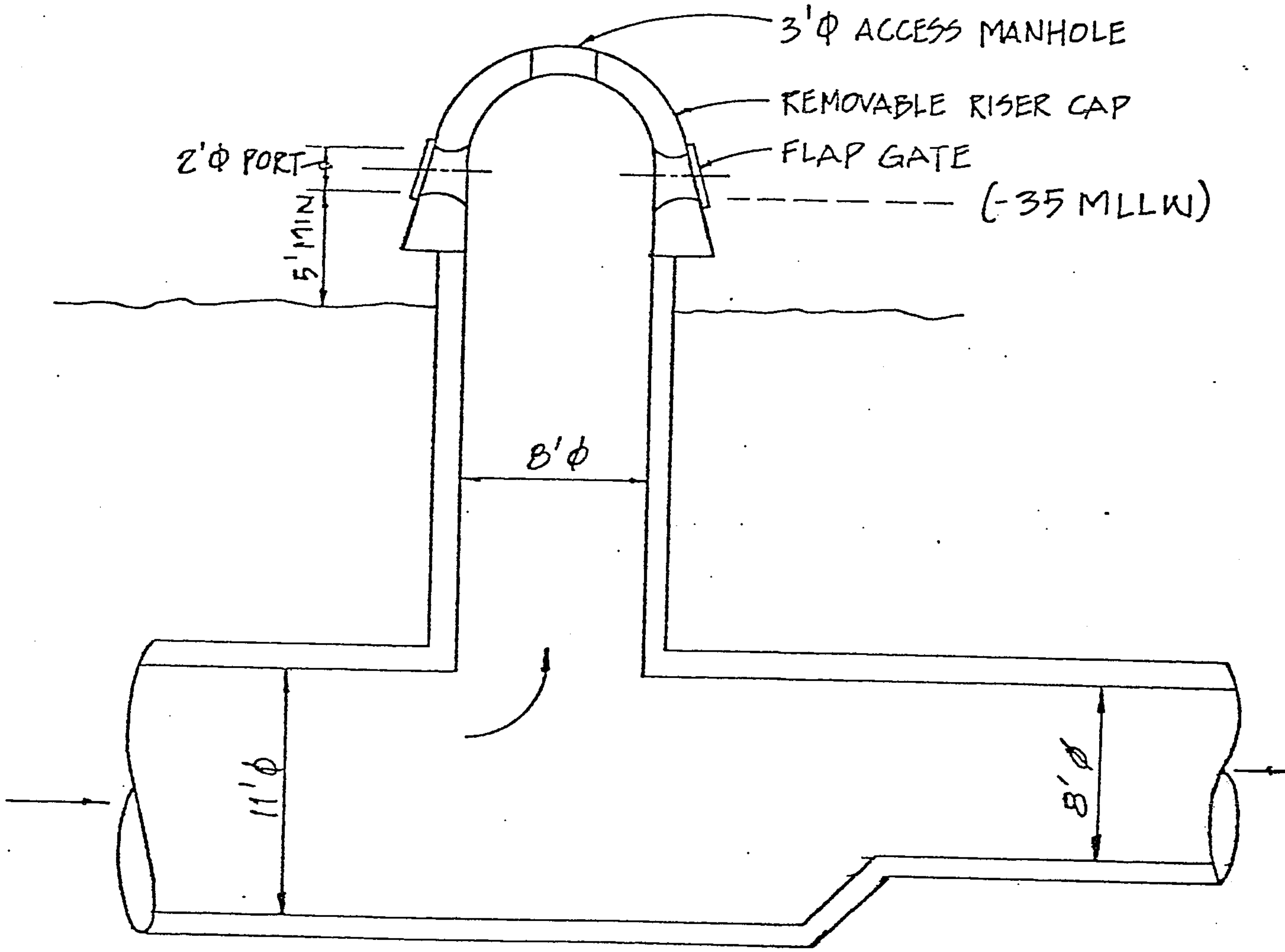
FIGURE 9
PROFILE OF OUTFALL
REVISED OVERLOW CONTROL STUDY

CH2M HILL

Figure VII-3



PLAN THROUGH PORTS
NO SCALE



SECTION
NO SCALE

FIGURE 11
DIFFUSER RISER
REVISED OVERFLOW CONTROL STUDY

CH2M HILL

Figure VII-4

EXPECTED OUTFALL PERFORMANCE

WINTER STORM CONDITIONS - SURFACING DISCHARGE

Initial Concentration (counts/100 ml)	Time After Discharge (hours)	Initial Dilution Factor	Subsequent Dilution Factor	Total Dilution Factor	Bacterial Decay Factor	Total Reduction Factor	Final Concentration (counts/100 ml)	Probability of Reaching Shore (% of time during all discharge events)
3×10^6	6	$.704 \times 10^{-1}$	$.266 \times 10^{-0}$	$.187 \times 10^{-1}$	$.326 \times 10^{-0}$	$.611 \times 10^{-2}$	18,300	.1
3×10^6	12	$.704 \times 10^{-1}$	$.124 \times 10^{-0}$	$.873 \times 10^{-2}$	$.106 \times 10^{-0}$	$.930 \times 10^{-3}$	2,790	.5
3×10^6	18	$.704 \times 10^{-1}$	$.740 \times 10^{-1}$	$.521 \times 10^{-2}$	$.313 \times 10^{-1}$	$.163 \times 10^{-3}$	489	.5
3×10^6	24	$.704 \times 10^{-1}$	$.510 \times 10^{-1}$	$.359 \times 10^{-2}$	$.897 \times 10^{-2}$	$.322 \times 10^{-4}$	96	.5

WINTER STORM CONDITIONS - SUBMERGED DISCHARGE

Initial Concentration (counts/100 ml)	Time After Discharge (hours)	Initial Dilution Factor	Subsequent Dilution Factor	Total Dilution Factor	Bacterial Decay Factor	Total Reduction Factor	Final Concentration (counts/100 ml)	Probability of Reaching Shore (% of time during all discharge events)
3×10^6	6	$.833 \times 10^{-1}$	$.265 \times 10^{-0}$	$.221 \times 10^{-1}$	$.321 \times 10^{-0}$	$.709 \times 10^{-2}$	21,270	<.1
3×10^6	12	$.833 \times 10^{-1}$	$.124 \times 10^{-0}$	$.103 \times 10^{-1}$	$.103 \times 10^{-0}$	$.106 \times 10^{-2}$	3,180	<.1
3×10^6	18	$.833 \times 10^{-1}$	$.739 \times 10^{-1}$	$.616 \times 10^{-2}$	$.291 \times 10^{-1}$	$.179 \times 10^{-3}$	537	<.1
3×10^6	24	$.833 \times 10^{-1}$	$.510 \times 10^{-1}$	$.425 \times 10^{-2}$	$.798 \times 10^{-2}$	$.339 \times 10^{-4}$	120	<.1

Table VII-1

SECTION VIII

CONCLUSIONS

- The differences in costs between the eight overflow per year frequency being requested by the City and the one overflow per year frequency currently mandated by the NPDES permit appears to be out of proportion to the derived benefits. The higher degree of control would result in only 21 additional days of acceptable water bacteriological quality per year. It is estimated that 165 people per day during these 21 days would be swimming or surfing in the area impacted by North Shore overflows. Based on the difference in annual cost this additional protection costs over $2886 per individual per day that would enjoy this protection. ?

- With the exception of bacteriological emissions, existing wet-weather overflows constitute less than 1% of the total mass emission loadings into the Bay and adjacent ocean area. Therefore, even complete elimination of all city-wide combined sewer overflows is unlikely to result in a measurable region-wide improvement in water quality.

- Notwithstanding the dramatic increase in nearshore receiving water coliform levels following overflows, the existing public health problem appears minimal. Information received from the City's Department of

Public Health - Bureau of Disease Control indicates that they can find no documented cases in the past 25 years of serious disease resulting from contact with Bay or Ocean waters. Serious disease resulting from bathing in fecally contaminated water is in general not a major public health problem in the United States. According to an article in the June, 1978 issue of the Journal of the Water Pollution Control Federation, there was only one reported outbreak of disease in the United States in 1977 resulting from swimming in fecally contaminated water.

- The short-term measurable adverse impacts of overflows consist of possible degradation of the aesthetic qualities of nearby beaches and increases in the coliform levels and presumably increased pathogens and viruses in the nearby waters. These impacts are essentially confined to the San Francisco shoreline, the northerly two miles of the San Mateo shoreline and possibly on occasion Alcatraz Island.

- Of the four mitigating measures investigated, only baffling of overflows appears to be cost-effective and warrants implementation at this time. Extended outfalls do not appear to provide benefits consistent with the considerable costs and potential for serious maintenance problems and the other two measures, - disinfection and screening - have serious operational uncertainties and cannot be recommended at this time.

- The present level of control mandated by NPDES permit, 1 overflow per year average, will result in the treatment of 99.5% of the total waste water treated. The revision of the control level to an average of 8 overflows per year will result in treatment of 95.9% of the total wastewater. This breaks down to 99.6% of all sanitary flow and 86 percent of all urban runoff will be treated. By being able to provide some treatment to a high percentage of the urban runoff, San Francisco's combined sewer system that has been frequently described as 'antiquated' would actually be providing greater protection to the environment than a purely separate system.

APPENDICES

CITY AND COUNTY OF SAN FRANCISCO

DEPARTMENT OF PUBLIC HEALTH

CENTRAL OFFICE
101 GROVE STREET
SAN FRANCISCO, CALIFORNIA 94102

ENTERIC DISEASE INCIDENCE - SAN FRANCISCO - 1964-1978
Prepared in San Francisco Department of Public Health
16 November 1978

In 25 years of records in the Bureau Of Disease Control, there are no documented laboratory- or clinically-confirmed cases of shigellosis, salmonellosis, or hepatitis A produced by direct contact with shoreline waters or by ingestion of raw bivalves in San Francisco. These three diseases, all reportable by law, are of particular interest in examining the potential role of recreational waters with high coliform count, or marine life from such waters, as possible source of diarrheal diseases (enteric infection) in San Francisco. These diseases are contracted by swallowing the infecting organism. Disease incidence records for diarrheal disease reported in the City from 1964 to the present are attached. Prior to 1967, much of the diarrhea was caused by shigella sonnei, a swallowed bacterium; it produced laboratory- or physician-confirmed reports of diarrhea primarily among the residents of the Spanish ethnic community in the City, more commonly among children than adults, with an annual incidence peak in July-September. Where the source could be determined, most of the cases were traced to food-borne transmission, occasionally in a local restaurant, but more commonly by members of the family household who were found to be fecal carriers who prepared meals for the family. During this period, salmonellosis, the other common bacterial cause of diarrheal disease, was reported at a low constant rate of 100-150 cases per year.

In 1967-68, during the Haight-Ashbury period, the incidence of reported cases of shigellosis did not change significantly, possibly due to insufficient medical care or tansiency of the population in that area, but it did begin a slow rise thereafter, caused by a different strain of shigella. Hepatitis A, caused by swallowing of the hepatitis virus, increased very remarkably during these two years, and remained then at a high level. The rise was attributed to the multiple personal contacts of the crowded, unsanitary, commune-style living conditions in that area and among that population. (The incidence of salmonellosis, in contrast, did not increase. This difference, we believe, is due to a dose/response factor: 10-100 shigellae can produce diarrhea in a human, but it requires 10,000-1,000,000 salmonellae for the same effect.) At the low temperature and high salinity of shore waters, although the organisms could survive, they could not multiply. Laboratory conditions for successful culture require an appropriate nutrient broth or gel medium, and constant temperature of 35°C.(95°F.) for at least 48 hours.

After 1974, a secondary rise in incidence of shigellosis and hepatitis A was found in the expanding alternate life-style communities within the City. Variously, in 75% to 92% of such patients on whom valid histories could be obtained, transmission was found to be by direct intimate personal or household food contact. There is no significant seasonal variation in the incidence of shigellosis, salmonellosis, or hepatitis A as reported in the City since the Haight-Ashbury summers.

Since the first appearance in the literature of reports of ingestion of raw shellfish as a source of possible infection with hepatitis A virus, Department staff have made inquiry on this point from appropriate patients, without confirming cases of such transmission. Although other bivalves could also theoretically concentrate and transmit the hepatitis virus, the local mussels, shrimp, clams, and crab are usually cooked before eating, and the virus would be expected to be destroyed or inactivated in the process. In 25 years of records in the Bureau of Disease Control, there are no documented laboratory- or clinically - confirmed cases of ~~shigellosis or hepatitis~~ hepatitis A produced by direct contact with shoreline waters or by ingestion of raw bivalves in San Francisco.

Approved:

Mervyn F. Silverman, M.D., M.P.H.
Director of Public Health

Prepared by:

Selma K. Dritz, M.D., M.P.H.
Assistant Director
Bureau of Disease Control
and Adult Health

REPORTED CASES - SELECTED CAUSES

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

YEAR	SHIGELLOSIS	SALMONELLOSIS	HEPATITIS A
1964	76	104	150
1965	81	99	181
1966	71	118	204
*1967	69	119	552
*1968	48	121	819
1969	144	140	651
1970	85	142	723
1971	159	171	767
1972	254	139	542
1973	208	122	696
1974	189	110	480
**1975	346	107	647
**1976	602	161	912
**1977	325	143	690
**1978 (9 months)	320	110	472

* Haight-Ashbury Period
** Expanded Alternate Life-Styles Period

APPENDIX B

TABULATIONS AND GRAPHS FOR SELECTED DISEASES REPORTED IN SAN FRANCISCO

DESCRIPTION OF SOURCE MATERIALS

From the files of the San Francisco Department of Public Health, Bureau of Disease Control, we present the following month-by-month incidence of laboratory-confirmed cases of shigellosis and salmonellosis, respectively, as reported in San Francisco for five selected years, in a resident population of roughly 700,000. Records are gathered chiefly from laboratory reports and physicians' Confidential Morbidity Reports, both legally required by order of the California State Board of Health, (see Attachment A) and from other sources, such as Departmental inspectors of food establishments, school nurses and teachers, field public health staff, and local citizens. From 3 to 5% of the patients are residents of other counties or states, diagnosed and reported from medical centers in the City, and therefor recorded as San Francisco cases. Though not all physicians file reports as required, the resulting discrepancy is a constant one throughout the year, and does not affect the configuration of the incidence curves. Disease incidence reports are compared for wet, dry and normal years, both prior to, (1964 and 1967) and following (1973, 74 and 77) the intensive drive by the Department to obtain more complete reporting of disease incidence from physicians. Tabulations which we submitted in a prior release were supplied from the Bureau of Statistics of the Department of Public Health, and are based on the date of receipt of the report. In those tables, some cases which developed late in the year were diagnosed and reported in the following year. But the graphs which are shown here are taken from abstracts of patient histories recorded in the files of the Bureau of Disease Control, and are based on actual date of onset of symptoms. These, therefor, have slightly different annual totals for the selected years than the previous tables. We chose to show incidence of shigellosis, because it is caused by the most frequently identified enteric bacterial pathogen in San Francisco, and one which readily causes disease symptoms with swallowing of a minimal dose (10 to 100 organisms). We show incidence of salmonellosis because it is caused by the hardiest enteric bacterial pathogen, although it requires a much larger dose (10^4 to 10^6 organisms). We do not show incidence of hepatitis A in these exhibits, because we have not, as yet, a readily available laboratory method for definitive identification of the hepatitis A virus.

Analysis of graphs and tables

Data were compared for wet, normal and dry rainfall years. The years 1964 and 1967 were, respectively, wet and normal rainfall years prior to a massive effort by the SFDPH to improve reporting of communicable diseases, as required by State law, by physicians in the community. The years 1973 and 1974 were, respectively, wet and normal rainfall years after the reporting had improved, and numbers of recorded cases subsequently increased. The increase was compounded by development of a large, persistent outbreak of enteric (diarrheal) disease resulting from increased household and direct personal transmission of the infecting organisms, without relation to water sports or ingestion of shellfish. The year 1977 was the most recent drought year.

None of the monthly variations in incidence reports were significant numbers in a population of 700,000. If any comment were made on the small seasonal variations in incidence reports, it would be to note that most of the small increases were recorded during the summer months, when little or no rain falls on the City.

Cabelli et al, in 1976, reported a perspective study done for EPA, on pollution effects on swimmers at two New York beaches. They found that symptoms of fever, headache, diarrheal disease, developed within 10 days of swimming at Coney Island Beach, "a barely acceptable (polluted) one," in 3-4% of swimmers, while the incidence of such symptoms was significantly lower at Rockaway Beach nearby, "a relatively unpolluted one". At both beaches, they found a higher incidence of these symptoms in swimmers, as compared to non-swimmers. The authors did not state the numbers of persons in the water at either of the beaches on the days of their study.

We must point out that the symptoms which they described, and ascribed to the ingestion of various enteric bateria, which they found at elevated levels on those days at those sites (particularly total coliforms), are also the symptoms that are produced by infection with enteroviruses; these enteroviruses are frequently cultured from human urine samples in cases of illness marked by the same symptoms as those described in their paper. If the total population in the water were as high as perhaps 100,000, which is not uncommonly reported from Coney Island Beach on a hot day in summer, the concentration of human urine from direct urination in the water, and potential for high viral concentration in the beach shallows, could be, and probably was, considerable. It is my opinion that the probability of developing enteric disease from ingestion of urinary enteroviruses at those beaches in summer is very much greater than that of infection by fecal organisms.

Such a situation is not comparable to beach conditions in San Francisco. If 1000 or even 2000 persons could be found in the water on a particularly hot day, the concentration of urine in the turbulent shore waters would be almost nil. A similar situation might be postulated for Aquatic Park swimming area by the very small number of persons who actually swim in those waters.

<u>State Department of Public Health</u>, (S. B. Werner, MD), report that <u>no cases</u> are known in their files that confirm enteric disease acquired in recreational waters or by ingestion of shellfish from the Bay Area waters, except for PSP (paralytic shellfish poisoning) from mussels taken during forbidden periods of May through October in this area.

<u>State Fish and Game</u> (Walter Dahlstrom) report that shellfish checked for concentration of <u>heavy metals and a variety of pesticides</u> indicate no public health problem from these substances.

Their concern would be aroused only by elevated coliform counts during periods of high runoff in winter storms.

LAWRENCE LAB BAY AREA SHELLFISH AND SEDIMENT STUDY - PLUS JONES AND STOKES EPA 1977

RECOMMENDATIONS AND FDA PROPOSED STANDARDS

Element	Average Daily uptake	Normal body levels	Lawrence lab findings	Jones & Stokes
Ag	na	na	Elevated So. Bay shellfish	no standards
As	na	na	na	no standards
Cd	15-35 ug	1 ug/gm wet tissue	3ppm Tara Hills. Coypte Pt. No., Foster City	0.5 ppm ss clam 1.5 oysters. So. 3.5 oysters. No.
Co.	0.1 ug (B12?)	80-300uug. blood	na	na
Cr.	na	6 mgm total body	na	5 ppm ss clam 2 ppm oysters
Cu	2.5-5 mgm	100 ug/100 ml blood	na	25 ppm ss clam 42 oysters So. 175 oysters No.
Fe	18 mg.	70-18- ug/100 ml serum	na	na
Hg	na	na	safe levels found	0.5 ppm*
I	100 ug	20-35 ug/100ml plasma	na	na
Mg	na	na	na	na
Mn	3-9 mgm, 40% absorbed	2.5 ug/100 ml plasma	na	na
Mo	na	0.1-3 ppm, total body	na	na
Ni	na	na	na	na
Pb	?.20 mgm???-5-10% absorbed?	child: 30ug/100ml bld adult: 60ug/100ml bld	safe levels except Albany Hills & Bayview Park	5 ss clam 2 oysters
Se	? Vit E?? Cystic fibrosis?	0.22 ug/100ml Blood	na	na
Zn	10-15 mgm, 30% absorbed	900 ug/100ml blood	na/	30 ss clam 1000 oysters So., 2000 oysters No.

DDT)
Chlorinated hydrocarbons) all levels safe and acceptable
Organophosphates ??)

* New FDA standard is 1.0 ppm

REGULATIONS OF THE CALIFORNIA STATE BOARD OF PUBLIC HEALTH FOR THE CONTROL OF COMMUNICABLE DISEASES †

GENERAL SECTIONS

2500. *Reporting to the Local Health Authority.* It shall be the duty of every physician, practitioner, dentist, coroner, every superintendent or manager of a dispensary, hospital, clinic, or any other person knowing of or in attendance on a case or suspected case of any of the following diseases or conditions, to notify the local health authority immediately. A standard type report form has been adopted and is available for this purpose.

*Amebiasis
Anthrax
Botulism
Brucellosis (Undulant Fever)
*Chancroid
Cholera
*Coccidioidomycosis
*Conjunctivitis, Acute Infectious of the Newborn (Gonorrheal Ophthalmia, Ophthalmia Neonatorum, and Babies' Sore Eyes in the first 21 days of life)
Dengue
Diarrhea of the Newborn
Diphtheria
Disorders Characterized by Lapses of Consciousness
Dysentery, Bacillary (see Shigella infections)
Encephalitis, viral
Food Poisoning (other than Botulism)
*German Measles (Rubella)
*Gonococcal Infections
*Granuloma Inguinale
Hepatitis, Infectious
Hepatitis, Serum
Leprosy (Hansen's Disease)
Leptospirosis (including Weil's Disease)
*Lymphogranuloma Venereum (Lymphogranuloma Inguinale)
Malaria
*Measles (Rubeola)
Meningitis, Viral
Meningococcal Infections
*Mumps
Paratyphoid Fever, A, B and C (see Salmonella infections)
*Pertussis (Whooping cough)
Plague
Poliomyelitis, Paralytic
Psittacosis
Q Fever
Rabies, Human or Animal
Relapsing Fever
*Rheumatic Fever, Acute
Rocky Mountain Spotted Fever
*Salmonella Infections (exclusive of typhoid fever)
*Scarlet fever
*Shigella Infections
Smallpox (Variola)
*Streptococcal Infections, hemolytic (including Scarlet Fever, and Streptococcal Sore Throat)
Syphilis
Tetanus
*Trachoma
Trichinosis
Tuberculosis
Tularemia
Typhoid fever, cases and carriers
Typhus fever
Viral Exanthem in Pregnant Women
Yellow fever

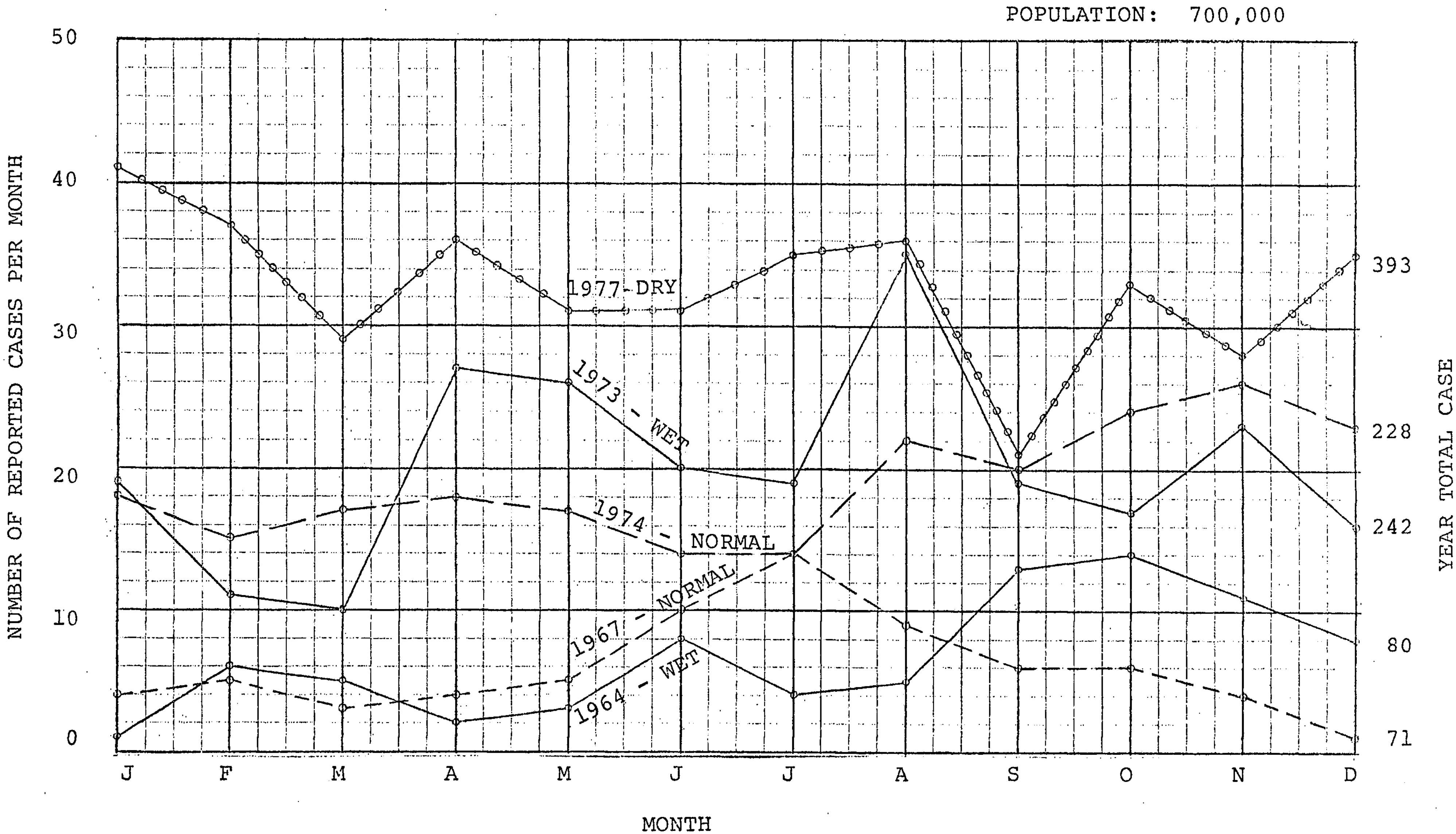
For outbreak reporting and reporting of occurrence of unusual and rare diseases see Sections 2502 and 2503.

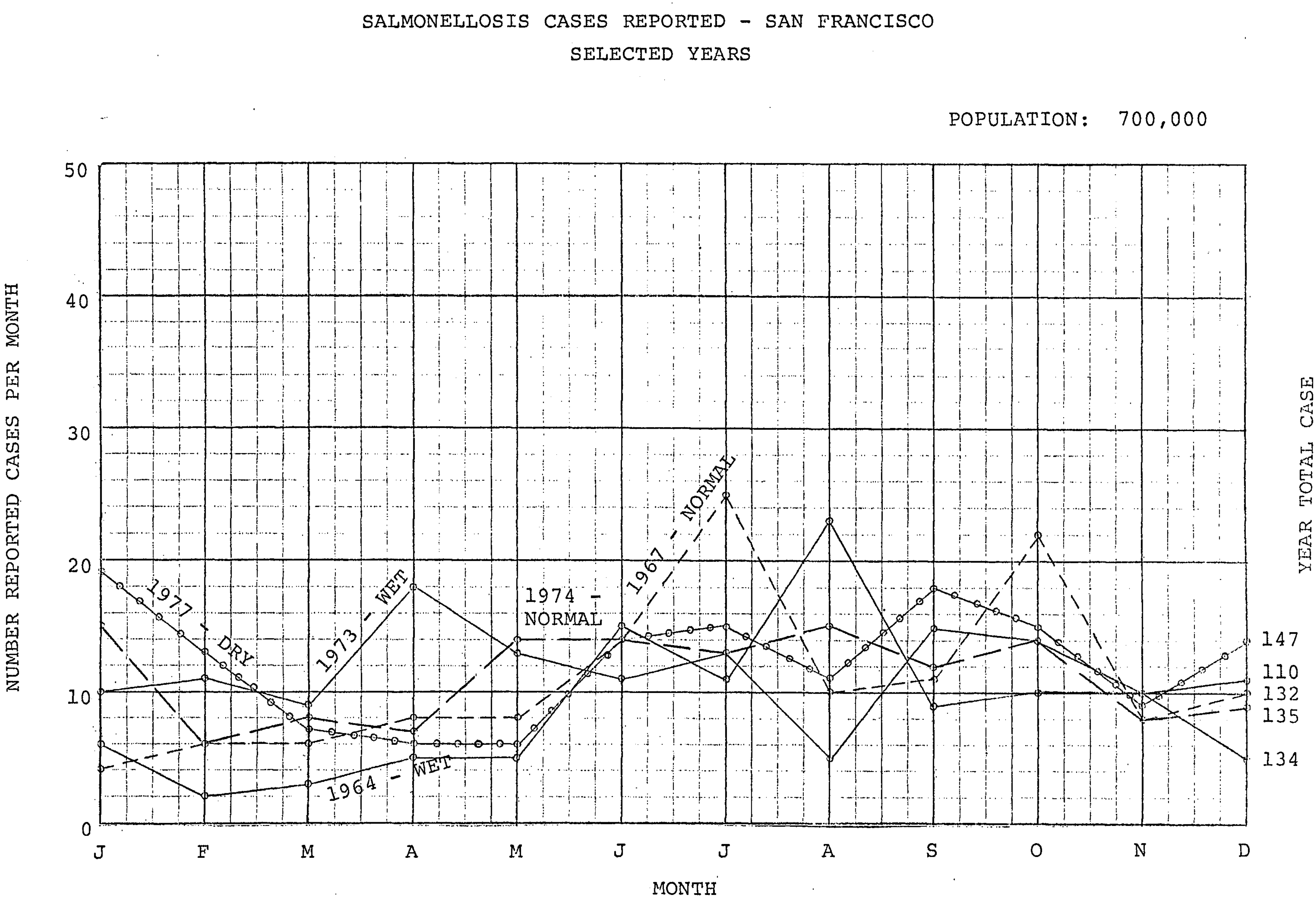
~~2501. *Reports by Local Health Officer to State Department of Public Health.* (a) Individual case reports: Each local health officer shall report at least weekly, on the prescribed form, to the Director of the State Department of Public Health each individual case of those diseases or conditions not marked with an asterisk (*) in the above list (Section 2500) which have been reported to him in the last seven days.~~

† From California Administrative Code, Title 17, Public Health.
* See Section 2501.

Attachment A

SHIGELLOSIS CASES REPORTED - SAN FRANCISCO
SELECTED YEARS




SALMONELLOSIS CASES REPORTED - SAN FRANCISCO
SELECTED YEARS
POPULATION: 700,000
NUMBER REPORTED CASES PER MONTH
YEAR TOTAL CASE
0
10
20
30
40
50
J
F
M
A
M
J
J
A
S
O
N
D
MONTH
1977 - DRY
1973 - WET
1974 - NORMAL
1967 - NORMAL
1964 - WET
147
110
132
135
134

DEPARTMENT OF HEALTH SERVICES
2151 BERKELEY WAY
BERKELEY, CA 94704
[illegible]

Appendix C

December 6, 1978

Selma Dritz, M.D.
Communicable Disease Control Officer
San Francisco City & County Health Department
101 Grove Street
San Francisco, California 94102

Dear Doctor Dritz:

NO REPORTS OF ENTERIC DISEASE IN SWIMMERS OFF THE SAN FRANCISCO COAST

In response to your request today for a written statement on this issue, let me say that the State's Infectious Disease Section has received no reports in recent years linking any enteric disease in individuals or groups of individuals to recreational use (swimming, surfing, boating, etc.) of waters in the immediate San Francisco area. This should not be construed to mean that there hasn't been any such disease .... only that none has been reported to us.

Potential disease does exist, however, not only from a theoretic point of view but as can be seen by published reports. But reports of disease from polluted recreational water are really quite rare. The major threat from such water comes from purposeful ingestion of the water or the consumption of raw or inadequately heated shellfish harvested from it. Nonetheless, reasonable efforts should be made to minimize the risk that San Francisco Bay waters may pose to the public's health.

Sincerely yours,

Ben

S. B. Werner, M.D.
Medical Epidemiologist
Infectious Disease Section

WESTSIDE

STATISTICAL SUMMARY WET-WEATHER OVERFLOWS

CONTROL LEVELS

Yearly O'flow Totals	Unit	Existing Min	Existing Ave	Existing Max	16 per year Min	16 per year Ave	16 per year Max	
No. of Overflows	Event	26	114	193	6	16	31	
% Reduction			Base			86		
Hours of Overflow	Hour	163	372	617	16	85	148	
% Reduction			Base			77		
Total Wastewater	$Gal.x10^6$	926	2,870	5,030	151	1,100	2,360	
% Reduction			Base			62		
Sanitary Discharge	$Gal.x10^6$	149	341	566	15	78	136	
% Reduction			Base			77		
Urban Runoff	$Gal.x10^6$	774	2,520	4,450	136	1,020	2,220	
% Reduction			Base			60		
Composition of Discharge (% Sanitary)	%		12			7.0		
Days Receiving Waster (near outfalls) coliform Levels exceed;								
(1) 10,000 MPN/100ml	Days	41	70	103	10	23	46	
% Reduction			Base			67		
(2) 1,000 MPN/100ml	Days	67	119	147	23	49	90	
% Reduction			Base			59		
BOD_5	$lbs.x10^3$	394	1,220	2,140	64	468	1,000	C_E =
% Reduction			Base			62		
Suspended Solids	$lbs.x10^3$	3890	12,100	21,200	635	4630	9,930	C_E =
% Reduction			Base			62		

Table VI-1

Alter w
without Lake Merced
& Richmond

CITY AND COUNTY OF SAN FRANCISCO
DEPARTMENT OF PUBLIC WORKS
BUREAU OF SANITARY ENGINEERING

PROJECT: W-7 : WESTCORE SYSTEM DATE: 6/13/84

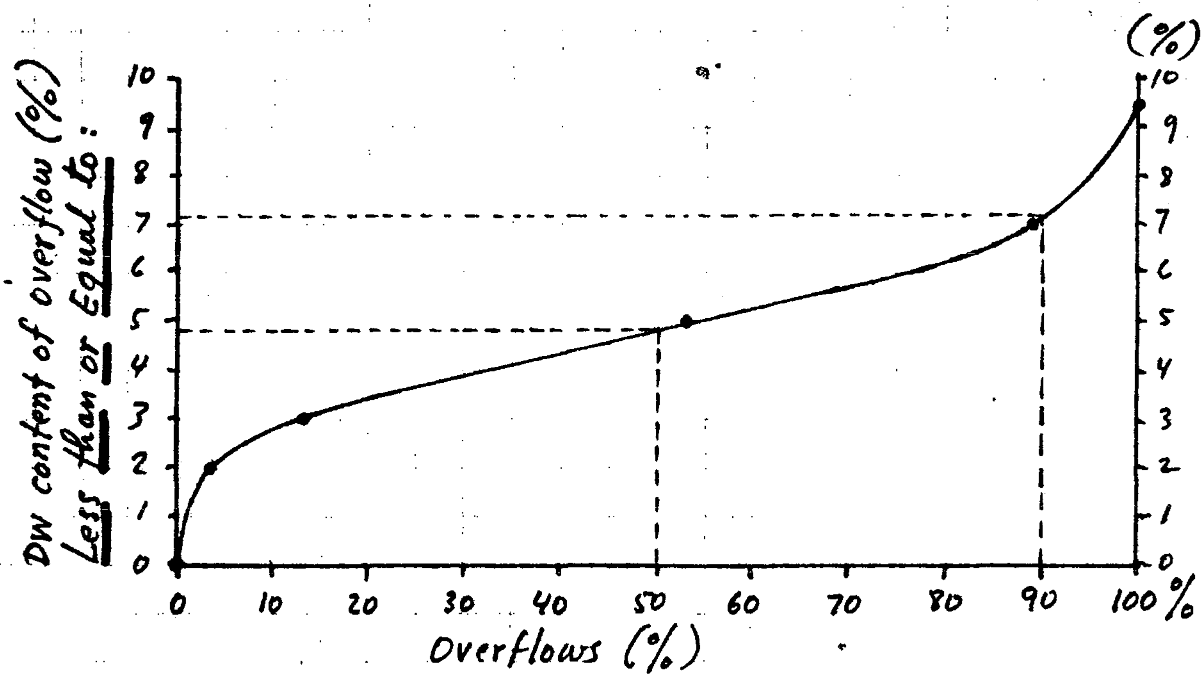
SUBJECT: QUALITY OF OVERFLOWS – REVISED PLOT FILE NO.:

PREPARED BY: C. A. Phanartzis SHEET 1 OF 1

The plot below shows the distribution of DW content versus overflows in percent, based on statistical analysis of hourly flows over a 70-year period.

Selected results of this analysis are summarized below:

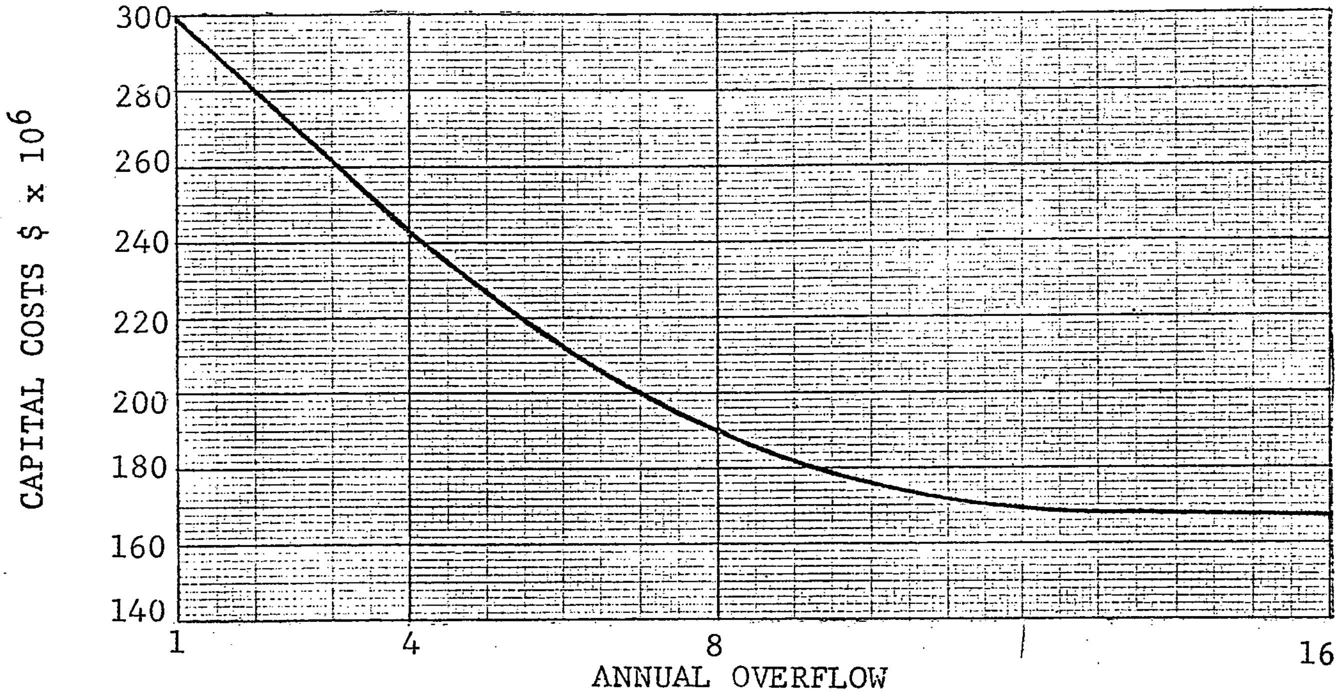
1. Long-term average DW content of overflows ≃ 5% by volume
2. Maximum single overflow DW content = 9.4% " "
3. Maximum hour within overflow DW content = 11% " "
4. Minimum " " " " " ≈ 1% " "
5. 90% of overflows have DW content ≤ 7.2% " "
6. 100% " " " " " ≤ 9.4% " "



BSE Form 1-3
(10/11/77)

WESTSIDE COSTS VERSUS OVERFLOW FREQUENCY

CAPITAL COST



EQUIVALENT ANNUAL COST

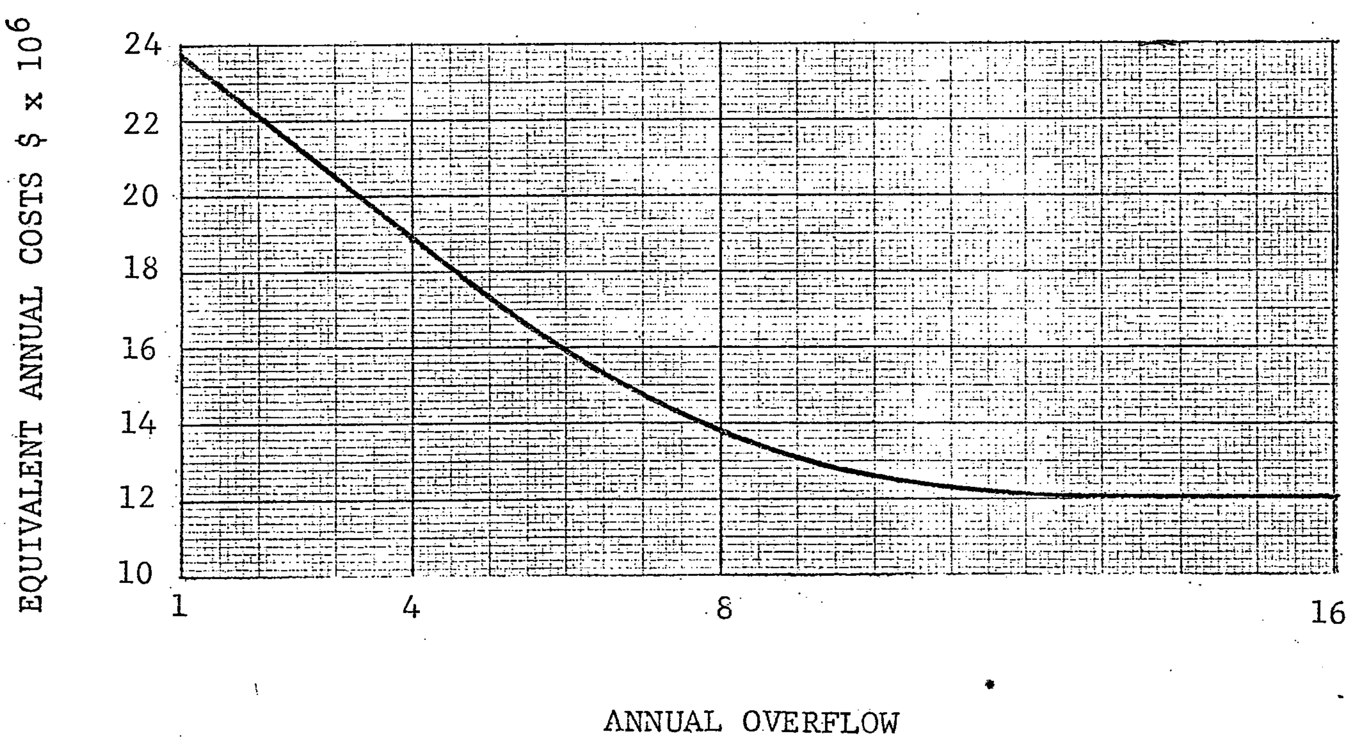


Fig. VI-1

WESTSIDE

STATISTICAL SUMMARY WET-WEATHER OVERFLOWS
(continued)

CONTROL LEVELS

Yearly O'flow Totals	Unit	8 per year Min	8 per year Ave	8 per year Max	4 per year Min	4 per year Ave	4 per year Max	1 per year Min	1 per year Ave	1 per year Max
No. of Overflows	Event	1	8	18	0	4	11	0	1	4
% Reduction			93			96.5			99	
Hours of Overflow	Hours	2	32	78	0	15.4	42	0	3.5	18
% Reduction			91			96			99+	
Total Wastewater	$Gal.x10^6$	15	449	1070	0	213	563	0	52	265
% Reduction			84			92.5			98	
Sanitary Discharge	$Gal.x10^6$	1.8	29	72	0	14	39	0	3.2	17
% Reduction			91.5			95.7			99+	
Urban Runoff	$Gal.x10^6$	13	420	998	0	198	524	0	49	248
% Reduction			83			92			98	
Composition of Discharge (% Sanitary)	%		6.5			6.5			6.2	
Days Receiving Waster (near outfalls) coliform Levels exceed;										
(1) 10,000 MPN/100ml	Days	2	10	23	0	6	16	0	1	6
% Reduction			86			91.4			98.6	
(2) 1,000 MPN/100ml	Days	6	25	51	0	13	31	0	4	14
% Reduction			79			89			96.6	
BOD_5	$lbs.x10^3$	6.4	191	460	0	91	239	0	22	113
% Reduction			84			92.5			98	
Suspended Solids	$lbs.x10^3$	63.1	1890	4550	0	896	2360	0	219	1,110
% Reduction			84			925			98	

Table VI-1 cont.

WESTSIDE

TABULATION OF OVERFLOWS VS COST VS ACCOMPLISHMENTS

No. of Overflows	COST ($ MILLION)		Susp. Solids & BOD % Reduction from Existing	Coliform > 10,000		Coliform > 1000		Overflow	
	Capital	Annual		Days	% Reduction	Days	% Reduction	Hrs.	% Reduction
Existing	-	-	-	70		119		372	
16	$167	$12	62	23	67	49	59	85	77
8	189	14	84	10	86	25	79	32	91
4	242	19	93	6	91	13	89	15.4	96
1 (NPDES)	299	24	98	1	99	4	97	3.5	99+

Table VI-2

WESTSIDE ZONE

WASTEWATER GENERATED AND PERCENTAGE TREATED

	Generated (Mill. Gal./Yr)	Percentage Treated				
		Existing	16 O'flows	8 O'flows	4 O'flows	1 O'flows
Sanitary	8040	95.8	99.02	99.63	99.82	99.96
Urban Runoff	3030	16.9	66.3	86.1	93.4	98.4
Total Wastewater	11070	74.1	90.1	95.9	98.1	99.53

Table VI-3

WESTSIDE COST-BENEFIT ANALYSIS

BASED ON RECREATIONAL BENEFICIARIES

Design No. of O'flows/yr	Days of coliform MPN >1000	Days		Annual Cost $\$x10^6$	Cost Diff. $\$ \times 10^6$	Per Diem Costs x $1000		Cost($) per beneficiary	Incremental Costs($) Per Addtl. Beneficiary
		from exist	between levels			from exist	between levels		
EXISTING	119								
			70		12		171		68
16	49	70		12		171		68	
			26		2		77		31
8	25	94		14		149		60	
			12		5		417		167
4	13	106		19		179		72	
			9		5		555		222
1	4	115		24		200		80	

NOTES: A beneficiary is a beach user (includes swimmers and surfers) that enjoys cleaner water (i.e. coliform MPN 1000) as a result of the elimination of overflows.

2500 people per day assumed visiting beaches after overflows in the Westside zone between the Golden Gate Bridge and Thornton Beach (from Table V-1)

Table VI-4

California Regional Water Quality Control Board

San Francisco Bay Region

1515 Clay Street, Suite 1400, Oakland, CA 94612
(510) 622-2300 • Fax (510) 622-2460
http://www.waterboards.ca.gov/sanfranciscobay

and

U.S. Environmental Protection Agency

Region IX

75 Hawthorne Street, San Francisco, California 94105
(415) 947-8707 * Fax (415) 947-3549
http://www.epa.gov/region9/

ORDER NO. R2-2009-0062
NPDES NO. CA0037681

WASTE DISCHARGE REQUIREMENTS FOR THE CITY AND COUNTY OF SAN FRANCISCO OCEANSIDE WATER POLLUTION CONTROL PLANT (SOUTHWEST OCEAN OUTFALL) AND COLLECTION SYSTEM, INCLUDING THE WESTSIDE WET WEATHER FACILITIES

The following Discharger is subject to waste discharge requirements as set forth in this Order.

Table 1. Discharger Information

Discharger	City and County of San Francisco
Name of Facility	Oceanside Water Pollution Control Plant and Collection System, Including the Westside Wet Weather Facilities
Facility Address	3500 Great Highway
	San Francisco, CA 94132
	San Francisco County
The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board have classified this discharge as a **major** discharge.	

Discharges by the City and County of San Francisco from the discharge points identified below are subject to waste discharge requirements as set forth in this Order.

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Secondary Treated Wastewater, Combined Primary and Secondary Treated Wastewater and Stormwater, and the equivalent of wet weather primary treated combined Wastewater and Stormwater decant flow from a Combined Sewer System	37 ° 42' 18" N	122 ° 34' 39" W	Pacific Ocean, Offshore

CSD-001	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 42' 55" N	122 ° 30' 16" W	Pacific Ocean (Fort Funston, Ocean Beach)
CSD-002	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 44' 16" N	122 ° 30' 29" W	Pacific Ocean (Vicente St., Ocean Beach)
CSD-003	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 45' 50" N	122 ° 30' 42" W	Pacific Ocean (Lincoln Way, Ocean Beach)
CSD-004	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 47' 5" N	122 ° 30' 37" W	Pacific Ocean (Mile Rock)
CSD-005	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 47' 16" N	122 ° 29' 30" W	Pacific Ocean (China Beach)
CSD-006	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 47' 22" N	122 ° 29' 16" W	Pacific Ocean (Baker Beach)
CSD-007	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater Discharge	37 ° 47' 22" N	122 ° 29' 13" W	Pacific Ocean (Baker Beach)

Table 3. Administrative Information

This Order was adopted by the Regional Water Quality Control Board on:	August 12, 2009
This Order shall become effective on:	October 1, 2009
This Order shall expire on:	September 30, 2014
CIWQS Regulatory Measure	360578
The Discharger shall file a Report of Waste Discharge in accordance with title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	180 days prior to the Order expiration date

The signatures below certify that the following is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on August 12, 2009, and of a National Pollutant Discharge Elimination System permit issued by the United States Environmental Protection Agency, Region IX, on the date below.

Bruce H. Wolfe

Bruce H. Wolfe, Executive Officer
California Water Quality Control Board
San Francisco Bay Region

Date: 8/12/09

Alexis Strauss

Alexis Strauss, Director
Water Division
USEPA Region IX

Date: 12 August 2009

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I. FACILITY INFORMATION

The following Discharger is subject to waste discharge requirements as set forth in this Order.

Table 4. Facility Information

Discharger	City and County of San Francisco
Name of Facility	Oceanside Water Pollution Control Plant and Collection System, Including Westside Wet Weather Facilities
Facility Address	3500 Great Highway
	San Francisco, CA 94132
	San Francisco County
Facility Contact, Title, Phone	Tommy Moala, Assistant General Manager, (415) 554-2465
CIWQS Place ID	256498
CIWQS Party ID	39680
Mailing Address	San Francisco Public Utilities Commission/Wastewater Enterprise
	1155 Market Street, 11th Floor
	San Francisco CA 94103
Type of Facility	Publicly Owned Treatment Works (POTW)
Facility Design Flow	<u>Oceanside Plant</u> 43 MGD, maximum dry weather design flow (providing secondary treatment) 65 MGD maximum wet weather design flow (providing secondary treatment for 43 MGD and primary treatment for an additional 22 MGD)
	<u>Westside Wet Weather Facilities</u> Collection system flows greater than 65 MGD and less than 175 MGD receive the equivalent of wet weather primary treatment in the Westside Wet Weather Facilities (storage/transports) and are discharged at the Southwest Ocean Outfall. Flows greater than 175 MGD receive the equivalent of wet weather primary treatment in the Westside Wet Weather Facilities and are discharged at authorized combined sewer overflow discharge points on the shoreline.

II. FINDINGS

The U.S. Environmental Protection Agency (USEPA) and the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), find:

A. **Background.** The City and County of San Francisco (hereinafter the Discharger) is currently discharging pursuant to Order No. R2-2003-0073 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0037681. The Discharger submitted a Report of Waste Discharge, dated March 28, 2008, and applied to renew its NPDES permit to discharge up to 65 MGD of treated wastewater from the Oceanside Water Pollution Control Plant (Plant), through the Southwest Ocean Outfall, and primary treated wet weather flows from the Westside Wet Weather Facilities.

For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and State laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

B. **Facility Description.** The Discharger is the owner and operator of the Oceanside Plant and its associated collection system, a combined sewer system that includes the Westside Wet Weather Facilities. The collection system includes approximately 300 miles of sewer pipes on the westside watershed of the city that covers the areas of Richmond, Sunset, and Lake Merced as well as a small portion of Daly City. The system also includes four all weather pump stations and two wet weather pump stations.

Treatment at the Oceanside Plant, which has a peak secondary treatment capacity of 43 MGD, includes coarse screening at the Westside Pump Station, fine screening and grit removal at the Plant headworks, primary sedimentation, activated sludge treatment by a pure oxygen process, and secondary clarification. Secondary treated wastewater is discharged to the Pacific Ocean between 3.4 and 3.6 nautical miles offshore, at Discharge Point 001 - the Southwest Ocean Outfall. These receiving waters are waters of the United States but are beyond the territorial waters of the State of California, which are three nautical miles from the low water mark at shore. During wet weather periods of high influent flow, the Oceanside Plant can provide primary treatment for an additional 22 MGD of influent flow, which, following treatment, is blended with secondary treated wastewater (i.e., a total treatment capacity of 65 MGD) and discharged at Discharge Point 001.

The Discharger's collection system includes three large storage/transport structures – the Westside Transport, a 49.3 million gallon box-like structure located beneath the Great Highway; the Richmond Transport, a 12 million gallon structure located to the north; and the Lake Merced Transport, a 10 million gallon structure located to the south. The combined storage capacity of these "Westside Wet Weather Facilities" is 73.5 million gallons, which includes 2.2 million gallons of capacity within the sewer lines.

Plant operations depend on rainfall, forecasts, and storage conditions in the Westside, Lake Merced, and Richmond Transport structures. Collection system flows that exceed the Oceanside Plant's treatment capacity of 65 MGD are stored in the Westside Wet Weather Facilities, which provide the equivalent of wet weather primary treatment through solids settling, skimming of floatable solids, and screening at pump stations. Combined wastewater from the storage/transport structures is pumped via the Westside Pump Station to Discharge Point 001, until the pumping capacity of the combined sewer system facilities to the outfall is reached at 175 MGD. Combined wastewater flows greater than 175 MGD also receive treatment in the storage/transport structures (the equivalent of wet weather primary treatment) but are discharged at the seven, near-shore combined sewer overflow discharge (CSOD) structures authorized by this Order. These receiving waters are waters of the United States and territorial waters of the State of California.

To be considered a discrete overflow discharge event, it must be separated by six hours in time from any other combined sewer overflow discharge. For the purposes of this permit, authorized, treated combined sewer overflow discharges from the near-shore discharge structures are referred to as combined sewer overflow discharges (CSODs). Unauthorized, untreated combined sewer overflow discharges from combined sewer systems are referred to as combined sewer overflows (CSOs).

Wastewater solids removed by settling in the Westside Wet Weather Facilities are flushed to the Plant when wet weather flows subside. Primary and secondary solids from the Plant are blended and thickened using gravity belt thickeners, anaerobically digested, dewatered, and beneficially re-used at permitted sites.

Attachment B provides a map of the area around the facility. Attachment C provides a flow schematic of the Plant and the Westside Wet Weather Facilities.

C. **Legal Authorities.** This Order is issued pursuant to federal Clean Water Act (CWA) §402 and the California Water Code (CWC) Chapter 5.5, Division 7 (commencing with §13370). It shall serve as an NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to CWC Article 4, Chapter 4, Division 7 (commencing with §13260). Because this Order concerns discharges to waters of the United States, both within and beyond State territorial waters, USEPA and Regional Water Board are jointly issuing the permit.

D. **Background and Rationale for Requirements.** The requirements of this Order are based on information submitted as part of the application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F), which contains background information and rationale for the requirements established by the Order, is hereby incorporated by reference into this Order and constitutes part of the Findings for this Order. Attachments A through E, and G through H are also incorporated into this Order by reference.

E. **California Environmental Quality Act (CEQA).** Under Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA. Similarly, pursuant to CWA §511(c), this action to reissue an NPDES permit does not trigger the requirements of the National Environmental Policy Act [42 U.S.C. 4321 et seq.].

F. **Technology Based Effluent Limitations.** CWA §301(b) and NPDES regulations at 40 CFR 122.44 require that permits include conditions meeting applicable technology-based requirements at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. Plant discharges authorized by this Order must meet the minimum federal technology-based requirements for POTWs established by USEPA at 40 CFR 133 (Secondary Treatment Regulation). For wet weather discharges, this Order includes technology-based requirements based on USEPA's Combined Sewer Overflow Control Policy. The Fact Sheet contains a discussion on the development of the technology-based effluent limitations and requirements.

G. **Water Quality Based Effluent Limitations.** CWA §301(b) and NPDES regulations at 40 CFR 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards.

40 CFR 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established

for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) must be established using:

- USEPA criteria guidance under CWA §304(a), supplemented where necessary by other relevant information;
- an indicator parameter for the pollutant of concern; or
- a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the State's narrative criterion, supplemented with other relevant information, as provided in 40 CFR 122.44(d)(1)(vi).

H. **Water Quality Control Plans.** The *Water Quality Control Plan for the San Francisco Bay Basin* (the Basin Plan) is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface water and groundwaters, and includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Resources Control Board (State Water Board), USEPA, and the Office of Administrative Law, as required. For the protection of ocean waters of the State, the Basin Plan incorporates by reference provisions of the *Water Quality Control Plan for Ocean Waters of California* (the Ocean Plan).

The Basin Plan implements State Water Board Resolution No. 88-63, which establishes State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply (MUN). As the total dissolved solids (TDS) levels of marine waters significantly exceed 3,000 mg/L, ocean waters meet an exception to Resolution No. 88-63, and therefore, the MUN designation does not apply. According to Basin Plan Table 2-1, beneficial uses of the Pacific Ocean are as follows.

Table 5. Beneficial Uses

Receiving Water	Basin Plan Beneficial Uses
Territorial waters of the State of California within the Pacific Ocean	• Industrial Service Supply • Ocean, Commercial, and Sport Fishing • Shellfish Harvesting • Marine Habitat • Fish Migration • Preservation of Rare and Endangered Species • Fish Spawning • Wildlife Habitat • Water Contact Recreation • Noncontact Water Recreation • Navigation

Requirements of this Order implement the Basin Plan.

I. **California Ocean Plan.** The State Water Board adopted the *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005, and it became effective on February 14, 2006. The Ocean Plan applies, in its entirety, to point source discharges to the territorial waters of the State as defined by California law to the extent that these waters are outside of enclosed bays, estuaries, and coastal lagoons. The Ocean Plan identifies the following beneficial uses of ocean waters of the State: Industrial Water Supply; Water Contact and Non-contact Recreation, Including Aesthetic Enjoyment; Navigation; Commercial and Sport Fishing; Mariculture; Preservation and Enhancement of Designated Areas of Special Biological Significance; Rare and Endangered Species; Marine Habitat; Fish Migration; Fish Spawning; and Shellfish Harvesting. To protect beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation for discharges to State territorial waters.

Discharge Point 001, the Southwest Ocean Outfall, is 3.4 to 3.6 nautical miles offshore in federal waters. The territorial waters of the State end three nautical miles from shore. The Ocean Plan (Appendix 1, Ocean Waters) states, "If a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters." For the reasons set forth in the Fact Sheet (Appendix F), the Regional Water Board finds that the discharge at Discharge Point 001 could not affect the quality of the waters of the State during dry weather. During wet weather, the Ocean Plan defers to the Combined Sewer Overflow Control Policy, discussed in Finding K, below. Therefore, this Order does not regulate the discharge at Discharge Point 001 directly through the Water Board's Ocean Plan authorities.

J. **Determination of Unreasonable Degradation of the Marine Environment.** Discharges from the Southwest Ocean Outfall are to waters of the United States beyond the territorial waters of the State of California. Federal regulations at 40 CFR 125.122 require the permitting authority to determine whether a discharge will cause unreasonable degradation of the marine environment. Based on 40 CFR 125.22(b), USEPA conducted a reasonable potential analysis using Ocean Plan objectives and included numeric permit limitations, based on the Ocean Plan's dilution procedures, for toxicity and mercury, the only numeric Ocean Plan objectives for which USEPA found reasonable potential to cause or contribute to an exceedance of water quality standards. USEPA also included narrative receiving water limitations for the Ocean Plan narrative objectives for which it found reasonable potential. For determining reasonable potential for the dioxins, USEPA used recently updated Toxicity Equivalency Factors (TEFs) published by the World Health Organization in 2005, as well as the congener-specific Bioconcentration Equivalency Factors (BEFs) used for the Great Lakes System. The "Bay Area Clean Water Agencies' Draft Dioxin Issue Paper: Expert Panel Response and Recommendations," dated April 4, 2008, proposed using both TEFs and BEFs in developing NPDES permit limits for dioxins. This approach incorporates recent scientific information for dioxins on a congener-specific basis, while continuing to use the Ocean Plan water quality objective for dioxins (TCDD equivalents) and standards implementation procedures. Given the unique issues dioxins present, USEPA has prepared a determination of no unreasonable degradation based on the ten factors under 40 CFR 125.122(a) (Appendix 1 to the Fact Sheet). USEPA has determined that no unreasonable degradation of the marine environment will result from the discharges of dioxins through the Southwest Ocean Outfall as authorized under this Order, with all the limitations, conditions, and monitoring requirements in effect.

K. **Combined Sewer Overflow Control Policy.** Wet weather flows from combined sewer systems are subject to CWA §301(b)(1)(A) and are not subject to secondary treatment regulations. Wet weather flows from combined sewer systems are addressed by the Combined Sewer Overflow Control Policy (59 Federal Register 18688-18698). The *Wet Weather Water Quality Act of 2000* incorporated this policy into the CWA.

The policy establishes a consistent national approach for controlling discharges from combined sewers to the nation's waters. Using the NPDES permit program, the policy initiates a two-phased process. During the first phase, a discharger is required to implement "nine minimum controls" (e.g., prevent dry weather overflows). These controls constitute the technology-based requirements of the CWA as applied to combined sewer facilities (i.e., best conventional pollutant control technology, BCT, and best available control technology economically achievable, BAT). The controls are intended to provide immediate and relatively low-cost water quality improvements for facilities that, unlike the Discharger, have not implemented a long-term control plan. During the first phase, a discharger is required to initiate development of a long-term control plan to select controls to comply with water quality standards, based on consideration of the discharger's financial capabilities.

The second phase of the process involves implementation of the long-term control plan developed in the first phase. The purpose of this long-term control plan is to comply with CWA water quality requirements. The Discharger's program, which continues to implement the Discharger's long-term plan, is consistent with the policy. This Order implements the policy and is consistent with the Regional Water Board policy on wet weather overflows described in Basin Plan Section 4.9. During wet weather, CSODs from shoreline discharge points CSD-001 through CSD-007 and the Southwest Ocean Outfall are subject to this policy.

L. **Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes [65 FR 24641 (April 27, 2000) (codified at 40 CFR 131.21)]. Under the revised regulation (also known as the Alaska Rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

M. **Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based and water quality-based effluent limitations for individual pollutants. The technology-based effluent limitations consist of restrictions on biochemical oxygen demand (BOD), total suspended solids (TSS), and pH. Restrictions on these pollutants are discussed in Section IV.B of the Fact Sheet (Attachment F). This Order's technology-based pollutant restrictions implement the minimum applicable federal technology-based requirements. In addition, this Order contains effluent limitations more stringent than the minimum federal technology-based requirements. The water quality-based limits are necessary to meet water quality standards. They are not more stringent than required by the CWA.

Water quality-based effluent limitations have been derived to implement water quality objectives that protect beneficial uses. Both beneficial uses and water quality objectives in State waters have been approved pursuant to federal law and are the applicable water quality standards. The procedures used for this Order to calculate individual water quality-based effluent limitations for State waters are based on the California Ocean Plan, which was approved by USEPA on February 14, 2006.

N. **Antidegradation Policy**. NPDES regulations at 40 CFR 131.12 require that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law and requires that existing quality of waters be maintained unless degradation is justified based on specific findings. Water quality plans implement and incorporate by reference, both the State and federal antidegradation policies. The permitted discharges are consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16 because there is no increase in authorized flow and effluent limitations are at least as stringent as in the previous permit.

O. **Anti-Backsliding Requirements.** CWA Sections 402(o)(2) and 303(d)(4) and NPDES regulations at 40 CFR 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. With the exception of acute and chronic toxicity, all effluent limitations in this Order are at least as stringent as the effluent limitations in the previous permit. Compliance with anti-backsliding requirements is discussed in Fact Sheet section IV.C.6.

P. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the State. The Discharger is responsible for meeting all requirements of applicable State and federal law pertaining to threatened and endangered species.

Section 7(a)(2) of the federal Endangered Species Act requires USEPA, in reissuing this NPDES permit, to ensure, after consultation with appropriate agencies that discharges at the Southwest Ocean Outfall are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat for such species. USEPA has initiated informal consultation with National Oceanic Atmospheric Administration.

Q. **Monitoring and Reporting.** NPDES regulations at 40 CFR 122.48 require that all NPDES permits specify requirements for recording and reporting monitoring results. CWC §13267 and §13383 authorize the Regional Water Board to require technical and monitoring reports. The Monitoring and Reporting Program accompanying this Order (Attachment E) establishes monitoring and reporting requirements to implement federal and State requirements.

R. **Standard and Special Provisions.** Federal Standard Provisions, which apply to all NPDES permits in accordance with 40 CFR 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 CFR 122.42, are provided in Attachment D. The Discharger must comply with all federal standard provisions and with those additional conditions that apply pursuant to 40 CFR 122.42. The Regional Water Board has also included State standard provisions in this Order as Attachment G. The rationale for these special provisions is provided in the Fact Sheet (Attachment F). Where federal standard provisions are duplicative with State standard provisions, the federal standard provisions will apply and any excursion from a duplicative standard provision will not be interpreted as two excursions.

S. **Notification of Interested Parties.** The USEPA and Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharges described herein and has provided them with an opportunity to submit written comments and recommendations. Details of the notification are provided in the Fact Sheet, which accompanies this Order.

T. **Consideration of Public Comment.** The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharges. Details of the public hearing are provided in the Fact Sheet of this Order.

THEREFORE, IT IS HEREBY ORDERED, that this Order supersedes Order No. R2-2003-0073, except for enforcement purposes, and in order to meet the provisions contained in CWC Division 7 (commencing with §13000) and regulations adopted hereunder, and the provisions of the federal CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order.

III. DISCHARGE PROHIBITIONS

A. Discharge of treated wastewater at a location or in a manner different from that described by this Order is prohibited.

B. Discharge from Discharge Point 001 that does not receive an initial dilution of at least 150:1 is prohibited.

C. Bypass of secondary treatment facilities at the Oceanside Plant is prohibited, except during a wet weather day, as defined by this Order (see Definitions, Attachment A), or as provided for by NPDES regulations at 40 CFR 122.41(m)(4) and in Section IV.B of *Regional Standard Provisions, and Monitoring and Reporting Requirements (Supplement to Attachment D) for NPDES Wastewater Discharge Permits*, July 2009 (Attachment G).

D. Discharge of wastewater at a location other than Discharge Point 001 is prohibited, except on wet weather days (as defined in Attachment A) when the capacity of the system to discharge to Discharge Point 001 has been exceeded.

E. Discharge of wastewater at Discharge Points CSD-001 through CSD-007 is prohibited, except on wet weather days (as defined in Attachment A) and in accordance with the terms of this Order.

F. Plant discharges shall not exceed 43 MGD at Monitoring Location EFF-001 during dry weather. Compliance with this prohibition shall be based on average dry weather flow determined over three consecutive dry weather months.

G. Any CSO that results in a discharge of untreated or partially treated wastewater to waters of the United States is prohibited. This does not include authorized combined sewer overflow discharges (CSODs).

H. The discharge of municipal and industrial waste sludge directly or indirectly to the ocean, or into a waste stream that discharges to the ocean without further treatment, is prohibited.

I. The discharge of waste to designated Areas of Special Biological Significance, except as provided by Ocean Plan Chapter III.E, is prohibited.

J. Degradation of harvestable shellfish in the area as a result of dry weather discharge from Discharge Point 001 is prohibited.

IV. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations for Dry Weather – Discharge Point 001

The following effluent limitations apply during dry weather days, as defined in Attachment A. Limitations, conditions, and other requirements applicable during wet weather conditions are established in Section VI.C of this Order.

1. Effluent Limitations – Discharge Point 001

a. The Discharger shall comply with the following effluent limitations at Discharge Point 001, with compliance measured at Monitoring Location EFF-001 as described in the attached Monitoring and Reporting Program:

Table 6. Effluent Limitations for Conventional Pollutants, Discharge Point 001

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD_5[(1)] @ 20°C	mg/L	30	45	---	---	---
TSS[(2)]	mg/L	30	45	---	---	---
pH[(3)]	std units	---	---	-9.0--	6.0	9.0

(1) Biochemical Oxygen Demand
(2) Total Suspended Solids
(3) The pH effluent limit of 6.0 shall not apply if the discharger can demonstrate that the addition of inorganic chemicals or industrial sources is not causing the excursion below 6.0. The regulations at 40 CFR 133.102(c) allow the modification or elimination of pH limitations when it can be demonstrated that the addition of inorganic chemicals or industrial sources is not causing an excursion above or below the limits.

b. Percent Removal: The average monthly percent removal of BOD_5 @ 20°C and TSS shall not be less than 85 percent.

2. Effluent Limitations for Toxic Substances – Discharge Point 001

The Discharger shall comply with the following effluent limitations at Discharge Point 001, with compliance measured at Monitoring Location EFF-001 as described in the attached Monitoring and Reporting Program:

Table 7. Effluent Limitations for Toxic Pollutants, Discharge Point 001

Parameter	Units	Effluent Limitations[(1)(3)]		
		6-month median	Maximum Daily	Instantaneous Maximum
Chronic Toxicity	TUc	N/A	150	N/A
Mercury[(2)]	µg/L	5.9	24	N/A

(1) Limitations apply to the concentration of all samples collected during the period (daily = 24-hour period)

(2) Mercury limitations are expressed as total recoverable metal.

(3) A daily or 6-month median value for a given constituent shall be considered noncompliant with the effluent limitations only if it exceeds the effluent limitation and the Reporting Level (RL) for that constituent. Ocean Plan Appendix II indicates the Minimum Level (ML) upon which the Reporting Level is based for compliance purposes. For mercury this is 0.2 µg/L.

3. Effluent Limits for Disinfectants

The effluent is not disinfected; thus there are no limits on chlorine or other disinfectant residuals.

B. Land Discharge Specifications

Not Applicable.

C. Reclamation Specifications

Not Applicable.

V. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Ocean Plan water quality objectives were used to determine the receiving water limitations in this Order. Dry Weather Day discharges authorized by this Order at Discharge Point 001 shall not cause exceedances of the following surface water limitations in ocean receiving waters. As indicated in the Fact Sheet (Attachment F, Section IV.C.6), disinfection to meet bacteria level objectives is not required. Attachment F Section III.C.4 describes an Ocean Plan exception for combined sewer overflows discharges.

1. Floating particulates and grease and oil shall not be visible.
2. The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.
3. Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.
4. The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.
5. The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as a result of the discharge of oxygen demanding waste material.
6. The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
7. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
8. The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life.

9. Nutrient levels shall not cause objectionable aquatic growths or degrade indigenous biota.

10. Marine communities, including vertebrate, invertebrate and plant species, shall not be degraded.

11. The natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.

12. The concentration of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

B. Groundwater Limitations

Not Applicable

VI. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions included in **Attachment D** of this Order.

2. The Discharger shall comply with all applicable items of the *Regional Standard Provisions and Monitoring and Reporting Requirements (Supplement to Attachment D) for NPDES Wastewater Discharge Permits*, July 2009 **(Attachment G)**, including any amendments thereto.

3. If any discrepancies exist between requirements in the Order, the federal standard provisions included in Attachment D, and the Regional Standard Provisions included in Attachment G, the requirements in this Order prevail over requirements in Attachment D, which prevail over requirements in Attachment G.

B. Monitoring and Reporting Program (MRP) Requirements

The Discharger shall comply with the MRP, and future revisions thereto, in Attachment E. The Discharger shall also comply with all applicable items of the *Regional Standard Provisions and Monitoring and Reporting Requirements (Supplement to Attachment D) for NPDES Wastewater Discharge Permits*, July 2009 **(Attachment G)**.

C. Special Provisions

1. Re-opener Provisions

The Regional Water Board or USEPA, as appropriate, may modify or re-open this Order prior to its expiration date in any of the following circumstances as allowed by law.

a. If present or future investigations demonstrate that a discharge governed by this Order will have, or will cease to have, a reasonable potential to cause or contribute to adverse impacts on water quality or beneficial uses of the receiving waters.

b. If new or revised Water Quality Objectives (WQOs) or TMDLs come into effect for the receiving waters, effluent limitations may be modified as necessary to reflect the updated WQOs and waste load allocations in TMDLs. Adoption of effluent limitations as contained in this Order is not intended to restrict in any way future modifications based on legally adopted WQOs, TMDLs, or as otherwise permitted under regulations governing permit modifications.

c. If translator or other water quality studies provide a basis for determining that a permit condition should be modified.

d. If an administrative or judicial decision on a separate NPDES permit or WDR necessitates modifications of the requirements established by this Order.

e. As otherwise authorized by law.

The Discharger may request permit modification in any of the circumstances described above. Such a request shall include appropriate antidegradation and anti-backsliding analyses.

2. Special Studies, Technical Reports, and Additional Monitoring Requirements

a. Combined Sewer Collection System Overflow Study

The combined sewer system commingles stormwater and domestic and industrial sewage. Heavy storm events can potentially result in flows that exceed the collection system capacity, at least in some areas. The Discharger shall submit a report, for planning purposes, by June 30, 2012, evaluating the potential locations of such system excursions and the primary conditions that result in such events. The report shall evaluate the feasibility and effectiveness of alternatives to minimize these events.

b. Dilution Model Update and Stratification Data Collection

Available ambient data to determine stratification for the purposes of dilution modeling for this discharge is out-dated. The Discharger shall submit with the permit application for the next permit reissuance, ambient data collected during the term of this permit, as well as updated dilution modeling for use during the next permit reissuance. The discharger shall:

(1) Submit a work plan to USEPA and the Regional Water Board for stratification data collection no later than one year after the effective date of this Order. The purpose of the data collection effort is to determine the months of maximum stratification based on actual ocean observations. At a minimum, the work plan shall include the following tasks:

- Collect temperature and salinity data during the months of maximum stratification in the vicinity of the outfall uninfluenced by the waste-field;
- Record data at a minimum of five equally spaced depths and at an appropriate resolution to determine maximum stratification;
- Provide effluent temperature and salinity or density data and flow rate for the time period encompassing the study;
- Describe how the data will be collected, the location(s), sensors, and instruments to be deployed and equipment to be used; and
- Describe appropriate quality assurance protocols to be followed to ensure the data is of adequate quality and representative of actual conditions within the water column.

(2) Upon completion of data collection, the Discharger shall prepare and submit a data report in hard copy and electronic format to USEPA and the Regional Water Board. Records that include large data gaps, errors, or instrument failures may not be used for dilution modeling.

(3) No later than 4 years after the effective date of this Order, the Discharger shall submit a work plan for updated dilution modeling. This work plan shall include models to be used and model inputs and assumptions.

(4) No later than at the time of submittal of the application for permit reissuance, the Discharger shall submit updated dilution modeling runs, with all inputs and outputs presented in hard copy and electronic form.

3. Best Management Practices and Pollution Prevention

a. Pollution Minimization Program

The Discharger shall continue to implement and improve, in a manner acceptable to the Executive Officer, its existing Pollutant Minimization Program (PMP) to reduce pollutant loadings to the combined sewer system, and therefore to the receiving waters.

b. Annual Pollution Prevention Report

The Discharger shall submit an annual report, acceptable to the Executive Officer, no later than February 28th of each calendar year. The annual report shall cover January through December of the preceding year. Each annual report shall include at least the following information.

(1) *Brief description of the treatment plant, treatment plant processes and service area.*

(2) *Discussion of current pollutants of concern.* Periodically, the Discharger shall determine which pollutants are currently a problem and which pollutants may be potential future problems. This discussion shall address why the pollutants were identified as pollutants of concern.

(3) *Identification of sources of pollutants of concern.* This discussion shall address how the Discharger identifies pollutant sources. The Discharger should also identify sources or potential sources not directly within its ability or authority to control, such as pollutants in the potable water supply and air deposition.

(4) *Identification and implementation of measures to reduce the sources of the pollutants of concern.* This discussion shall identify and prioritize tasks to address the Discharger's pollutants of concern. The Discharger may implement the tasks themselves or participate in a regional, State, or national group to address its pollutants of concern whenever it is efficient and appropriate to do so. A time line shall be included for the implementation of each task.

(5) *Outreach to employees.* The Discharger shall inform its employees regarding pollutants of concern, potential sources, and how they might be able to help reduce the discharge of these pollutants. The Discharger may provide a forum for employees to provide input to the program.

(6) *Continuation of Public Outreach Program. The* Discharger shall prepare a public outreach program to communicate pollution minimization measures to its service area. Outreach may include participation in existing community events such as county fairs, initiating new community events such as displays and contests during Pollution Prevention Week, conducting school outreach programs, conducting plant tours, and providing public information in various media. Information shall be specific to target audiences. The Discharger shall coordinate with other agencies as appropriate.

(7) *Discussion of criteria used to measure PMP's and tasks' effectiveness.* The Discharger shall establish criteria to evaluate the effectiveness of its PMP. This discussion shall address specific criteria used to measure the effectiveness of each task identified in provisions VI.C.3.b(3 – 6), above.

(8) *Documentation of efforts and progress.* The Discharger shall describe all its PMP activities for the reporting year.

(9) *Evaluation of PMP's and tasks' effectiveness.* The Discharger shall use the criteria established in b.7, above, to evaluate the Program's and tasks' effectiveness.

(10) *Identification of specific tasks and time schedules for future efforts.* Based on the evaluation of effectiveness, the Discharger shall describe how it will continue or change its PMP tasks to more effectively reduce the loading of pollutants to the treatment plant, and subsequently, in its effluent.

The Discharger shall develop and conduct a PMP as further described below when there is evidence (e.g., sample results reported as DNQ when the effluent limitation is less than the ML, sample results from analytical methods more sensitive than those methods required by this Order, presence of whole effluent toxicity, health advisories for fish consumption, results of benthic or aquatic organism tissue sampling) that a pollutant identified in Table B of the Ocean Plan is present in the effluent above an effluent limitation that is calculated for a constituent contained in Table B of the Ocean Plan and either:

(i) The concentration of the pollutant is reported as DNQ and the effluent limitation is less than the reported ML; or

(ii) The concentration of the pollutant is reported as ND and the effluent limitation is less than the ML, using definitions described in Attachment A and reporting protocols described in MRP section X.B.4.

The PMP shall include, but not be limited to, the following actions and submittals acceptable to the Regional Water Board:

(i) An annual review and semi-annual monitoring of potential sources of the reportable pollutant(s), which may include fish tissue monitoring and other bio-uptake sampling; or alternative measures approved by the Executive Officer when it is demonstrated that source monitoring is unlikely to produce useful analytical data;

(ii) Quarterly monitoring for the reportable pollutant(s) in the influent to the wastewater treatment system; or alternative measures approved by the Executive Officer, when it is demonstrated that influent monitoring is unlikely to produce useful analytical data;

(iii) Submittal of a control strategy designed to proceed toward the goal of maintaining concentrations of the reportable pollutant(s) in the effluent at or below the effluent limitation;

(iv) Implementation of appropriate cost-effective control measures for the reportable pollutant(s), consistent with the control strategy; and

(v) An annual status report that shall be sent to the Regional Water Board including:

- All PMP monitoring results for the previous year;
- A list of potential sources of the reportable pollutant(s);
- A summary of all actions undertaken pursuant to the control strategy; and
- A description of actions to be taken in the following year.

4. Construction, Operation and Maintenance Specifications

a. Wastewater Facilities, Review and Evaluation, and Status Reports

(1) The Discharger shall operate and maintain its wastewater collection, treatment, and disposal facilities in a manner to ensure that all facilities are adequately staffed, supervised, financed, operated, maintained, repaired, and upgraded as necessary, in order to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the Discharger's service responsibilities.

(2) The Discharger shall regularly review and evaluate its wastewater facilities and operation practices in accordance with Section a.(1) above. Reviews and evaluations shall be conducted as an ongoing component of the Discharger's administration of its wastewater facilities.

(3) The Discharger shall provide USEPA and the Regional Water Board, upon request, a report describing the current status of its wastewater facilities and operation practices, including any recommended or planned actions and an estimated time schedule for these actions. The Discharger shall also include, in each annual SMR, a description or summary of its review and evaluation procedures, and wastewater facility programs or capital improvement projects.

b. Operations and Maintenance (O&M) Manual, Review and Status Reports

(1) The Discharger shall maintain an O&M Manual for the Plant and collection system. The O&M Manual shall be maintained in usable condition and be available for reference and use by all personnel.

(2) The Discharger shall regularly review, revise, or update, as necessary, the O&M Manual to ensure that it remains useful and relevant to current equipment and operation practices. The Discharger shall conduct reviews annually, and revise or update the O&M Manual as necessary. For any significant changes in treatment facility equipment or operation practices, the Discharger shall complete any revisions within 90 days.

(3) The Discharger shall provide USEPA and the Regional Water Board, upon request, a report describing the current status of its O&M Manual, including any recommended or planned actions and an estimated time schedule for these actions. The Discharger shall also include, in each annual SMR, a description or summary of review and evaluation procedures and changes to its operations and maintenance manual.

c. Contingency Plan, Review and Status Reports

(1) The Discharger shall maintain a Contingency Plan as prudent in accordance with current municipal facility emergency planning. The discharge of pollutants in violation of this Order when the Discharger has failed to develop

and adequately implement a Contingency Plan will be the basis for considering such a discharge a willful and negligent violation of this Order pursuant to CWC §13387.

(2) The Discharger shall annually review the Contingency Plan and update it, as necessary, so that the plan may remain useful and relevant to current equipment and operation practices.

(3) The Discharger shall provide USEPA and the Regional Water Board, upon request, a report describing the current status of its Contingency Plan review and update. The Discharger shall also include, in each annual SMR, a description or summary of its review and evaluation procedures and any changes to its Contingency Plan.

5. Special Provisions for Municipal Facilities

a. Pretreatment Program

(1) The Discharger shall implement and enforce its approved pretreatment program in accordance with federal Pretreatment Regulations (40 CFR 403), pretreatment standards promulgated under Sections 307(b), 307(c), and 307(d) of the CWA, pretreatment requirements specified under 40 CFR 122.44(j), and the requirements in Attachment H, “Pretreatment Requirements.” The Discharger’s responsibilities include, but are not limited to:

(i) Enforcement of National Pretreatment Standards of 40 CFR 403.5 and 403.6;
(ii) Implementation of its pretreatment program in accordance with legal authorities, policies, procedures, and financial provisions described in the General Pretreatment regulations (40 CFR 403) and its approved pretreatment program;
(iii) Submission of reports to USEPA, the State Water Board, and the Regional Water Board, as described in Attachment H “Pretreatment Requirements”.

(iv) Evaluate the need to revise local limits under 40 CFR 403.5(c)(1), and within the term of this Order, submit a report acceptable to the Executive Officer describing the changes with a plan and schedule for implementation.

(2) The Discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Regional Water Board, the State Water Board, or USEPA may take enforcement actions against the Discharger as authorized by the CWA .

b. Sludge Management Practices Requirements

(1) All sewage sludge generated by the discharger shall be disposed in a municipal solid waste landfill that meets the requirements of 40 CFR 258, land applied in accordance with the requirements in 40 CFR 503 Subpart B, or delivered to a composter for treatment and land application in accordance with the requirements in 40 CFR 503 Subpart B. The Discharger shall notify USEPA and the Regional Water Board 60 days prior to any change in use or disposal practices.

(2) Sludge treatment, storage, and disposal or reuse shall not create a nuisance, such as objectionable odors or flies, or result in groundwater contamination.

(3) The Discharger shall take all reasonable steps to prevent or minimize any sludge use or disposal that has a likelihood of adversely affecting human health or the environment.

(4) The discharge of sludge shall not cause waste material to be in a position where it is or can be carried from the sludge treatment and storage site and deposited in waters of the United States.

(5) The sludge treatment and storage site shall have facilities adequate to divert surface runoff from adjacent areas, to protect boundaries of the site from erosion, and to prevent any conditions that would cause drainage from the materials in the temporary storage site. Adequate protection is defined as protection from at least a 100-year storm and protection from the highest possible tidal stage that may occur.

(6) For sludge applied to land, placed on a surface disposal site, or fired in a sludge incinerator as defined in 40 CFR 503, the Discharger shall submit an annual report to USEPA and the Regional Water Board containing monitoring results and pathogen and vector attraction reduction requirements as specified by 40 CFR 503, by February 19 of each year, for the period covering the previous calendar year.

(7) Sludge disposed of in a municipal solid waste landfill shall meet the requirements of 40 CFR 258. In the annual self-monitoring report, the Discharger shall include the amount of sludge disposed of and the landfill to which it was sent.

(8) Permanent on-site sludge storage or disposal activities are not authorized by this Order. A report of Waste Discharge shall be filed and the site brought into compliance with all applicable regulations prior to commencement of any such activity.

(9) Sludge Monitoring and Reporting Provisions of this Order (Attachment G) apply to sludge handling, disposal, and reporting practices.

(10) The USEPA and the Regional Water Board may amend this Order prior to expiration if changes occur in applicable state and federal sludge regulations.

6. Combined Sewer Overflow (CSO) Control Policy Requirements (Wet Weather Controls)

In accordance with the Nine Minimum Controls of the USEPA *Combined Sewer Overflow Control Policy* (1994) and the Discharger's Long Term Control Plan, the Discharger shall maximize flow to the Plant and pollutant removal during wet weather.

a. Combined Sewer Operations and Maintenance Plan. The Discharger shall revise and update its Combined Sewer Operations and Maintenance Plan as necessary to ensure compliance with the Nine Minimum Controls and the Long Term Control Plan requirements of the Combined Sewer Overflow Control Policy. The Discharger shall submit a revised plan to the Regional Water Board by September 30, 2010, and following any subsequent revisions during the term of this Order.

b. Nine Minimum Controls. The Discharger shall continue to implement and comply with the following technology-based requirements.

(1) *Conduct Proper Operations and Regular Maintenance Programs*. The Discharger shall implement its Combined Sewer Operations and Maintenance Plan, which shall include the elements described below. The Discharger shall update the plan to incorporate changes to the system and shall operate and maintain the system according to the plan. The Discharger shall maintain records to document the implementation of the Combined Sewer Operations and Maintenance Plan.

(i) *Designation of a Manager for CSOs.* The Discharger shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding the operation of the combined sewer system. The Discharger shall notify USEPA and the Regional Water Board within 90 days of the designation of a new contact person.

(ii) *Inspection and Maintenance of the Combined Sewer System.* The Discharger shall:

- Inspect and maintain all overflow structures, regulators, pumping stations, and tide gates to ensure that they are in good working condition and adjusted to minimize overflows and prevent tidal inflow.
- Inspect each overflow outfall at least once per year. The inspection shall include, but not be limited to, entering the regulator structure, if accessible; determining the extent of debris and grit buildup; and removing any debris that may constrict flow, cause blockage, and result in a dry weather CSO. For overflow outfalls that are inaccessible,

the Discharger may perform a visual check of the overflow pipe to determine whether CSOs have occurred or could potentially occur during dry weather flow conditions.

- Record the results of the inspections in a maintenance log.

(iii) *Provision for Trained Staff*. The Discharger shall provide adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this Order. Each member of the staff shall receive appropriate training.

(iv) *Allocation of Funds for Operation and Maintenance*. The Discharger shall allocate adequate funds specifically for CSO operation and maintenance activities.

(2) *Maximize Use of the Collection System for Storage.* The Discharger shall continue to maximize the use of the collection system for in-line storage. (Note that this provision refers to the use of collection system piping, not the storage basins/transports, for storage.)

(3) *Review and Modify Pretreatment Program*. The Discharger shall continue to implement selected controls to minimize the impact of non-domestic discharges to its collection system. At three-year intervals, the Discharger shall re-evaluate whether additional modifications to its pretreatment program are feasible or practical. The Discharger shall maintain records to document this evaluation and to document implementation of the selected controls to minimize non-domestic discharges to its collection system.

(4) *Maximize Flow to Plant*. The Discharger shall operate the Plant at maximum treatable flow during wet weather flow conditions. The Discharger shall report rainfall and influent flow data to USEPA and the Regional Water Board with SMRs required by the attached Monitoring and Reporting Program (Attachment E.)

Consistent with the objectives of the Combined Sewer Operations and Maintenance Plan, the Discharger shall ensure that the facility Operation and Maintenance Plan is implemented to maximize the volume of wastewater treated at the Plant and discharged via Discharge Point 001, consistent with the hydraulic capacities of the storage, transport, treatment, and disposal facilities.

(5) *Prohibit CSOs During Dry Weather*. Dry weather CSOs from Discharge Points CSO-001 through CSO-007 or other locations are prohibited. All CSOs must be responded to in accordance with Regional Standard Provisions, and Monitoring, and Reporting Requirements (Section V.E.2) as provided in Attachment G. The Discharger shall document in the inspection log each CSO event, the duration of the event, the cause of the event and the corrective measures taken.

(6) *Control Solid and Floatable Materials in CSODs.* The Discharger shall continue to implement measures to control solid and floatable materials in CSODs. These measures shall include:

(i) ensuring that all the CSO structures are baffled or that other means are used to reduce the volume of floatable materials in CSOs, and

(ii) removing solid or floatable materials captured in the storage/transport system in an acceptable manner prior to discharge to receiving waters.

(7) *Develop and Implement a Pollution Prevention Program*. The Discharger shall continue to implement a Pollution Prevention Program focused on reducing the impact of CSOs on receiving waters. This Pollution Prevention Program is authorized by federal regulations on CSOs. This program shall be developed and implemented in accordance with Provision VI.C.3.

(8) *Notify the Public of Overflows*. The Discharger shall continue to implement a public notification plan to inform citizens of when and where CSOs occur. The process shall include:

(i) a mechanism to alert persons using all receiving waters affected by overflows.

(ii) a system to determine the nature and duration of conditions resulting from overflows that are potentially harmful to users of these receiving waters.

Specifically, warning signs must be posted at beach locations where water contact recreation occurs whenever there is a discharge from the diversion structures. Such warning signs shall be posted on the same days as the overflow events unless the overflow occurs after 4:00 p.m., in which case, signs shall be posted by 8:00 a.m. The Discharger shall maintain records documenting public notification.

(9) *Monitor to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls*. To comply with the Nine Minimum Controls as well as post construction compliance monitoring under the CSO Control Policy, the Discharger shall continue regular monitoring necessary to evaluate CSO controls. The monitoring shall build on the efforts and results of the Discharger described in its August 30, 2007, report, *Westside Study to Effectively Characterize Overflow Impacts and the Efficacy of Combined Sewer Overflow Controls.* The Discharger shall provide a summary report annually and submit a final report to USEPA and the Regional Water Board by September 30, 2014. The report shall include:

(i) Summary of existing data in order to show status and trends;
(ii) Monitoring of wet weather discharges;
(iii) Evaluation of results in order to effectively characterize CSO impacts and efficacy of CSO controls;

(iv) Review of CSO impacts and, if necessary, proposal of revisions to the CSOD control program, including the Nine Minimum Controls;
(v) Recreational use surveys, as described in the MRP, following CSO events, to track changes in uses over time; and
(vi) Summary of post-construction monitoring results and an analysis of CWA compliance with water quality standards and the protection of beneficial uses.

If water quality standards are not being attained, the Discharger shall submit a revised CSO control program that, once implemented, will attain water quality standards. The Discharger may also wish to consider the review and appropriate revision of water quality standards and implementation procedures on CSO-impacted waters.

c. Long-Term Control Plan. The Discharger shall comply with the following provisions:

(1) The Discharger shall optimize the operation of its system to minimize combined sewer discharges and maximize pollutant removal during all wet weather conditions.

(2) The Discharger shall capture for treatment, or storage and subsequent treatment, 100 percent of the combined sewage flow collected in the combined sewage system during precipitation events. Captured combined sewage shall be directed to either the Plant or the storage/transports. All combined sewage captured shall receive a minimum of the following treatment:

- Secondary treatment (at Plant), or
- Primary treatment (at Plant), or
- Flow-through treatment (in storage/transports).

(3) The Discharger shall comply with the following for wet weather Plant operations:

(i) The Plant shall have an influent flow rate of at least 43 MGD prior to initiating decant from the Westside Transport to Discharge Point 001.

(ii) The flow rate at Discharge Point 001 shall be at least 165 MGD within 2 hours of a discharge into the Pacific Ocean from Discharge Point CSD-002 or CSD-003.

(iii) The Sea Cliff Pump Station I shall be operated at maximum capacity prior to an overflow at Discharge Point CSD-005.

(iv) The Sea Cliff Pump Station II shall be operated at maximum capacity prior to an overflow at Discharge Point CSD-007.

(4) The Discharger shall comply with the following after rains subside:

(i) Treatment at the Plant shall continue until the Westside Drainage Basin storage/transports are empty of stormwater flows.

(ii) If the National Weather Service predicts a 30 percent chance of rain within the next 24 hours:

- Pumping shall be maximized from the Westside storage/transport via the Westside Pump Station to the Oceanside Plant and Discharge Point 001 until the level of combined sewage in the East Box is between 5 and 10 feet.

- Pumping shall be maximized from the Westside storage/transport via the Westside Pump Station to the Plant and/or Discharge Point 001 until the level of combined sewage in the West Box is essentially zero.

(iii) If the National Weather Service does not predict rain within the next 24 hours:

- Pumping shall be maximized from the Westside storage and transport until the level of combined sewage in the West Box is zero and total flow to the Oceanside Plant is less than 43 MGD.

7. Sensitive Areas Feasibility Report for Overflows

The Discharger shall submit a report, by December 31, 2011, implementing the “consideration of sensitive areas” section of the Combined Sewer Overflow Control Policy. At a minimum, the Discharger shall assess techniques (including green infrastructure and low impact development) to eliminate or relocate CSODs from sensitive areas and discuss the level of treatment for any remaining CSODs necessary to meet water quality standards.

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in section IV of this Order will be determined as specified below:

A. General

Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined in the Monitoring and Reporting Program (Attachment E) and Fact Sheet Section VI. For purposes of reporting and administrative enforcement, the Discharger shall be deemed out of compliance with single-sample effluent limitations if the concentration of the pollutant in the monitoring sample is greater than the effluent limitation. For averaged or median-based effluent limitations, the Discharger shall be deemed out of compliance if the average or median concentration in the data set is greater than the effluent limitation.

B. Multiple Sample Data

When determining compliance with a pollutant limit and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of “Detected, but Not Quantified” (DNQ) or “Not Detected” (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle, unless one or both of these points are ND or DNQ, in which case the median value shall be the lower of the two data points, where DNQ is lower than a value, and ND is lower than DNQ.

ATTACHMENT A – DEFINITIONS

Acute Toxicity

a. Acute Toxicity (TUa)

Expressed in Toxic Units Acute (TUa)

$$TUa = \frac{100}{\text{96-hr LC 50\%}}$$

b. Lethal Concentration 50% (LC 50)

LC 50 (percent waste giving 50% survival of test organisms) shall be determined by static or continuous flow bioassay techniques using standard marine test species as specified in Ocean Plan Appendix III. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC 50 may be determined after the test samples are adjusted to remove the influence of those substances.

When it is not possible to measure the 96-hour LC 50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the expression:

$$TUa = \frac{\log(100 - S)}{1.7}$$

where:

S = percentage survival in 100% waste. If S > 99, TUa shall be reported as zero.

Areas of Special Biological Significance (ASBS)
Those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of Special Biological Significance are also classified as a subset of STATE WATER QUALITY PROTECTION AREAS.

Average Dry Weather Discharge
The average dry weather discharge is the average discharge rate over three consecutive months of dry weather (i.e., a wet weather day has not occurred)

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)
The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Chlordane
Shall mean the sum of chlordane-alpha, chlordane-gamma, chlordene-alpha, chlordene-gamma, nonachlor-alpha, nonachlor-gamma, and oxychlordane.

Chronic Toxicity
This parameter shall be used to measure the acceptability of waters for supporting a healthy marine biota until improved methods are developed to evaluate biological response.

a. Chronic Toxicity (TUc)

Expressed as Toxic Units Chronic (TUc)

$$TUc = \frac{100}{NOEL}$$

b. No Observed Effect Level (NOEL)

The NOEL is expressed as the maximum percent effluent or receiving water that causes no observable effect on a test organism, as determined by the result of a critical life stage toxicity test listed in Ocean Plan Appendix III.

Combined Sewer System
A combined sewer system (CSS) is a wastewater collection system owned by a State or municipality which conveys sanitary wastewaters (domestic, commercial, and industrial wastewaters) and stormwater through a single-pipe system to a Publicly Owned Treatment Works (POTW) Treatment Plant.

Combined Sewer Overflow
A combined sewer overflow (CSO) is the discharge from a combined sewer system at a point prior to the POTW Treatment Plant.

Combined Sewer Overflow Discharge
A combined sewer discharge (CSOD) is an authorized, treated discharge from the near-shore discharge structures, offshore discharge structures, or treatment facilities during a wet weather day.

Daily Discharge
Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

DDT
Shall mean the sum of 4,4'DDT, 2,4'DDT, 4,4'DDE, 2,4'DDE, 4,4'DDD, and 2,4'DDD.

Degrade
Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected.

Detected, but Not Quantified (DNQ)
Sample results that are less than the reported Minimum Level, but greater than or equal to the laboratory's MDL.

Dichlorobenzenes
Shall mean the sum of 1,2- and 1,3-dichlorobenzene.

Downstream Ocean Waters
Waters downstream with respect to ocean currents.

Dredged Material
Any material excavated or dredged from the navigable waters of the United States, including material otherwise referred to as "spoil".

Dry Weather Day
Any day that is not a wet weather day. During dry weather, all wastewater collected is treated to secondary levels at the Plant and discharged at Discharge Point 001.

Enclosed Bays
Indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of the bay. This definition includes but is not limited to: Humboldt Bay, Bodega Harbor, Tomales Bay, Drakes Estero, San Francisco Bay, Morro Bay, Los Angeles Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay.

Endosulfan
The sum of endosulfan-alpha and -beta and endosulfan sulfate.

Estuaries and Coastal Lagoons are waters at the mouths of streams that serve as mixing zones for fresh and ocean waters during a major portion of the year. Mouths of streams that are temporarily separated from the ocean by sandbars shall be considered as estuaries. Estuarine waters will generally be considered to extend from a bay or the open ocean to the upstream limit of tidal action but may be considered to extend seaward if significant mixing of fresh and salt water occurs in the open coastal waters. The waters described by this definition include but are not limited to the Sacramento-San Joaquin Delta as defined by Section 12220 of the California Water Code, Suisun Bay, Carquinez Strait downstream to Carquinez Bridge, and appropriate areas of the Smith, Klamath, Mad, Eel, Noyo, and Russian Rivers.

Halomethanes shall mean the sum of bromoform, bromomethane (methyl bromide) and chloromethane (methyl chloride).

HCH shall mean the sum of the alpha, beta, gamma (lindane) and delta isomers of hexachlorocyclohexane.

Initial Dilution
The process that results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge.

For a submerged buoyant discharge, characteristic of most municipal and industrial wastes that are released from the submarine outfalls, the momentum of the discharge and its initial buoyancy act together to produce turbulent mixing. Initial dilution in this case is completed when the diluting wastewater ceases to rise in the water column and first begins to spread horizontally.

For shallow water submerged discharges, surface discharges, and non-buoyant discharges, characteristic of cooling water wastes and some individual discharges, turbulent mixing results primarily from the momentum of discharge. Initial dilution, in these cases, is considered to be completed when the momentum induced velocity of the discharge ceases to produce significant mixing of the waste, or the diluting plume reaches a fixed distance from the discharge to be specified by the Regional Water Board, whichever results in the lower estimate for initial dilution.

Instantaneous Maximum Effluent Limitation
The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation
The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Kelp Beds
For purposes of the bacteriological standards of the Ocean Plan, are significant aggregations of marine algae of the genera Macrocystis and Nereocystis. Kelp beds include the total foliage canopy of Macrocystis and Nereocystis plants throughout the water column.

Mariculture
The culture of plants and animals in marine waters independent of any pollution source.

Material
(a) In common usage: (1) the substance or substances of which a thing is made or composed (2) substantial; (b) For purposes of the Ocean Plan relating to waste disposal, dredging and the disposal of dredged material and fill, MATERIAL means matter of any kind or description which is subject to regulation as waste, or any material dredged from the navigable waters of the United States. See also, DREDGED MATERIAL.

Maximum Daily Effluent Limitation (MDEL)
The highest allowable daily discharge of a pollutant.

Method Detection Limit (MDL)
The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in title 40 of the Code of Federal Regulations, Part 136, Attachment B.

Minimum Level (ML)
The concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Natural Light
Reduction of natural light may be determined by the Regional Water Board by measurement of light transmissivity or total irradiance, or both, according to the monitoring needs of the Regional Water Board.

Not Detected (ND)
Those sample results less than the laboratory's MDL.

Ocean Waters
The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the state could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters.

PAHs (polynuclear aromatic hydrocarbons)
The sum of acenaphthylene, anthracene, 1,2-benzanthracene, 3,4-benzofluoranthene, benzo[k]fluoranthene, 1,12-benzoperylene, benzo[a]pyrene, chrysene, dibenzo[ah]anthracene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene and pyrene.

PCBs (polychlorinated biphenyls)
The sum of chlorinated biphenyls whose analytical characteristics resemble those of Aroclor-1016, Aroclor-1221, Aroclor-1232, Aroclor-1242, Aroclor-1248, Aroclor-1254 and Aroclor-1260.

Pollutant Minimization Program (PMP)
PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management methods, and education of the public and businesses. The goal of the PMP shall be to reduce

all potential sources of pollutants of concern through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Regional Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to Water Code section 13263.3(d), shall be considered to fulfill the PMP requirements.

Reported Minimum Level
The ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from Appendix II of the Ocean Plan in accordance with section III.C.5.a. of the Ocean Plan or established in accordance with section III.C.5.b. of the Ocean Plan. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the reported ML.

Satellite Collection System
The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility that a sanitary sewer system is tributary to.

Shellfish
Organisms identified by the California Department of Public Health as shellfish for public health purposes (i.e., mussels, clams and oysters).

Significant Difference
Defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level.

Six-Month Median Effluent Limitation
The highest allowable moving median of all daily discharges for any 180-day period.

State Water Quality Protection Areas
Non-terrestrial marine or estuarine areas designated to protect marine species or biological communities from an undesirable alteration in natural water quality. All AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE (ASBS) that were previously designated by the State Water Board in Resolution Numbers 74-28, 74-32, and 75-61 are now also classified as a subset of State Water Quality Protection Areas and require special protections afforded by the Ocean Plan.

TCDD Equivalents
In this Order, TCDD Equivalents means the sum of the concentrations of chlorinated dibenzodioxins and chlorinated dibenzofurans multiplied by their Toxicity Equivalency Factor

(TEF) and their Bioaccumulation Equivalency Factor (BEF). This is based on 40 CFR Part 132, Appendix F, Procedure 4, Tables 1 and 2.

$$(TEC)_{TCDD} = \text{The sum of } (C)_x (TEF)_x (BEF)_x$$

Where $(TEC)_{TCDD}$ = TCDD Equivalents concentration in effluent

$(C)_x$ = concentration of total congener x in effluent

$(TEF)_x$ =TCDD toxicity equivalency factor for congener x

$(BEF)_x$ = TCDD bioaccumulation equivalency factor for congener x

Toxicity Equivalency Factor and Bioaccumulative Equivalency Factors are listed in the table below.

Congener	Toxicity Equivalency Factor (TEF)	Bioaccumulation Equivalency Factors (BEF)
2,3,7,8-TCDD	1.0	1.0
1,2,3,7,8-Pe-CDD	0.5	0.9
1,2,3,4,7,8-HxCDD	0.1	0.3
1,2,3.6,7,8-HxCDD	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.05
OCDD	0.0003	0.01
2,3,7,8-TCDF	0.1	0.8
1,2,3,7,8-PeCDF	0.03	0.2
2,3,4,7,8-PeCDF	0.3	1.6
1,2,3,4,7,8-HxCDF	0.1	0.08
1,2,3,6,7,8-HxCDF	0.1	0.2
2,3,4,6,7,8-HxCDF	0.1	0.7
1,2,3,7,8,9-HxCDF	0.1	0.6
1,2,3,4,6,7,8-HpCDF	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.4
OCDF	0.0003	0.02

Toxicity Reduction Evaluation (TRE)
A study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation

of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

Waste
As used in the Ocean Plan, waste includes a discharger’s total discharge, of whatever origin, i.e., gross, not net, discharge.

Water Reclamation
The treatment of wastewater to render it suitable for reuse, the transportation of treated wastewater to the place of use, and the actual use of treated wastewater for a direct beneficial use or controlled use that would not otherwise occur.

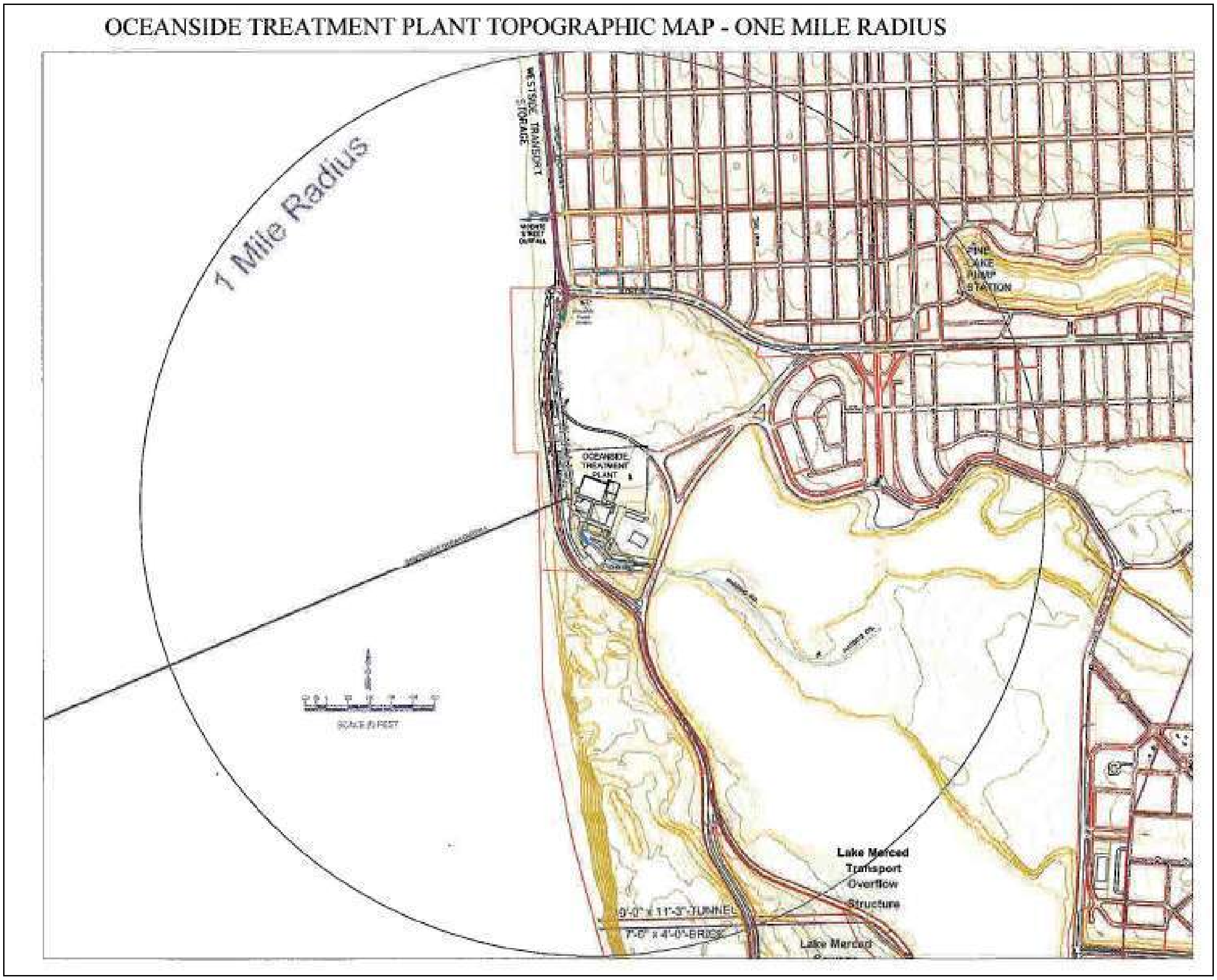
Wet Weather Day
A wet weather day is any day in which one of the following conditions exists as a result of rainfall:

1. Instantaneous influent flow to the Plant exceed 43 MGD; or

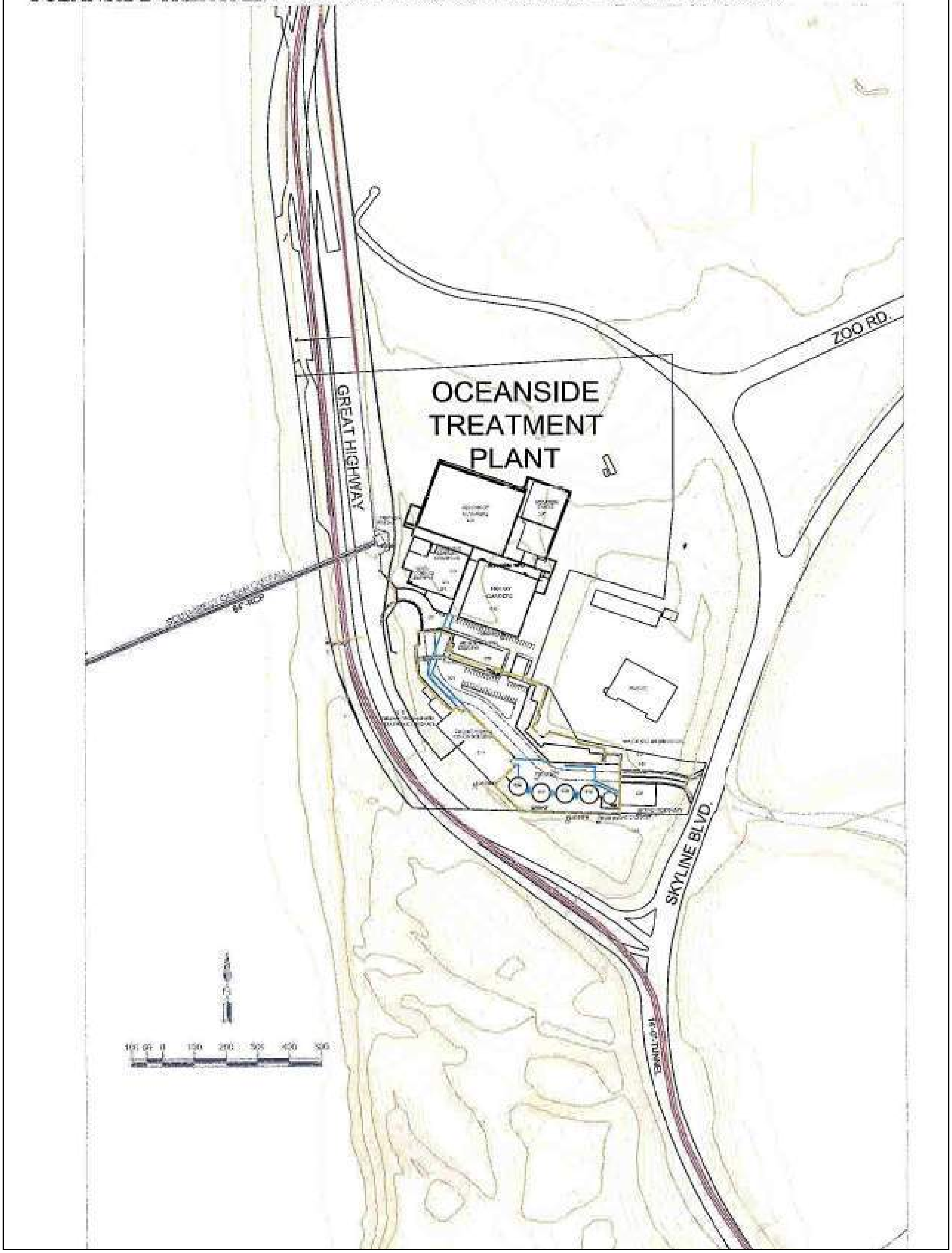
2. The average daily influent flow concentration of TSS or BOD is less than 100 mg/L; or

3. The Westside storage/transport flow elevation exceeds 0 feet in the West Box or 18 feet in the East Box. (Flow is decanted to the West Box from the East Box only when the East Box storage level exceeds 18 feet.)

ATTACHMENT B – MAP

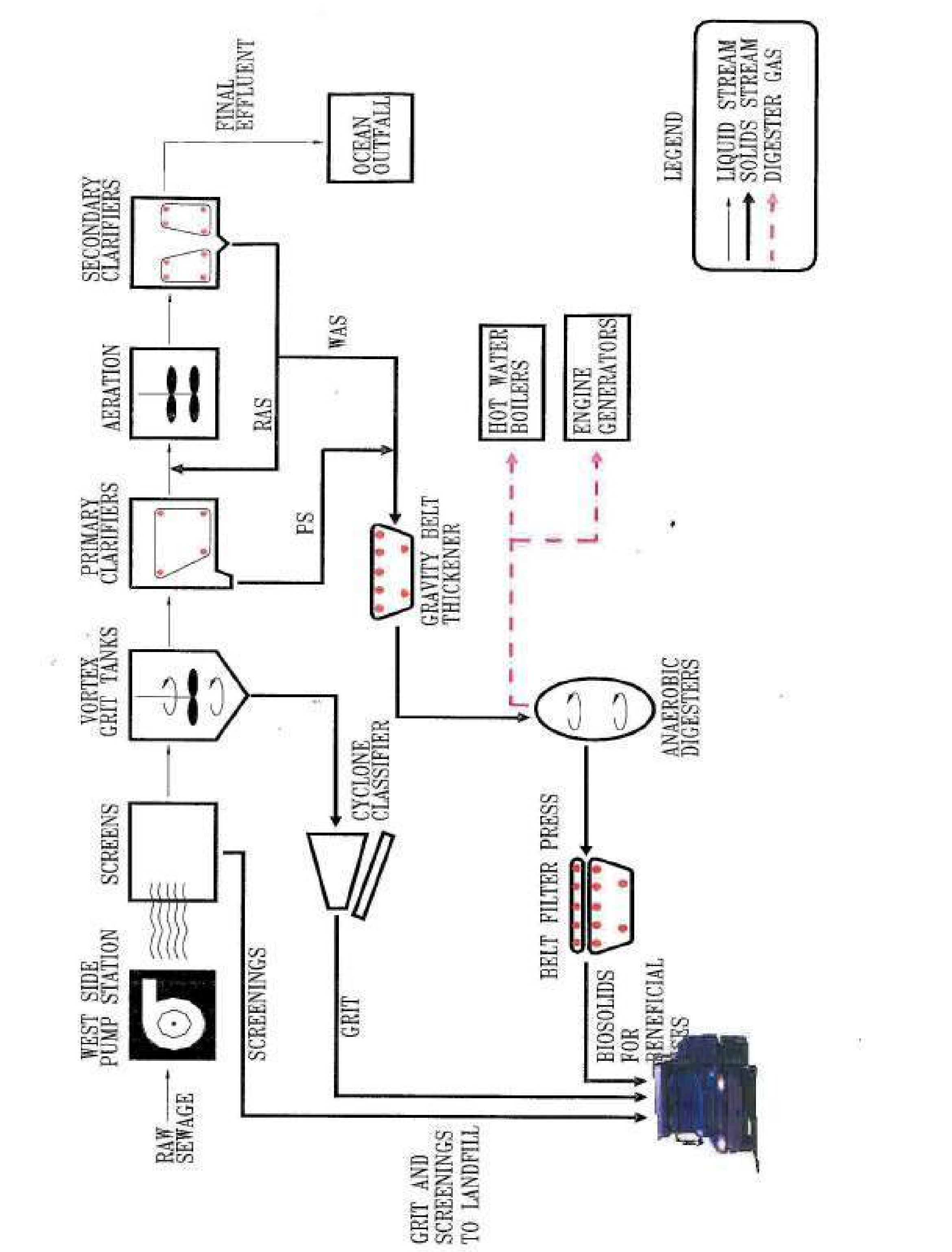


OCEANSIDE TREATMENT PLANT TOPOGRAPHIC MAP - 1/4 MILE RADIUS

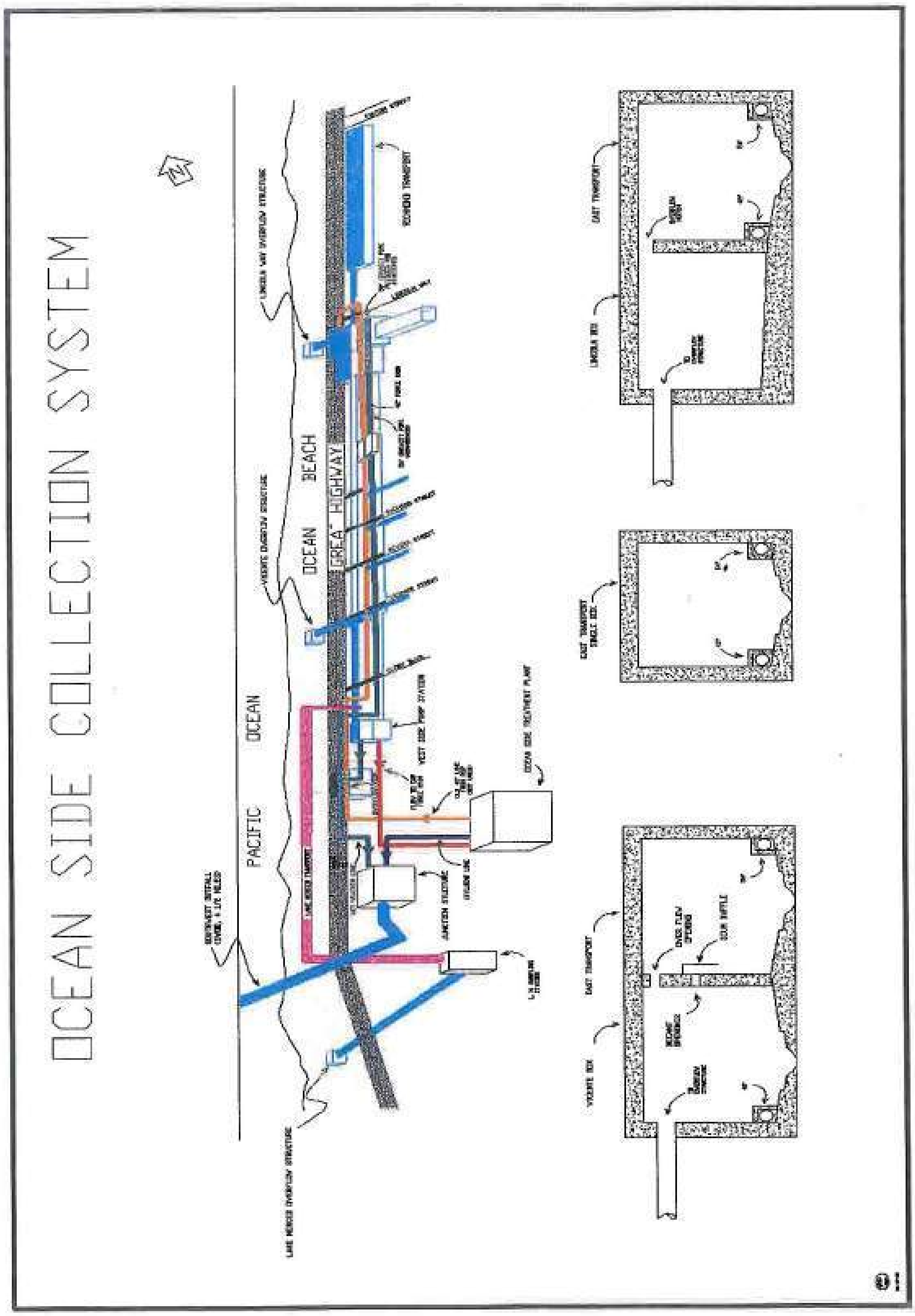


ATTACHMENT C – FLOW SCHEMATIC

Process Flow Diagram. Oceanside Water Pollution Control Plant



Process Flow Diagram. Westside Transport



ATTACHMENT D – STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 CFR §122.41(a).)

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 CFR §122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order, 40 CFR §22.41(c).

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment, 40 CFR §122.41(d).

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by a Discharger only when necessary to achieve compliance with the conditions of this Order, 40 CFR §122.41(e).

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 CFR §122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 CFR §122.5(c).)

F. Inspection and Entry

The Discharger shall allow the Regional Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 CFR §122.41(i); Water. Code, §13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 CFR. § 122.41(i)(1));

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 CFR §122.41(i)(2));

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 CFR §122.41(i)(3)); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 CFR §122.41(i)(4).)

G. Bypass

1. Definitions

a. “Bypass” means the intentional diversion of waste streams from any portion of a treatment facility. (40 CFR §122.41(m)(1)(i).)

b. “Severe property damage” means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 CFR §122.41(m)(1)(ii).)

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 CFR §122.41(m)(2).)

3. Prohibition of bypass. Bypass is prohibited, and the Regional Water Board may take enforcement action against a Discharger for bypass, unless (40 CFR §122.41(m)(4)(i)):

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 CFR §22.41(m)(4)(i)(A));

b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 CFR §122.41(m)(4)(i)(B)); and

c. The Discharger submitted notice to the Regional Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 CFR §122.41(m)(4)(i)(C).)

4. The Regional Water Board may approve an anticipated bypass, after considering its adverse effects, if the Regional Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 CFR §122.41(m)(4)(ii).)

5. Notice

a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 CFR §122.41(m)(3)(i).)

b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 CFR §122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation, 40 CFR §122.41(n)(1).

Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review, 40 CFR §122.41(n)(2).

6. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 CFR §122.41(n)(3)):

a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 CFR §122.41(n)(3)(i));

b. The permitted facility was, at the time, being properly operated (40 CFR §122.41(n)(3)(ii));

c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 CFR §122.41(n)(3)(iii)); and

d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above,. 40 CFR §122.41(n)(3)(iv).

7. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 CFR § 122.41(n)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition,. 40 CFR §122.41(f).

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit,. 40 CFR §122.41(b).

C. Transfers

This Order is not transferable to any person except after notice to the Regional Water Board. The Regional Water Board may require modification or revocation and reissuance of the Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code, 40 CFR §122.41(l)(3); §122.61.

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 CFR §122.41(j)(1).)

B. Monitoring results must be conducted according to test procedures under Part 136 or, in the case of sludge use or disposal, approved under Part 136 unless otherwise specified in Part 503 unless other test procedures have been specified in this Order, 40 CFR §122.41(j)(4); §122.44(i)(1)(iv).

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by Part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time. (40 CFR §122.41(j)(2))

B. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements (40 CFR §122.41(j)(3)(i));
2. The individual(s) who performed the sampling or measurements (40 CFR §122.41(j)(3)(ii));
3. The date(s) analyses were performed (40 CFR §122.41(j)(3)(iii));
4. The individual(s) who performed the analyses (40 CFR §122.41(j)(3)(iv));
5. The analytical techniques or methods used (40 CFR §122.41(j)(3)(v)); and
6. The results of such analyses, 40 CFR §122.41(j)(3)(vi).

C. Claims of confidentiality for the following information will be denied (40 CFR § 122.7(b)):

1. The name and address of any permit applicant or Discharger (40 CFR §122.7(b)(1)); and
2. Permit applications and attachments, permits and effluent data. (40 CFR §122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Regional Water Board, State Water Board, or USEPA within a reasonable time, any information which the Regional Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance with this Order. Upon request, the Discharger shall also furnish to the Regional Water Board, State Water Board, or USEPA copies of records required to be kept by this Order, 40 CFR §122.41(h); Water Code, §13267.

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Regional Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 CFR §122.41(k).)

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 CFR §122.22(a)(3).).

3. All reports required by this Order and other information requested by the Regional Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 CFR §122.22(b)(1));

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 CFR §122.22(b)(2)); and

c. The written authorization is submitted to the Regional Water Board and State Water Board. (40 CFR §122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Regional Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 CFR §122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.” (40 CFR §122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 CFR §122.22(l)(4).)

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Regional Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 CFR §122.41(l)(4)(i).)

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under Part 136 or, in the case of sludge use or disposal, approved under Part 136 unless otherwise specified in Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Regional Water Board. (40 CFR §122.41(l)(4)(ii).)

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 CFR §122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date, 40 CFR §122.41(l)(5).

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 CFR §122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 CFR §122.41(l)(6)(ii)):

a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 CFR §122.41(l)(6)(ii)(A).)

b. Any upset that exceeds any effluent limitation in this Order. (40 CFR §122.41(l)(6)(ii)(B).)

3. The Regional Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 CFR §122.41(l)(6)(iii).)

F. Planned Changes

The Discharger shall give notice to the Regional Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 CFR § 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in section 122.29(b) (40 CFR §122.41(l)(1)(i)); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (40 CFR §122.41(l)(1)(ii).)

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 CFR§ 122.41(l)(1)(iii).)

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Regional Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements, 40 CFR §122.41(l)(2).

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above, 40 CFR §122.41(l)(7).

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information, 40 CFR §122.41(l)(8).

VI. STANDARD PROVISIONS – ENFORCEMENT

The Regional Water Board is authorized to enforce the terms of this permit under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

Additional Provisions – Notification Levels

A. Publicly-Owned Treatment Works (POTWs)

All POTWs shall provide adequate notice to the Regional Water Board of the following (40 CFR §122.42(b)):

1. Any new introduction of pollutants into the POTW from an indirect discharger that would be subject to sections 301 or 306 of the CWA if it were directly discharging those pollutants (40 CFR §122.42(b)(1)); and

2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of adoption of the Order. (40 CFR §122.42(b)(2).)

3. Adequate notice shall include information on the quality and quantity of effluent introduced into the POTW as well as any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW. (40 CFR §122.42(b)(3).)

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

NPDES regulations at 40 CFR 122.48 require that all NPDES permits specify monitoring and reporting requirements. California Water Code (CWC) §13267 and §13383 authorize the Regional Water Quality Control Board (Regional Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, that implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. The Discharger shall comply with the MRP and *Regional Standard Provisions, and Monitoring and Reporting Requirements (Supplement to Attachment D) for NPDES Wastewater Discharge Permits*, July 2009 (**Attachment G**). The MRP may be amended by the Executive Officer pursuant to USEPA regulations 40 CFR122.62, 122.63, and 124.5. If any discrepancies exist between the MRP and the Regional Standard Provisions, the MRP prevails.

B. Sampling is required during the entire year when discharging. All analyses shall be conducted using current USEPA methods, or methods that have been approved by the USEPA Regional Administrator pursuant to 40 CFR 136.4 and 136.5, or if 40 CFR 136 methods are not available, equivalent methods that are commercially and reasonably available. Analytical methods shall provide sufficient quantification of sampling parameters and constituents to evaluate compliance with applicable effluent limits and to perform reasonable potential analyses. Equivalent methods shall be more sensitive than those specified in 40 CFR 136, shall be specified in the permit, and shall be approved for use by the Executive Officer following consultation with the State Water Quality Control Board’s Quality Assurance Program.

C. For compliance and reasonable potential monitoring, analyses shall be conducted using commercially available and reasonably achievable detection levels that are lower than applicable water quality objectives or criteria, or the effluent limitations, whichever are lower. The objective is to provide quantification of constituents sufficient to allow evaluation of observed concentrations with respect to the Minimum Levels (MLs).

MLs are the concentrations at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

As shown in Table II-3 of Ocean Plan Appendix II, the test method the Discharger may use for compliance with mercury effluent limitations and reasonable potential monitoring is Cold Vapor Atomic Absorbance with a ML of 0.2 µg/L.

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	INF-001	Formerly Sampling Station A-003. At any point in the facility headworks at which all waste tributary to the system is present and preceding any phase of treatment, and exclusive of any return flows or process side streams that would significantly impact the quantity or quality of the influent.
001	EFF-001	Formerly Sampling Station E-007. At any point in the sewerage system following all phases of treatment and prior to contact with the receiving water or any effluent from the Westside Wet Weather Facilities.
CSD-001 through CSD-007	EFF-CSD	A representative monitoring location for the Westside Wet Weather Facilities, previously identified as a point prior to discharge from the Vicente Box, where all waste tributary to the diversion structure is present and treatment is complete.
---	SRF-15 east	Near shore receiving water along Baker Beach, in the surf east of SRF-15
---	SRF-15	Near shore receiving water along Baker Beach, in the surf at the terminus of Lobos Creek
---	SRF-16	Near shore receiving water along Baker Beach, in the surf opposite the Sea Cliff 2 Pump Station
---	SRF-17	Near shore receiving water in the surf along China Beach opposite the Sea Cliff 1 Pump Station
---	SRF-18	Near shore receiving water along Ocean Beach, in the surf at the foot of Balboa Street
---	SRF-19	Near shore receiving water along Ocean Beach, in the surf at the foot of Lincoln Way, opposite the Lincoln Overflow Discharge Structure
---	SRF-20	Near shore receiving water along Ocean Beach, in the surf at the foot of Pacheco Street
---	SRF-21	Near shore receiving water along Ocean Beach, in the surf at the foot of Vicente Street, opposite the Vicente Overflow Discharge Structure
---	SRF-21.1	Near shore receiving water along Ocean Beach, in the surf at the foot of Sloat Blvd
---	SRF-22	Near shore receiving water along Ocean Beach, in the surf at Fort Funston, opposite the Lake Merced Overflow Discharge Structure.

III. INFLUENT MONITORING REQUIREMENTS

The Discharger shall monitor Plant influent at Monitoring Location INF-001 in accordance with the following table.

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Test Method
Flow rate (1)	MGD	Continuous	Daily	Meter
$BOD^{(2)}_5$	mg/L	C-24	1/W	(3)
TSS(4)	mg/L	C-24	5/W	(3)
pH	Standard units	Grab	5/W	(3)

(1) For influent flows, the following shall be reported:

Daily: Total Daily Flow Volume (million gallons) plus total daily influent flow originating as effluent/decant from the Westside Transport

Monthly: Minimum, Average, and Maximum Daily Flow (MGD)

Monthly: Total Flow Volume (million gallons) plus total monthly influent flow originating as effluent/decant from the Westside Transport

(2) Biochemical Oxygen Demand

(3) Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

(4) Total Suspended Solids

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location EFF-001

The Discharger shall monitor effluent at Monitoring Location EFF-001 as follows.

Table E-3. Effluent Monitoring, Monitoring Location EFF-001

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Method
Flow rate (1)	MGD	Cont.	Daily	Meter
BOD_5	mg/L	C-24	1/W	(2)
TSS	mg/L	C-24	5/W	(2)
Grease and Oil (3)	mg/L	C-24	1/Q	(2)
Turbidity	NTU	C-24	1/Q	(2)
pH	Standard Units	Grab	5/W	(2)
Ammonia, total	mg/L N	C-24	1/Q	(2)
Chronic Toxicity (4)	TUc	C-24	1/Q	(2)
Mercury (5)	µg/L	C-24	1/M	(2)
TCDD Equivalents	µg/L	C-24	1/Y	(2)
Table B Inorganic Pollutants (6)	µg/L	C-24	1/Q	(2)
Remaining Table B Pollutants (7)	µg/L	C-24	1/Y	(2)

(1) For effluent flows, the following shall be reported:

Daily: Total Daily Flow Volume (million gallons)

Monthly: Minimum, Average, and Maximum Daily Flow (MGD)

Monthly: Total Flow Volume (million gallons)

(2) Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136. The methods shall meet the lowest minimum levels (MLs) specified in Ocean Plan Appendix II. Where no method is specified for a given pollutant, the method shall be approved by the Regional Water Board. For TCDD congeners, the Discharger shall use USEPA Method 1613 and the MLs shall be as given below. Estimated congener concentrations (below the ML) shall not be included when adding the congener concentrations to calculate TCDD equivalents.

Parameter	Minimum Level
2,3,7,8-TetraCDD	5 pg/L
1,2,3,7,8-PentaCDD	25 pg/L
1,2,3,4,7,8-HexaCDD	25 pg/L
1,2,3,6,7,8-HexaCDD	25 pg/L
1,2,3,7,8,9-HexaCDD	25 pg/L
1,2,3,4,6,7,8-HeptaCDD	25 pg/L
OctaCDD	50 pg/L
2,3,7,8-TetraCDF	5 pg/L
1,2,3,7,8-PentaCDF	25 pg/L
2,3,4,7,8-PentaCDF	25 pg/L
1,2,3,4,7,8-HexaCDF	25 pg/L
1,2,3,6,7,8-HexaCDF	25 pg/L
1,2,3,7,8,9-HexaCDF	25 pg/L
2,3,4,6,7,8-HexaCDF	25 pg/L
1,2,3,4,6,7,8-HeptaCDF	25 pg/L
1,2,3,4,7,8,9-HeptaCDF	25 pg/L
OctaCDF	50 pg/L

(3) Grease and oil samples shall consist of 3 grab samples taken at 8 hour intervals during the sample day, with each grab being collected in a glass container and analyzed separately. Results shall be expressed as a weighted average of the three results, based on the instantaneous flow rates at the time each sample was collected.

(4) Samples for whole effluent toxicity tests shall be collected coincident with routine composite effluent samples. Refer to Section V of this MRP for whole effluent toxicity testing requirements.

(5) The Discharger may, at its option, sample effluent mercury either as grab or as 24-hour composite samples.

(6) The Table B inorganic pollutants are those inorganic constituents listed in Ocean Plan Table B, excluding mercury.

(7) The remaining Table B pollutants are the pollutants listed in Ocean Plan Table B, excluding those pollutants with monitoring requirements established elsewhere in this table (i.e., inorganics, mercury, chronic toxicity, and radioactivity). Because effluent is not chlorinated, chlorine is also excluded.

B. Monitoring Locations EFF-CSD-0xx

1. During each CSOD occurrence, the Discharger shall monitor discharges at the appropriate Monitoring Location EFF-CSD-0xx in accordance with the following elements established by Table E-4. Monitoring is required only during discharge events, which may last for less than one hour or for more than one day. Composite sampling shall commence within one hour after a discharge begins or as soon as

reasonably practicable with due consideration for safety. and shall continue until the discharge stops; however, the compositing period shall not exceed 24 hours.

Table E-4. Effluent Monitoring, Monitoring Location EFF-CSD

Parameter	Units	Sample Type	Minimum Sampling Frequency	Required Analytical Method
Flow	MGD	Cont.	Continuous during discharge	Meter (1)
BOD_5	mg/L	C-X (2)	1/occurrence	(7)
Total Suspended Solids	mg/L	C-X (2)	1/occurrence	(7)
Ammonia	mg/L N	C-X (2)	1/occurrence	(7)
Grease and Oil	mg/L	C-X (2)	1/occurrence	(7)
pH	Std Units	C-X (2)	1/occurrence	(7)
Table B Inorganics (3)	µg/L	C-X (2)	1/occurrence	(7)
Pesticides and PCBs (4)	µg/L	C-X (2)	1/occurrence	(7)
PAHs (5)	µg/L	C-X (2)	1/occurrence	(7)
Remaining Table B Pollutants (6)	µg/L	C-X (2)	1/year	(7)

(1) Alternately, flow may be estimated using models.

(2) Composite sample of 1 grab sample per hour over X hours, where X = the duration of the discharge but not exceeding 24 hours

(3) The Table B inorganic pollutants are those inorganic constituents listed in Table B of the 2005 Ocean Plan - arsenic, cadmium, hexavalent chromium, copper, lead, mercury, nickel, selenium, silver, zinc, and cyanide.

(4) As identified in EPA Method 608,

(5) As identified by the Ocean Plan and by Attachment A of this Order (Definitions).

(6) The remaining Table B pollutants are those listed in Ocean Plan Table B, excluding those with monitoring requirements established elsewhere in this table, and radioactivity. These pollutants shall be monitored during a CSOD occurrence.

(7) Pollutants shall be analyzed using the analytical methods described in 40 CFR Part 136.

2. The Discharger shall record the following information for each combined sewer overflow discharge event from discharge points CSD-001, CSD-002, CSD-003, CSD-005, and CSD-007.

- **a.** Date and time that CSOD started;
- **b.** Frequency, duration, and volume of CSOD;
- **c.** Rainfall intensity and amount (hourly data, aggregated);
- **d.** Data to support discharge volume estimate (if estimated); and
- **e.** Documentation of conformance with the Operation Plan for wet weather facilities.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. Chronic Toxicity Monitoring Requirements

1. *Sampling.* The Discharger shall collect 24-hour composite samples of the effluent for critical life stage toxicity testing as indicated below. For toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

2. *Test Species.* The Discharger shall utilize the echinoderm embryo development test, with either the sand dollar (*Dendraster excentricus*) or the purple sea urchin (*Strongylocentrotus purpuratus*), such that the test species used is in gravid condition. The Discharger is required to re-screen for the most sensitive species once during the term of this permit and shall submit the chronic toxicity screening report to the Regional Water Board no later than 180 days prior to the Order expiration date with the application for permit reissuance.

3. *Methodology.* Sample collection, handling and preservation shall be in accordance with USEPA protocols. In addition, bioassays shall be conducted in compliance with the most recently promulgated test methods, as shown in **Appendix E-2**. These are "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms," currently EPA/600/R-95/136, August 1995. Any methodology exceptions must be granted by the Executive Officer and the Environmental Laboratory Accreditation Program (ELAP).

4. *Dilution Series*. The Discharger shall conduct tests at the in-stream waste concentration (IWC), four concentrations bracketing the IWC, and a control.

B. Chronic Toxicity Reporting Requirements

1. Routine Reporting. Toxicity test results for the current reporting period shall include, at a minimum, for each test:

   (i) Sample date(s)

   (ii) Test initiation date

   (iii) Test species

   (iv) End point values for each dilution (e.g., number of young, growth rate, percent survival)

   (v) NOEC value(s) in percent effluent

   (vi) IC15, IC25, IC40, and IC50 values (or EC15, EC25 ... etc.) as percent effluent

   (vii) TUc values (100/NOEC)

(viii) Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)

(ix) NOEC and LOEC values for reference toxicant test(s)

(x) IC50 or EC50 value(s) for reference toxicant test(s)

(xi) Available water quality measurements for each test (pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

2. Compliance Summary. The results of the chronic toxicity testing shall be provided in the self-monitoring report and shall include a summary table of chronic toxicity data from at least eleven of the most recent samples. The information in the table shall include items listed above under 1 specifically item numbers (i), (iii), (v), (vi) (IC25 or EC25) and (vii).

C. Quality Assurance

1. Concurrent testing with reference toxicants shall be conducted.

2. If either the reference toxicant test or effluent test does not meet all test acceptability criteria as specified in the test method manual, then the Discharger must re-sample and re-test at the earliest time possible.

3. Control and dilution water should be obtained from an unaffected area of the receiving water. If the dilution water used is different from the culture water, a second control using culture water should be used. If it is not practicable to collect samples from the unaffected area of the receiving water then a laboratory prepared control and dilution water should be used.

4. If the effluent sample is significantly different from the control sample, and the minimum significant difference (% MSD) is less than 5%, the Discharger at its option may exclude this result and re-test. If control sample variability in the effluent test exceeds the upper limit of 20% MSD which is the same as the reference toxicant, the Discharger shall re-sample and re-test as soon as possible.

D. Toxicity Reduction Evaluation (TRE)

If monitoring shows a violation of the chronic toxicity effluent limitation, the Discharger shall conduct a TRE and take all reasonable steps to reduce toxicity once the source of toxicity is identified. The Discharger shall initiate a TRE in accordance with the following:

1. ,To be ready to respond to a toxicity event the Discharger shall prepare a generic TRE work plan within 90 days of the effective date of this Order and update it as necessary.

2. Within 60 days of exceeding the effluent limitation for chronic toxicity, the Discharger shall submit to USEPA a TRE work plan that should be the generic work plan revised for this toxicity event after considering discharge data.

3. Within 30 days of the date of completion of the accelerated monitoring tests observed to exceed the effluent limitation, the Discharger shall initiate a TRE in accordance with a TRE work plan that incorporates any and all comments from USEPA. Accelerated monitoring can be achieved by the Discharger conducting six additional toxicity tests using the same species and test method, approximately every two weeks, over a 12 week period. This testing shall begin within 145 days of receipt of test results exceeding the toxicity effluent limit. If none of the additional tests exceed the toxicity limitation, then the Discharger may return to the regular testing frequency.

4. The TRE shall be specific to the discharge and be prepared in accordance with current technical guidance and reference materials, including USEPA guidance materials. The TRE shall be conducted as a tiered evaluation process as summarized below:

a. Tier 1 consists of basic data collection (routine and accelerated monitoring).

b. Tier 2 consists of evaluation of optimization of the treatment process, including operation practices and in-plant process chemicals.

c. Tier 3 consists of a toxicity identification evaluation (TIE).

d. Tier 4 consists of evaluation of options for additional wastewater treatment processes.

e. Tier 5 consists of evaluation of options for modifications of in-plant treatment processes.

f. Tier 6 consists of implementation of selected toxicity control measures, and follow- up monitoring and confirmation of implementation success.

5. The TRE may be ended at any stage if monitoring finds there is no longer consistent toxicity (complying with requirements of Section VI.C.2.a of this Order).

6. The objective of a TIE shall be to identify the substance or combination of substances causing the observed toxicity. All reasonable efforts using currently available TIE methodologies shall be employed.

7. As toxic substances are identified or characterized, the Discharger shall continue the TRE by determining the sources and evaluating alternative strategies for reducing or eliminating the substances from the discharge. All reasonable steps shall be taken to reduce toxicity to levels consistent with the toxicity effluent limitations.

8. Many recommended TRE elements parallel required or recommended efforts of source control, pollution prevention, and stormwater control programs. TRE efforts should be coordinated with such efforts. To prevent duplication of efforts, evidence of complying with requirements or recommended efforts of such programs may be acceptable to comply with TRE requirements.

9. Chronic toxicity may be episodic and identification of causes of, and reduction of sources of, toxicity may not be successful in all cases. Enforcement action will be based in part on the Discharger’s responses and efforts to identify and control or reduce sources of consistent toxicity.

VI. LAND DISCHARGE MONITORING REQUIREMENTS

Not Applicable.

VII. RECLAMATION MONITORING REQUIREMENTS

Not Applicable.

VIII. RECEIVING WATER MONITORING REQUIREMENTS

The Discharger shall conduct routine shoreline monitoring for bacteria at six monitoring locations from Baker Beach along the San Francisco County shoreline perimeter to Sloat Blvd. on Ocean Beach one day per week in accordance with the schedule established in Table E-5, below.

During CSOD events, the Discharger shall post the beach in the vicinity of the CSOD event and shall conduct shoreline monitoring for bacteria at monitoring locations in the vicinity of the CSOD event from Baker Beach along the San Francisco County shoreline perimeter to Fort Funston on Ocean Beach in accordance with the schedule established in Table E-5, below.

During CSOD events, shoreline monitoring shall be initiated as soon as reasonable, with due consideration for safety. (Darkness, tidal conditions and storm related wave activity may prevent samples from safely being collected immediately after initiation of a CSOD event.) Shoreline monitoring shall be conducted at those locations in closest proximity to the CSOD. Daily shoreline monitoring during and following CSOD events and beach posting shall continue until bacteria concentrations in the receiving water at those locations fall below single sample maximum limits.

Table E-5. Receiving Water Surf Monitoring Requirements

Monitoring Locations	Bacteria Type	Units	Minimum Monitoring Frequency	Sample Type	Analytical Method
Routine Monitoring					
SRF-15 east SRF-15 SRF-17 SRF-18 SRF-19 SRF-21.1	Total Coliform *E. coli* Enterococcus	MPN/100 mLs	Once / week (1)	Grab	Quanti-Tray Method - Colilert 18™ Medium (total coliform and *E. coli*), Enterolert™ Medium (enterococcus)
CSOD Event Monitoring(1)					
SRF-15 east SRF-15 SRF-16 SRF-17 SRF-18 SRF-19 SRF-20 SRF-21 SRF-21.1 SRF-22	Total Coliform *E. coli* Enterococcus	MPN/100 mLs	Daily	Grab	Quanti-Tray Method - Colilert 18™ Medium (total coliform and *E. coli*), Enterolert™ Medium (enterococcus)

(1) Monitoring is only required at those locations in the vicinity of the CSOD.

IX. PRETREATMENT AND BIOSOLIDS MONITORING REQUIREMENTS

The Discharger shall comply with the pretreatment requirements specified in Table E-2 for influent (at Monitoring Location INF-001), effluent (at Monitoring Location EFF-001), and biosolids monitoring.

Table E-6. Pretreatment and Biosolids Monitoring Requirements

Constituents	Influent INF-001	Effluent(3) EFF-001	Biosolids(4)	Sample Type	
				INF-001 & EFF-001	Biosolids(d)
VOC	1/quarter	1/quarter	2/year	multiple grabs(5a)	grabs
BNA	1/quarter	1/quarter	2/year	multiple grabs(5a)	grabs
Metals(1)	1/month	1/month	2/year	24-hour composite(5b)	grabs
Hexavalent Chromium(2)	1/month	1/month	2/year	multiple grabs(5a)	grabs
Mercury	1/month	1/month	2/year	24-hour composite(5b,5c)	grabs
Cyanide	1/month	1/month	2/year	multiple grabs(5a)	grabs

Legends

VOC	= volatile organic compounds
BNA	= base/neutrals and acids extractable organic compounds
1/month	= once per month
1/quarter	= once per quarter
2/year	= twice per year

Footnotes:

(1) The parameters are arsenic, cadmium, copper, lead, nickel, silver, zinc, and selenium.

(2) The Discharger may elect to run total chromium instead of hexavalent chromium. Sample collection for total chromium measurements may also use 24-hour composite sampling.
(3) Effluent monitoring conducted in accordance with Table E-3 can be used to satisfy these pretreatment monitoring requirements.
(4) Since the Discharger operates its solar drying operations only during the dry season, the biosolids monitoring frequency is once per year during those times when it does not stockpile biosolids (i.e., the dry season). However, if and when the Discharger stockpiles biosolids (e.g., during wet weather), it shall report biosolids monitoring results for the stockpile during the wet season monitoring as well (i.e., twice per year).
(5) Sample types:
   a. Multiple grabs samples for VOC, BNA, hexavalent chromium, and cyanide, must be made up of a minimum of four (4) discrete grab samples, collected equally spaced over the course of a 24-hour period, with each grab analyzed separately and the results mathematically flow-weighted or with grab samples combined (volumetrically flow-weighted) prior to analysis.
   b. 24-hour composite sample may be made up discrete grab samples and may be combined (volumetrically flow-weighted) prior to analysis, or they should be mathematically flow-weighted. If automatic compositor is used, 24-hour composite samples must be obtained through flow-proportioned composite sampling.
   c. Automatic compositors are allowed for mercury if either 1) the compositing equipment (hoses and containers) comply with ultra-clean specifications, or 2) appropriate equipment blank samples demonstrate that the compositing equipment has not contaminated the sample. This direction is consistent with the Regional Water Board's October 22, 1999, letter on this subject.
   d. Biosolids collection should comply with those requirements specified in Attachment H, Appendix H-3 of this Order for sludge monitoring. The biosolids analyzed shall be a composite sample of the biosolids for final disposal. The Discharger shall also comply with biosolids monitoring requirements required by 40 CFR 503.

X. OTHER MONITORING REQUIREMENTS

1. **Off-Shore Monitoring Areas**. The Discharger shall continue to monitor the area outside San Francisco Bay between Rocky Point in Marin County and Point San Pedro in San Mateo County to identify any environmental effects of the discharge on receiving waters, sediment, or aquatic life.

2. **Frequency of Sampling**. The Discharger shall continue the Ocean Outfall Offshore Monitoring Program, sampling annually in the fall, when sediments are least disturbed.

3. **Specific Monitoring Points**. Monitoring locations are identified in Table E-6, below. (The Discharger selected locations using the USEPA's EMAP grid system, with 15 fixed locations and 36 random locations.)

Table E-7. Ocean Outfall Offshore Monitoring Locations

EMAP Station Number	Southwest Ocean Outfall (SWOO) Station Number	Latitude	Longitude
Fixed Locations			
1	---	37º 42' 12.00''	-122º 34' 31.20''
2	---	37º 42' 37.80''	-122º 34' 30.00''
4	---	37º 42' 42.00''	-122º 35' 42.00''
6	---	37º 40' 00.00''	-122º 32' 15.00''

25	---	37º 42' 13.80''	-122º 34' 30.00''
28	---	37º 41' 54.00''	-122º 34' 28.80''
31	---	37º 43' 28.80''	-122º 34' 01.80''
Random Locations			
R1	32	37º 52' 04.77''	-122º 38' 28.60''
R2	33	37º 51' 06.14''	-122º 36' 00.87''
R3	34	37º 51' 04.65''	-122º 38' 50.77''
R4	35	37º 50' 53.96''	-122º 40' 45.11''
R5	36	37º 50' 15.84''	-122º 37' 12.27''
R6	37	37º 50' 11.61''	-122º 35' 41.45''
R7	38	37º 49' 40.86''	-122º 39' 18.05''
R8	39	37º 49' 19.20''	-122º 41' 25.50''
R9	40	37º 48' 31.68''	-122º 37' 29.76''
R12	43	37º 47' 07.88''	-122º 36' 57.88''
R14	45	37º 46' 29.37''	-122º 38' 38.38''
R16	47	37º 45' 39.83''	-122º 37' 04.52''
R17	48	37º 45' 33.87''	-122º 38' 55.98''
R19	50	37º 45' 00.01''	-122º 39' 56.01''
R20	51	37º 44' 46.38''	-122º 35' 55.51''
R21	52	37º 43' 43.07''	-122º 31' 11.61''
R22	53	37º 43' 04.34''	-122º 38' 42.51''
R23	54	37º 42' 59.44''	-122º 32' 47.41''
R24	55	37º 42' 56.50''	-122º 34' 15.08''
R25	56	37º 42' 41.24''	-122º 36' 28.29''
R26	57	37º 42' 33.84''	-122º 31' 08.82''
R27	58	37º 42' 15.49''	-122º 34' 55.24''
R28	59	37º 41' 35.66''	-122º 32' 11.82''
R29	60	37º 41' 20.89''	-122º 36' 06.47''
R30	61	37º 40' 55.35''	-122º 33' 29.05''
R31	62	37º 40' 56.18''	-122º 37' 43.15''
R32	63	37º 39' 31.65''	-122º 33' 41.41''
R33	64	37º 39' 14.63''	-122º 32' 04.75''
R34	65	37º 38' 02.91''	-122º 32' 27.99''
R35	66	37º 37' 42.23''	-122º 36' 40.08''
R36	67	37º 37' 34.73''	-122º 33' 53.51''
R37	68	37º 37' 00.97''	-122º 36' 55.75''
R38	69	37º 36' 52.15''	-122º 35' 28.81''
R39	70	37º 36' 32.16''	-122º 32' 01.35''
R40	71	37º 36' 16.73''	-122º 33' 03.03''

4. **Sediment Sampling**. The Discharger shall collect benthic samples from seven historical fixed locations (1, 2, 4, 6, 25, 28, 31) to maintain time series data, and 30 out of the 36 random locations (R1- R9, R12, R16 – R17, R19 – R40), for a total of 45 samples. Samples shall be collected using a 0.1 m^2 Smith McIntyre grab sampler. Two grabs shall be collected at each station and the top 5 centimeters of sediment shall be composited from each grab prior to analysis. Analysis of the sediment samples shall include:

   - Total volatile solids
   - Total organic carbon
   - Kjeldahl nitrogen
   - Grain size
   - Inorganic toxic pollutants [Al, As, Cd, Cr, Cr(VI), Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn] [The Discharger may elect to report total chromium in lieu of chromium (VI).].
   - DDT, PCBs, and PAHs

5. **Infaunal Sampling**. One benthic grab sample collected from each of the above locations shall be analyzed for infaunal organisms. This sample shall be passed through a 1.0 mm and a 0.5 mm sieve. Organisms retained on each sieve shall be relaxed and preserved for later enumeration and taxonomic determination to the lowest taxon.

6. **Trawls**. The Discharger shall conducts trawls once per year in the fall to assess the presence or absence of demersal fish and epibenthic invertebrates in the vicinity of the ocean outfall, and to determine any bioaccumulation of priority pollutants in these organisms.

   A fish community analysis shall be conducted at a minimum of one of four fixed sampling locations (SWOO 1, 2, 25, or 28) and at one reference location outside of the influence of the discharge. Fish and invertebrates shall be collected, identified to the lowest identifiable taxon, and enumerated. The following information shall be recorded.

   - Fish
     - Abnormalities and disease symptoms, such as fin erosion, lesions, or tumors
     - Standard length of all fish specimens; disk width for skates and rays

   - Invertebrates
     - Carapace length and identification of unsexed or gravid females of shrimp
     - Carapace width and sex of crabs

   Tissue samples to assess the bioaccumulation of pollutants shall be composite samples collected at one of four fixed sampling locations (SWOO 1, 2, 25, 28) and at one or more reference locations outside of the influence of the discharge. Three composite samples shall be collected of one fish species and one macroinvertebrate species at each location. Each composite sample shall consist of ten or more organisms of each species, with the preferred species being English sole (*Pleuronectes vetulus)* and dungeness crab (*Cancer magister).* Muscle and liver/hepatopancreas tissues shall be analyzed for inorganic pollutants (As, Cd, Cr, Cu, Pb, Hg, Se, Ag, and Zn), and DDT, PCBs, and PAHs.

7. **Adaptive Management**. The Discharger shall confer with USEPA and the Regional Water Board regarding any proposed changes to the monitoring program in response to ongoing analyses of monitoring data to maximize the amount of relevant and useful data that can be collected within the five year permit term.

8. **Reporting**. All offshore monitoring data shall be reported to USEPA and the Regional Water Board in an Annual Report submitted by August 30 of the year following sampling to allow for time to make modifications, if necessary, for the following sampling event. The report shall include raw data tables and summaries for each monitoring component. A comprehensive cumulative summary report shall be submitted with the next application for permit reissuance.

XI. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with all Standard Provisions (Attachment D) and Regional Standard Provisions, and Monitoring Requirements (Attachment G) related to monitoring, reporting, and recordkeeping.

B. Self Monitoring Reports (SMRs)

1. At any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit Self-Monitoring Reports (SMRs) using the State Water Board's California Integrated Water Quality System (CIWQS) Program Web site (http://www.waterboards.ca.gov/ciwqs/index.html) or to any other Internet web site specified by the Regional Water Board or USEPA. Until such notification is given, the Discharger shall submit paper copy SMRs. The CIWQS Web site will provide additional directions for SMR submittal in the event there will be service interruption for electronic submittal.

2. The Discharger shall submit monthly SMRs including the results of all required monitoring using USEPA-approved test methods or other test methods specified in this Order for each calendar month. Monthly SMRs shall be due on the 30th day following the end of each calendar month, covering samples collected during that calendar month; Annual Reports shall be due on February 1 following each calendar year.

3. The Discharger shall comply with the following schedule of monitoring periods and reporting.

Table E-8. Monitoring Periods

Sampling Frequency	Monitoring Period Begins On…	Monitoring Period
Continuous	Day after permit effective date	All
Cont./D	Day after permit effective date	All
Daily	Day after permit effective date	(Midnight through 11:59 PM) or any 24-hour period that reasonably represents a calendar day for purposes of sampling.
Weekly	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday
5/Week	Sunday following permit effective date or on permit effective date if on a Sunday	Sunday through Saturday
Monthly	First day of calendar month following permit effective date or on permit effective date if that date is first day of the month	1st day of calendar month through last day of calendar month
2/Month	First day of calendar month following permit effective date or on permit effective date if that date is first date of the month	1st day of calendar month through last day of calendar month
Quarterly	Closest of January 1, April 1, July 1, or October 1 following (or on) permit effective date	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31
Annually	January 1 following (or on) permit effective date	January 1 through December 31. July 1 through June 30 for shoreline CSD and other rainfall initiated data.
<X> / Discharge Event	As soon as possible after discharge begins	For the duration of the discharge event

4. The Discharger shall report with each sample result the applicable reported Minimum Level (ML) and the current Method Detection Limit (MDL) as determined by the procedure in Part 136.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

b. Sample results less than the ML, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated

Concentration" (which may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numeric estimates of the data quality for the reported result. Numeric estimates of data quality may be percent accuracy (± a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

c. Sample results less than the laboratory's MDL shall be reported as "Not Detected" or ND.

d. Dischargers are to instruct laboratories to establish calibration standards so that the ML (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve except in reporting estimated sample results less than the RL, but greater than or equal to the laboratory MDL as stated in 4.b. above.

5. The Discharger shall comply with effluent limitations for reportable pollutants determined using sample reporting protocols defined above and in Attachment A of this Order. For purposes of reporting and administrative enforcement, the Discharger shall be deemed out of compliance with single-sample effluent limitations if the concentration of the reportable pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the ML. For averaged or median-based effluent limitations, the Discharger shall be deemed out of compliance if the average or median concentration in the data set is greater than the effluent limitation

6. The Discharger shall submit SMRs in accordance with the following requirements:

a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

b. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of this Order; corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations shall include the requirement violated and a description of the violation.

c. If the Discharger wishes to invalidate any measurement, the letter of transmittal shall include identification of the measurement suspected to be invalid and notification of intent to submit a formal request to invalidate the measurement , within 60 days. This request shall include the original measurement in question, the reason for invalidating the measurement, all relevant documentation that supports the invalidation (e.g., laboratory sheet, log entry, test results etc.), and discussion of the corrective actions taken or planned (with time schedule for completion) to prevent recurrence of the sampling or measurement problem. The invalidation of a measurement by USEPA or Regional Water Board staff will be based solely on the documentation submitted at that time.

d. SMRs must be submitted to the Regional Water Board, signed and certified as required by the Standard Provisions (Attachment D), to the address listed below:

Executive Officer
California Regional Water Quality Control Board
San Francisco Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
ATTN: NPDES Wastewater Division

C. Discharge Monitoring Reports (DMRs)

1. As described in Section X.B.1 above, at any time during the term of this permit, the State or Regional Water Board may notify the Discharger to electronically submit SMRs that will satisfy federal requirements for submittal of DMRs. Until such notification is given, the Discharger shall submit DMRs in accordance with the requirements described below.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to the address listed below:

STANDARD MAIL	FEDEX/UPS/ OTHER PRIVATE CARRIERS
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 **I** Street, 15th Floor Sacramento, CA 95814

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated will not be accepted unless they follow the exact same format of EPA Form 3320-1.

APPENDIX E-1
CHRONIC TOXICITY
DEFINITION OF TERMS AND SCREENING PHASE REQUIREMENTS

I. Definition of Terms

A. No observed effect level (NOEL) for compliance determination is equal to IC_{25} or EC_{25}. If the IC_{25} or EC_{25} cannot be statistically determined, the NOEL shall be equal to the NOEC derived using hypothesis testing.

B. Effective concentration (EC) is a point estimate of the toxicant concentration that would cause an adverse effect on a quantal, “all or nothing,” response (such as death, immobilization, or serious incapacitation) in a given percent of the test organisms. If the effect is death or immobility, the term lethal concentration (LC) may be used. EC values may be calculated using point estimation techniques such as probit, logit, and Spearman-Karber. EC_{25} is the concentration of toxicant (in percent effluent) that causes a response in 25 percent of the test organisms.

C. Inhibition concentration (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction in a nonlethal, nonquantal biological measurement, such as growth. For example, an IC_{25} is the estimated concentration of toxicant that would cause a 25 percent reduction in average young per female or growth. IC values may be calculated using a linear interpolation method such as USEPA's Bootstrap Procedure.

D. No observed effect concentration (NOEC) is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. It is determined using hypothesis testing.

II. Chronic Toxicity Screening Phase Requirements

A. The Discharger shall perform screening phase monitoring:

1. Subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to source control efforts, and at least once during the Order term.

2. Screening phase monitoring data shall be included in the NPDES permit application for reissuance. The information shall be as recent as possible, but may be based on screening phase monitoring conducted within 5 years before the permit expiration date.

B. Design of the screening phase shall, at a minimum, consist of the following elements:

1. Use of test species specified in **Appendix E-2**, attached, and use of the protocols referenced in those tables, or as approved by the Executive Officer.

2. Two stages:

a. Stage 1 shall consist of a minimum of one battery of tests conducted concurrently. Selection of the type of test species and minimum number of tests shall be based on **Appendix E-2** (attached).

b. Stage 2 shall consist of a minimum of two test batteries conducted at a monthly frequency using the three most sensitive species based on the Stage 1 test results and as approved by the Executive Officer.

3. Appropriate controls.

4. Concurrent reference toxicant tests.

5. Dilution series should include the IWC, and four concentrations that bracket the IWC, or other concentrations approved by the Executive Officer.

C. The Discharger shall submit a screening phase proposal acceptable to the Regional Water Board. The proposal shall address each of the elements listed above. If within 30 days neither USEPA nor the Regional Water Board staff comments, the Discharger shall commence with screening phase monitoring.

APPENDIX E-2
SUMMARY OF TOXICITY TEST SPECIES REQUIREMENTS
Critical Life Stage Toxicity Tests for Marine and Estuarine Waters

Species	(Scientific Name)	Effect	Test Duration	Reference
Alga	*(Skeletonema costatum)* *(Thalassiosira pseudonana)*	Growth rate	4 days	1
Red alga	*(Champia parvula)*	Number of cystocarps	7–9 days	3
Giant kelp	*(Macrocystis pyrifera)*	Percent germination; germ tube length	48 hours	2
Abalone	*(Haliotis rufescens)*	Abnormal shell development	48 hours	2
Oyster Mussel	*(Crassostrea gigas)* *(Mytilus edulis)*	Abnormal shell development; percent survival	48 hours	2
Echinoderms - Urchins Sand dollar	*(Strongylocentrotus purpuratus, S. franciscanus)* *(Dendraster excentricus)*	Percent fertilization Development test	1 hour 72 hours	2
Shrimp	*(Mysidopsis bahia)*	Percent survival; growth	7 days	3
Shrimp	*(Holmesimysis costata)*	Percent survival; growth	7 days	2
Topsmelt	*(Atherinops affinis)*	Percent survival; growth	7 days	2
Silversides	*(Menidia beryllina)*	Larval growth rate; percent survival	7 days	3

Toxicity Test References:

1. American Society for Testing Materials (ASTM). 1990. Standard Guide for Conducting Static 96-Hour Toxicity Tests with Microalgae. Procedure E 1218-90. ASTM, Philadelphia, PA.
2. Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms. EPA/600/R-95/136. August 1995.
3. Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to Marine and Estuarine Organisms. EPA/600/4-90/003. July 1994.

Toxicity Test Requirements for Stage One Screening Phase

Requirements	Receiving Water Characteristics		
	Discharges to Coast	Discharges to San Francisco Bay[2]	
	Ocean	Marine/Estuarine	Freshwater
Taxonomic diversity	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish	1 plant 1 invertebrate 1 fish
Number of tests of each salinity type: Freshwater[1] Marine/Estuarine	0 4	1 or 2 3 or 4	3 0
Total number of tests	4	5	3

[1] The freshwater species may be substituted with marine species if:

(a) The salinity of the effluent is above 1 part per thousand (ppt) greater than 95 percent of the time, or

(b) The ionic strength (TDS or conductivity) of the effluent at the test concentration used to determine compliance is documented to be toxic to the test species.

[2] (a) Marine/Estuarine refers to receiving water salinities greater than 1 ppt at least 95 percent of the time during a normal water year.

(b) Fresh refers to receiving water with salinities less than 1 ppt at least 95 percent of the time during a normal water year.

ATTACHMENT F – FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in section II of this Order, this Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for dischargers in California. Only those sections or subsections of this Order that are specifically identified as "not applicable" have been determined to not apply to this discharger. Sections or subsections of this Order not specifically identified as "not applicable" are fully applicable to this discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table F-1. Facility Information

WDID	2 386009001
Discharger	City and County of San Francisco
Name of Facility	Oceanside Water Pollution Control Plant, and Collection System including the Westside Wet Weather Facilities
Facility Address	3500 Great Highway
	San Francisco, CA 94132
	San Francisco County
Facility Contact, Title and Phone	Tommy Moala, Assistant General Manager, Wastewater Enterprise (415) 554-2465
Authorized Person to Sign and Submit Reports	Arleen Navarret, Regulatory Manager, (415) 934-5731
Mailing Address	San Francisco Public Utilities Commission/Wastewater Enterprise 1155 Market St., 11th Floor, San Francisco CA 94103
Billing Address	Same as above
CIWQS Place ID	256498
CIWQS Party ID	39680
Billing Address	Same as above
Type of Facility	Publicly Owned Treatment Works
Major or Minor Facility	Major
Threat to Water Quality	2
Complexity	A
Pretreatment Program	Y
Receiving water	Pacific Ocean
Receiving Water Type	Main discharge starting at about 3.4 nautical miles from shore, CSO discharges at shoreline
Reclamation Requirements	NA
Facility Permitted Flow	43 million gallons per day (MGD), average dry weather
Facility Design Flow	<u>Oceanside Plant</u> 43 MGD, average dry weather design flow (providing secondary treatment) 65 MGD maximum wet weather design flow (providing secondary treatment for 43 MGD, and primary treatment for an additional 22 MGD)

	Westside Wet Weather Facilities Collection system flows greater than 65 MGD and less than 175 MGD receive the equivalent of wet weather primary treatment in the Westside Wet Weather Facilities (storage/transports) and are discharged at the Southwest Ocean Outfall. Flows greater than 175 MGD receive the equivalent of wet weather primary treatment in the Westside Wet Weather Facilities and are discharged at authorized combined sewer overflow discharge (CSOD) points.
Watershed	San Mateo Coastal
Receiving Water	Pacific Ocean
Receiving Water Type	Ocean waters

A. The City and County of San Francisco (hereinafter the Discharger) is the owner and operator of the Oceanside Water Pollution Control Plant (Plant) and Westside Wet Weather Facilities, a publicly owned treatments works (POTW). For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and State laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

B. The facility discharges wastewater to the Pacific Ocean, waters of the United States, and is currently regulated by Order No. R2-2003-0073, which was adopted on August 20, 2003, expiring on September 30, 2008.

C. On March 28, 2008, the Discharger filed a report of waste discharge and submitted an application for renewal of its Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit.

II. FACILITY DESCRIPTION

A. Description of Wastewater and Biosolids Treatment or Controls

The Discharger is the owner and operator of the Oceanside Plant and its associated collection system, a combined sewer system that includes the Westside Wet Weather Facilities. The collection system includes approximately 300 miles of sewer pipes on the west side watershed of the city that covers the areas of Richmond, Sunset, and Lake Merced as well as a small portion of Daly City. The system also includes four all weather pump stations, Seacliff #1, Seacliff #2, Pine Lake and Westside and two wet weather pump stations, Seacliff #3 and the Zoo Wet-Weather Lift Station. There are no satellite systems.

Treatment at the Oceanside Plant, which has a peak secondary treatment capacity of 43 MGD, includes coarse screening at the Westside Pump Station, fine screening and grit removal at the Plant headworks, primary sedimentation, activated sludge treatment by a pure oxygen process, and secondary clarification. Secondary treated wastewater is discharged to the Pacific Ocean, 3.4 to 3.6 nautical miles offshore, at Discharge Point 001 - the Southwest Ocean Outfall. These receiving waters are waters of the United States but are beyond the territorial waters of the State of California. During wet weather periods of high influent flow, the Oceanside Plant can provide primary treatment for an additional 22 MGD of influent flow, which, following treatment, is blended with secondary treated wastewater (i.e., a total treatment capacity of 65 MGD) and discharged at Discharge Point 001.

The Discharger's collection system includes three large storage/transport structures – the Westside Transport, a 49.3 million gallon box-like structure located beneath the Great Highway; the Richmond Transport, a 12 million gallon structure located to the north; and the Lake Merced Transport, a 10 million gallon structure located to the south. The combined storage capacity of these "Westside Wet Weather Facilities" is 73.5 million gallons, which includes 2.2 million gallons of capacity within the sewer lines.

Collection system flows that exceed the Oceanside Plant's treatment capacity of 65 MGD, are stored in the Westside Wet Weather Facilities, which provide the equivalent of wet weather primary treatment through solids settling, skimming of floatable solids, and screening at pump stations. Combined wastewater from the storage/transport structures is pumped via the Westside Pump Station to Discharge Point 001, until the pumping capacity of the combined sewer system facilities to the outfall is reached at 175 MGD. Combined wastewater flows greater than 175 MGD also receive (the equivalent of wet weather primary treatment) treatment in the storage/transport structures but are discharged at the seven, near-shore combined sewer overflow discharge structures, authorized by this Order. These receiving waters are waters of the United States and territorial waters of the State of California. To be considered a discrete combined sewer overflow discharge event, the combined sewer overflow discharge must be separated by six hours in time from any other combined sewer overflow discharge. For the purposes of this permit, authorized treated combined sewer overflow discharges from the near-shore overflow discharge structures are referred to as combined sewer overflow discharges (CSODs). Unauthorized untreated combined sewer overflows from combined sewer systems are referred to as combined sewer overflows (CSOs).

Wastewater solids removed by settling in the Westside Wet Weather Facilities are flushed to the Plant when wet weather flows subside. Primary and secondary solids from the Plant are blended and thickened using gravity belt thickeners, anaerobically digested, dewatered, and beneficially re-used at permitted sites.

Attachment B provides a map of the area around the Plant. Attachment C provides a flow schematic of the Plant.

Based on 70 years of historical rainfall records, the Westside Wet Weather Facilities were designed to achieve a long term average of eight discrete CSOD events per year. State Water Board Order No. WQ 79-16 defines a discrete combined sewer overflow discharge event as one separated from any other combined sewer overflow discharge by at least six hours. CSOD information for the period of January 2007 through December 2007 is summarized in Table F- 2, below.

Table F-2. CSOD Summary 2007

Overflow Discharge Point	CSD-001	CSD-002	CSD-003	CSD-004	CSD-005	CSD-006	CSD-007
CSOD Structure Name	Lake Merced	Vicente St.	Lincoln Way	Mile Rock	Sea Cliff 1	Sea Cliff Sewer	Sea Cliff 2
Days with Rainfall	63	63	63	63	63	63	63
Discharge Events	2	2	2	NA	0	NA	1
Average Duration (hours)	1.64	1.71	2.19	NA	NA	NA	1.1
Average Volume/Event (million gallons.)	5.98	5.83	6.17	NA	NA	NA	7.11

B. Discharge Points and Receiving Waters

The locations of the discharge points and their receiving waters are listed in Table F-3, below.

Table F-3. Outfall Locations

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Secondary Treated Wastewater, Combined Primary and Secondary Treated Wastewater and Stormwater, and the equivalent of wet weather primary treated combined Wastewater and Stormwater decant flow from a combined sewer system.	37 º 42’ 18” N	122 º 34’ 39” W	Pacific Ocean
CSD-001	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 42’ 55” N	122 º 30’ 16” W	Pacific Ocean (Fort Funston, Ocean Beach)
CSD-002	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 44’ 16” N	122 º 30’ 29” W	Pacific Ocean (Vicente St., Ocean Beach)
CSD-003	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 45’ 50” N	122 º 30’ 42” W	Pacific Ocean (Lincoln Way, Ocean Beach)
CSD-004	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 47’ 5” N	122 º 30’ 37” W	Pacific Ocean (Mile Rock)

CSD-005	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 47' 16" N	122 º 29' 30" W	Pacific Ocean (China Beach)
CSD-006	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 47' 22" N	122 º 29' 16" W	Pacific Ocean (Baker Beach)
CSD-007	The equivalent of wet weather Primary Treated Combined Wastewater and Stormwater	37 º 47' 22" N	122 º 29' 13" W	Pacific Ocean (Baker Beach)

Discharge Point 001 is located beginning about 3.4 nautical miles offshore, beyond the three nautical mile limit of the State's territorial waters. CSOD outfalls are located in the nearshore waters of the San Mateo Coastal Watershed.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

1. Effluent limitations contained in the existing Order for discharges from Discharge Point 001 (formerly Discharge Point 007) and representative monitoring data for Monitoring Location EFF-001 (formerly E-007) from the term of the previous permit are as follows:

Table F-4. Historic Effluent Limitations and Monitoring Data

Parameter	Unit	Effluent Limitation				Monitoring Data (From 12/03 to 12/07)		
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Maximum	Highest Average Monthly Discharge	Highest Average Weekly Discharge	Highest Daily Discharge
BOD_5	mg/L	30	45	---	---	33	40	---
TSS	mg/L	30	45	---	---	19	30	
Grease and Oil	mg/L	25	40	---	75	9.7	9.7	9.7
Turbidity	NTU	75	100	225	---	11	25	38
pH	s.u.	Between 6 and 9 at all times			---	5.7 minimum 8.0 maximum		
Acute Toxicity	TUa	---	---	2.58	---	---	---	1.58
Chronic Toxicity	TUc	---	---	76	---	---	---	50

2. The previous permit contained weekly monitoring requirements for bacteria in the receiving water at several surf stations, and additional surf monitoring requirements for bacteria in response to CSOD events. Requirements of the previous permit included posting notices at beaches with elevated bacteria levels until monitoring indicated bacteria were below water quality objectives. The following table summarizes periods of elevated bacteria levels during the term of the previous permit.

Table F-5. Receiving Water Surf Monitoring Summary

Wet Weather Season	Rainfall (inches)	Number of Discrete[(1)] Combined Sewer Discharges	Total Number of Days Per Year One or More Beaches Were Posted for Elevated Bacteria Counts
2003-2004	18.77	8	33
2004-2005	26.2	12	31
2005-2006	31.83	13	53
2006-2007	14.76	3	12
Average	22.89	9	32.3

(1) Discrete events are separated by at least six hours between discharges, as defined in State Water Board Order No. WQ 79-16.

D. Compliance Summary

1. **Compliance with Numeric Effluent Limitations.** During the term of Order No. R2-2003-0073, the Discharger reported exceedances of effluent limitations for BOD_5 and pH as summarized in Table F-6.

Table F-6. Summary of Effluent Violations

Date of Violation	Parameter	Effluent Limitation	Reported Value
December 31, 2005	BOD_5	30 mg/L	32.5 mg/L
December 31, 2005	BOD_5 Percent Removal	85% Removal Minimum	76% Removal
October 10, 2007	pH	Between 6 and 9 at all times	5.7

Rainfall records for San Francisco indicate that 2.12 inches of rain fell on December 31, 2005, and 0.82 inches fell on the preceding day. This may have been a “wet weather” day, in which case no exceedance occurred. Similarly on October 10, 2007, the reported date of the pH exceedance, the rainfall was 0.18 inches and the rainfall for the preceding day was 0.43 inches. This rainfall could have contributed to the low pH values. Under these circumstances, Regional Water Board staff did not recommend formal enforcement.

2. **Compliance with Permit Provisions.** A list of special activities required by Order No. R2-2003-0073 and the status toward completing those requirements are shown in Table F-7, below.

Table F-7. Permit Provisions Compliance

Provision Number	Requirement	Status of Completion
F.2 [A]	Marine Mammal Report identifying monitoring methodologies to determine presence of pathogens with potential to affect marine mammals.	Report submitted October 28, 2005.
F.4.i	Nine Minimum Controls (A) Study Plan to monitor CSOD Impacts and Controls due December 1, 2003 (B) Annual Status Reports summarizing data, evaluating CSOD impacts and controls, and proposing revisions to nine minimum controls, if necessary, due August 30 annually. (C) Final Report due 1 year prior to permit expiration.	Submitted November 26, 2003 Submitted 2004, 2005, 2006, 2007 Submitted August 30, 2007

[A] In response to concerns expressed by the National Oceanic Atmospheric Administration (NOAA) Fisheries and US Fish and Wildlife Service regarding the potential of stormwater and undisinfected wastewater from the Southwest Ocean Outfall to transmit pathogens to marine mammals, the previous permit required investigation of methods to determine impacts of human pathogens on marine mammals and conveyance of the findings in a Marine Mammal Report. On October 28, 2005, the Discharger submitted a report that concluded that little information is available regarding the environmental occurrence, fate, and transport of *T. gondii*, *S. neurona*, and Morbilliviruses, microbes of concern to marine mammals, in part because methods for detection of these microbes in the environment are insufficient.

E. Planned Changes

No changes are planned

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the proposed Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to the federal Clean Water Act (CWA) §402 and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and California Water Code (CWC) Chapter 5.5, Division 7 (commencing with §13370). It shall serve as an NPDES permit for point source discharges from this facility to surface waters. This Order also serves as Waste Discharge Requirements (WDRs) pursuant to CWC Article 4, Chapter 4, Division 7 (commencing with §13260). USEPA and the Regional Water Board are jointly issuing this permit. It covers Discharge Point 001, the Southwest Ocean Outfall, which is 3.4 to 3.6 nautical miles offshore in Federal waters. (The territorial waters of the State end three nautical miles from shore.) It also covers Discharge Points CSD-001 through CSD-007, which are near-shore in State waters.

Under Water Code §13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA. Likewise, pursuant to CWA §511(c), this action to reissue an NPDES permit does not trigger the requirements of the National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.].

B. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The *Water Quality Control Plan for the San Francisco Bay Basin* is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Board, USEPA, and the Office of Administrative Law where required.

   Beneficial uses established by the Basin Plan for waters within the San Mateo Coastal Watershed are as follows:

Table F-8. Basin Plan Beneficial Uses

Receiving Water	Basin Plan Beneficial Uses
Territorial waters of the State of California within the Pacific Ocean	• Industrial Service Supply • Ocean, Commercial, and Sport Fishing • Shellfish Harvesting • Marine Habitat • Fish Migration • Preservation of Rare and Endangered Species • Fish Spawning • Wildlife Habitat • Water Contact Recreation • Noncontact Water Recreation • Navigation

   Requirements of this Order implement the Basin Plan.

2. **California Ocean Plan.** The State Water Board adopted the *Water Quality Control Plan for Ocean Waters of California* (Ocean Plan) in 1972 and amended it in 1978, 1983, 1988, 1990, 1997, 2000, and 2005. The State Water Board adopted the latest amendment on April 21, 2005, and it became effective on February 14, 2006. The Ocean Plan applies, in its entirety, to point source discharges to the territorial waters of the State as defined by California law to the extent that these waters are outside of enclosed bays, estuaries, and coastal lagoons. The Ocean Plan identifies the following beneficial uses of ocean waters of the State: Industrial Water Supply; Water Contact and Non-contact Recreation, Including Aesthetic Enjoyment; Navigation; Commercial and Sport Fishing; Mariculture; Preservation and Enhancement of Designated Areas of Special Biological Significance; Rare and Endangered Species; Marine Habitat; Fish Migration; Fish Spawning; and Shellfish Harvesting. To protect beneficial uses, the Ocean Plan establishes water quality objectives and a program of implementation for discharges to state territorial waters.

   Discharge Point 001, the deep water outfall, is 3.4 to 3.6 nautical miles offshore in federal waters. The territorial waters of the State end three nautical miles from shore. The Ocean Plan (Appendix 1, Ocean Waters) states, "If a discharge outside the territorial waters of the State could affect the quality of the waters of the State, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters." For the reasons set forth below, the Regional Water Board finds that the discharge at Discharge Point 001 could not affect the quality of the waters of the State during dry weather. During wet weather, the Ocean Plan defers to the Combined Sewer Overflow Control Policy, discussed in Finding K. Therefore, this Order does not regulate the discharge at Discharge Point 001 directly through the Water Board's Ocean Plan authorities.

The Discharger has compiled information demonstrating that the discharge at Discharge Point 001 during dry weather could not affect the quality of the waters of the State ("Assessment of Effects on California State Waters from the Oceanside Southeast Ocean Outfall," September 26, 2008). Regional Water Board staff has supplemented the Discharger's information with independent analysis.

a. **Receiving Water Monitoring.** The Discharger has monitored the receiving waters since the 1970s, before and after the installation of the Southwest Ocean Outfall in 1986. Aquatic biological communities, including benthic communities, do not appear to be any different near the outfall than at reference locations. Sediment quality appears to be similar as well. Since the discharge does not appear to affect water quality in the vicinity of the outfall, there is no evidence that it could affect the quality of State waters.

b. **Dilution.** This Order uses a minimum initial dilution of effluent from Discharge Point 001 of 150:1. The Discharger has submitted a study indicating that initial dilution could be over 170:1 ("Dilution Modeling for the San Francisco Southwest Ocean Outfall," City and County of San Francisco, June 2007). Substantial additional dilution occurs between the outfall and State waters, which are 0.36 nautical miles (2,200 feet) away. A worst-case estimate of this far-field dilution is over 400:1. Regional Water Board staff has concluded that such highly diluted effluent from the deep water outfall could not affect the quality of State waters.

c. **Ocean Currents.** Ocean currents at the Southwest Ocean Outfall typically move parallel to the coast, not toward State waters.

d. **Effluent Toxicity Monitoring.** The Discharger routinely monitors acute and chronic toxicity in the effluent to ensure that it complies with effluent limitations. This monitoring has never indicated a violation of toxicity limitations at the outfall. Therefore, the discharge could not cause toxicity in State waters 0.36 nautical miles away. Receiving water sediment toxicity test results corroborate this conclusion.

e. **Bacteria Monitoring.** In the 1980s, the Discharger completed an extensive study to determine how discharging primary treated effluent from the deep water outfall was affecting receiving water bacteria levels (*Wastefield Transport and Bacteriological Compliance Studies of the San Francisco Ocean Outfall CH2MHill March 1989*). The Discharger now treats its wastewater to secondary treatment standards during dry weather. Regional Water Board staff used data from that study representing primary treatment to estimate the potential effects of discharging secondary-treated effluent (staff memorandum, October 10, 2008). Estimated bacteria levels in federal waters were below Ocean Plan water quality objectives. Therefore, the deep water discharge could not affect bacteria levels in State waters.

3. **Determination of Unreasonable Degradation of the Marine Environment.** Discharges from the Southwest Ocean Outfall are to waters of the United States beyond the territorial waters of the State of California. Federal regulations at 40 CFR 125.122 require the permitting authority to determine whether a discharge will cause unreasonable degradation of the marine environment. Based on 40 CFR 125.22(b), USEPA conducted a reasonable potential analysis using Ocean Plan objectives and included numeric permit limitations, based on the Ocean Plan's dilution procedures, for toxicity and mercury, the only numeric Ocean Plan objectives for which USEPA found reasonable potential to cause or contribute to an exceedance of water quality standards. USEPA also included narrative receiving water limitations for the Ocean Plan narrative objectives for which it found reasonable potential. For determining reasonable potential for the dioxins, USEPA based its analysis on 40 CFR 125.122(a) and used recently updated Toxicity Equivalency Factors (TEFs) published by the World Health Organization in 2005, as well as the congener-specific Bioconcentration Equivalency Factors (BEFs) used for the Great Lakes System. The "Bay Area Clean Water Agencies' Draft Dioxin Issue Paper: Expert Panel Response and Recommendations," dated April 4, 2008 recommended the use of TEFs and BEFs to develop NPDES permit limits for dioxins. This approach incorporates recent scientific information for dioxins on a congener-specific basis, while continuing to use the Ocean Plan water quality objective for dioxins (TCDD equivalents) and standards implementation procedures. Given the unique issues dioxins present, USEPA has prepared a determination of unreasonable degradation for the ten factors under 40 CFR 125.122(a) (Appendix 1 of this Fact Sheet). USEPA has determined that no unreasonable degradation of the marine environment will result from the discharges of dioxins through the Southwest Ocean Outfall as authorized under this Order, with all the limitations, conditions, and monitoring requirements in effect.

4. **Combined Sewer Overflow Control Policy.** Wet weather flows from combined sewer systems are subject to CWA §301(b)(1)(A) and are not subject to secondary treatment regulations. Wet weather flows from combined sewer systems are addressed by the Combined Sewer Overflow Control Policy (59 Federal Register 18688-18698). The *Wet Weather Water Quality Act of 2000* incorporated this policy into the CWA.

   The policy establishes a consistent national approach for controlling discharges from combined sewers to the nation's water. Using the NPDES permit program, the policy initiates a two-phased process. During the first phase, the Discharger is required to implement "nine minimum controls" (e.g., prevent dry weather overflows). These controls constitute the technology-based requirements of the Clean Water Act as applied to combined sewer facilities (i.e., best conventional pollutant control technology, BCT, and best available control technology economically achievable, BAT). The controls are intended to provide immediate and relatively low-cost water quality improvements for facilities that, unlike the Discharger, have not implemented a long-term control plan. During the first phase, the Discharger is required to initiate development of a long-term control plan to select controls to comply with water quality standards, based on consideration of the Discharger's financial capabilities.

The second phase of the process involves implementation of the long-term control plan developed in the first phase. The purpose of this long-term control plan is to comply with the CWA water quality requirements. The Discharger's program, which continues to implement the Discharger's long-term plan, is consistent with the policy. This Order implements the policy and is consistent with the Regional Water Board policy on wet weather overflows described in Basin Plan Section 4.9. During wet weather, CSODs from shoreline discharge points CSD-001 through CSD-007 and the Southwest Ocean Outfall are subject to this policy.

Ocean Plan Section III.A.4 acknowledges, "Not withstanding any other provisions in this plan, discharges from the City of San Francisco's combined sewer system are subject to the USEPA's Combined Sewer Overflow Policy." In large part, this acknowledgement is a response to State Water Board Order No. WQ 79-16 (March 23, 1979), which granted an exception from the Ocean Plan for wet weather discharges from the Discharger's diversion structures in the western-most portion of the Discharger's combined sewer system. The exception was necessary because CSODs are inherently inconsistent with certain Ocean Plan standards. In accordance with Ocean Plan procedures for granting exceptions, the State Water Board found that there were unusual circumstances not anticipated at the time of the plan's adoption (the Ocean Plan had failed to address CSODs), that beneficial uses would be protected, and that the public interest would be served. Of particular importance to the State Water Board in granting the exception was the Discharger's proposal to improve its wet weather facilities to allow only an average of eight CSODs per year. The exception was subject to several conditions, including:

- The Discharger needed self-monitoring in accordance with Regional Water Board specifications (this Order requires this in Attachment E),
- Beaches and shellfish harvesting areas potentially affected by CSODs needed to be posted (this Order requires this in Section VI.C.6.b(8)),
- To the greatest extent practical, the Discharger needed to design, construct, and operate wet weather facilities to comply with Ocean Plan requirements (this Order requires this in Section VI.C.4),
- Aside from the average of eight CSOD events per year, all other storm water runoff needed to be contained, and the discharge of all other untreated waste to waters of the State was to be prohibited (this Order requires this in Section III; the provision for eight overflow events per year is the design basis of the effluent treatment system).

5. **Alaska Rule.** On March 30, 2000, USEPA revised its regulation that specifies when new and revised state and tribal water quality standards (WQS) become effective for CWA purposes [65 Fed. Reg. 24641 (April 27, 2000), codified at 40 CFR §131.21]. Under the revised regulation (also known as the Alaska rule), new and revised standards submitted to USEPA after May 30, 2000, must be approved by USEPA before being used for CWA purposes. The final rule also provides that standards

already in effect and submitted to USEPA by May 30, 2000, may be used for CWA purposes, whether or not approved by USEPA.

6. **Stringency of Requirements for Individual Pollutants.** This Order contains both technology-based and water quality-based effluent limitations for individual pollutants. This Order's technology-based pollutant restrictions implement the minimum applicable federal technology-based requirements. In addition, this Order contains effluent limitations more stringent than the minimum federal technology-based requirements. The water quality-based limits are necessary to meet water quality standards. They are not more stringent than required by the CWA.

   Water quality-based effluent limitations have been derived to implement water quality objectives that protect beneficial uses. Both beneficial uses and water quality objectives in State waters have been approved pursuant to federal law and are the applicable federal water quality standards. The procedures used for this Order to calculate individual water quality-based effluent limitations for State waters are based on the California Ocean Plan, which was approved by USEPA on February 14, 2006.

7. **Antidegradation Policy.** NPDES regulations at 40 CFR§131.12 require that the State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16, which incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. Water quality plans implement, and incorporate by reference, both the State and federal antidegradation policies. The permitted discharge is consistent with the antidegradation provision of 40 CFR§131.12 and State Water Board Resolution No. 68-16 because there is no increase in authorized flow and effluent limitations are at least as stringent as in the previous permit.

8. **Anti-Backsliding Requirements.** CWA Sections 402(o)(2) and 303(d)(4) and NPDES regulations at 40 CFR §122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. With the exception of acute and chronic toxicity, all effluent limitations in this Order are at least as stringent as the effluent limitations in the previous permit. Compliance with anti-backsliding requirements is discussed in section IV.C.6.

9. **Endangered Species Act.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the State. The Discharger is responsible for meeting all

requirements of applicable State and federal law pertaining to threatened and endangered species.

§7(a)(2) of the federal Endangered Species Act requires USEPA, in reissuing this NPDES permit, to ensure, after consultation with appropriate agencies, that discharges at the Southwest Ocean Outfall are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat for such species. USEPA has initiated informal consultation with National Oceanic Atmospheric Administration (NOAA).

C. Impaired Water Bodies on CWA 303(d) List

On November 30, 2006, USEPA approved a revised list of impaired water bodies prepared by the State [hereinafter referred to as the 303(d) list] pursuant to CWA section 303(d), which requires identification of specific water bodies where it is expected that water quality standards will not be met after implementation of technology-based effluent limitations on point sources. Receiving waters for discharges from CSOD outfalls authorized by this Order are listed as impaired for indicator organisms at Baker Beach, specifically at the mouth of Lobos Creek.

1. Total Maximum Daily Loads

The Regional Water Board plans to adopt Total Maximum Daily Loads (TMDLs) for pollutants on the 303(d) list within ten years. Future review of the 303(d) list may provide schedules or result in revision of schedules for adoption of TMDLs.

2. Waste Load Allocations

The TMDLs will establish waste load allocations (WLAs) for point sources and load allocations for non-point sources, which will result in achieving the water quality standards for waterbodies. Future water quality-based effluent limitations for 303(d) listed pollutants will be based on WLAs contained in the respective TMDLs. If a TMDL is developed and WLAs are established independently for discharges of stormwater and wastewater, these WLAs may be combined to be met collectively by the wastewater and stormwater effluent loads.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. There are two principal bases for effluent limitations in the Code of Federal Regulations: section 122.44(a) requires that permits include applicable technology-based limitations and standards; and section 122.44(d) requires that permits include water quality-based effluent limitations to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water.

A. Discharge Prohibitions

1. **Discharge Prohibition III.A**. (No discharge other than that described in this Order). This prohibition is retained from the previous permit and is based on CWC §13260, which requires filing a Report of Waste Discharge before discharges can occur. Discharges not described in the Report of Waste Discharge, and subsequently in the Order, are therefore prohibited.

2. **Discharge Prohibition III.B**. (No discharge from Discharge Point 001 that does not receive an initial dilution of at least 150:1). This prohibition is retained from the previous permit. In addition, the Order accounts for dilution of 150:1 in the reasonable potential analysis and calculation of WQBELs. The limitations in this Order may not be protective of water quality if the discharge were to not actually achieve a 150:1 initial dilution.

3. **Discharge Prohibition III.C**. (Bypass of secondary treatment is prohibited except as described by the Order on wet weather days or as provided in 40 CFR §122.41(m)(4) and in Regional Standard Provisions, and Monitoring and Reporting Requirements [Attachment G]). This prohibition is retained from the previous permit and is based on NPDES regulations at 40 CFR §122.41(m)(4).

4. **Discharge Prohibition III.D**. (Discharge at a location other than Discharge Point 001 is prohibited except for wet weather days). This prohibition is retained from Order No. R2-2003-0073 and reflects a principle objective of USEPA's *Combined Sewer overflow Control Policy* (1994) to ensure that, if CSODs occur, they are only a result of wet weather and such discharges only occur at specified locations.

5. **Discharge Prohibition III.E**. (Discharge at Discharge Points CSOD-001 through CSOD-007 is prohibited except on wet weather days). This prohibition is retained from the previous permit and reflects a principle objective of USEPA's *Combined Sewer Overflow Control Policy* (1994) to ensure that, if CSODs occur, they are only a result of wet weather.

6. **Discharge Prohibition III.F**. (Average dry weather flow not to exceed 43 MGD). This prohibition is retained from the previous permit, and is based on the design treatment capacity of the Plant. Exceedance of the design capacity may result in lowering the reliability of achieving compliance with effluent limitations.

7. **Discharge Prohibition III.G**. (CSOs are prohibited). CSOs, as opposed to CSODs, are unauthorized discharges from the combined sewer system. This prohibition is necessary because CSOs result in the release of untreated sewage.

8. **Discharge Prohibition III.H**. (Discharge of municipal or industrial sludge to the ocean is prohibited). This prohibition implements Ocean Plan discharge prohibition III.H.3.

9. **Discharge Prohibition III.J**. (Degradation of harvestable shellfish resulting from dry weather discharges is prohibited). This prohibition is retained from the previous permit and implements Ocean Plan discharge prohibition II.B.2.

B. Technology-Based Effluent Limitations

1. Scope and Authority

a. CWA section 301(b) requires USEPA to develop secondary treatment standards for publicly owned wastewater treatment facilities. These standards implement the level of effluent quality attainable through application of secondary or equivalent treatment. USEPA promulgated technology-based effluent guidelines for POTWs at 40 CFR §133. These Secondary Treatment Regulations include the following minimum requirements, which apply to the Plant during dry weather.

Table F-9. Secondary Treatment Requirements

Parameter	30-Day Average Limitation	7-Day Average Limitation
BOD_5 (1)	30 mg/L	45 mg/L
$CBOD_5$ (2)	25 mg/L	40 mg/L
TSS (1)	30 mg/L	45 mg/L
pH	6.0 – 9.0	

(1) The 30-day average percent removal shall not be less than 85 percent.
(2) At the option of the permitting authority, these effluent limitations for $CBOD_5$ may be substituted for BOD_5 limitations.

b. The USEPA Combined Sewer Overflow Control Policy establishes the technology based requirements for combined sanitary sewer systems, which requires implementation of the Nine Minimum Controls. Related requirements are included in section VI.C.6.b. of this Order.

2. Applicable Technology-Based Effluent Limitations

This Order retains the following technology-based effluent limitations, applicable to discharges at Discharge Point 001 during dry weather, as determined at Monitoring Location EFF-001.

a.. **Compliance with limits.** The Discharger shall comply with the following effluent limitations shown in Table F-10.

Table F-10. Technology-based Effluent Limitations – Discharge Point 001

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
BOD_5 @ 20°C	mg/L	30	45	---	---	---
TSS(1)	mg/L	30	45	---	---	---
pH	Standard units	---	---	9.0	6.0	9.0

The pH requirement is retained from the previous permit and is established by USEPA's Secondary Treatment Regulations at 40 CFR Part 133 and by Ocean Plan Table A.

b. Percent Removal. Based on Secondary Treatment Regulation at 40 CFR §133.102 and 133.103 and previous permit limits the average monthly percent removal of BOD_5 at 20°C and TSS shall not be less than 85%.

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

CWA section 301(b) and section 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards. This Order contains requirements, expressed as a technology equivalence requirement, more stringent than secondary treatment requirements that are necessary to meet applicable water quality standards.

Section 122.44(d)(1)(i) mandates that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs when necessary is intended to protect the designated uses of the receiving water as specified in the Basin Plan, and achieve applicable water quality objectives and criteria that are contained in the Ocean Plan.

2. Minimum Initial Dilution

In accordance with the Ocean Plan, water quality-based effluent limits reflect the minimum initial dilution of the effluent as it reaches the receiving water. The minimum initial dilution can be estimated by experimental observation and computer simulation. The reasonable potential calculation for this Order is based on a dilution ratio of 150:1. This is based on an updated dilution model submitted by the Discharger that averaged UM3 and NRFIELD results and utilized averaged oceanographic data from 1988. If the Discharger provides new information to use with new dilution modeling (see provision VI.C.2.b of this Order), any new results based on updated oceanographic data may be considered for the next permit reissuance.

3. Determining the Need for WQBELs

This Order is based on a reasonable potential analysis based on procedures described in Ocean Plan Section III.C and Ocean Plan Appendix VI to determine the need for WQBELs. In general, the procedure is a statistical method that evaluates an effluent data set while taking into account the averaging period of water quality objectives, the long term variability of pollutants in the effluent, limitations associated with sparse data sets, and uncertainty associated with censored data sets. The procedure assumes a lognormal distribution of the effluent data set and compares the 95th percentile concentration at 95 percent confidence for each pollutant in Ocean Plan Table B, accounting for dilution, to the applicable water quality criterion in Ocean Plan Table B. The reasonable potential analysis results in one of three endpoints.

Endpoint 1 – There is “reasonable potential,” and a WQBEL and monitoring are required.

Endpoint 2 – There is no “reasonable potential.” A WQBEL is not required, but monitoring may be required.

Endpoint 3 – The analysis is inconclusive. There are less than 3 detects or more than 80% of samples are non-detect. Any existing WQBEL is retained, and monitoring is required.

The Ocean Plan reasonable potential analysis involves five paths:

a. First Path

If available information about the receiving water or the discharge supports a finding of reasonable potential without analysis of effluent data, the permitting authority may decide that WQBELs are necessary after a review of such information. Such information may include the facility or discharge type, solids loading, lack of dilution, history of compliance problems, potential toxic effects, fish tissue data, 303(d) status of the receiving water, presence of threatened or endangered species or their critical habitat, or other information.

b. Second Path

If any pollutant concentration, adjusted to account for dilution, is greater than the most stringent applicable water quality criterion, there is reasonable potential for that pollutant to cause or contribute to exceedances of water quality standards, and a WQBEL is required.

c. Third Path

If the effluent data contains three or more detected and quantified values (i.e., values that are at or above the Minimum Level [ML]), and all values in the data set are at or above the ML, a parametric reasonable potential analysis is conducted to project the range of possible effluent values. The 95th percentile concentration is determined at 95 percent confidence for each pollutant, and compared to the most stringent applicable criterion to determine reasonable potential. A parametric analysis assumes that the range of possible effluent values is distributed lognormally. If the 95th percentile value is greater than the most stringent applicable criterion, there is reasonable potential for that pollutant to cause or contribute to exceedances of water quality standards and a WQBEL is required.

d. Fourth Path

If the effluent data contains three or more detected and quantified values (i.e., values that are at or above the ML), but at least one value in the data set is less than the ML, a parametric reasonable potential analysis is conducted according to the following steps.

(1) If the number of censored values (those expressed as a “less than” value) account for less than 80 percent of the total number of effluent values, calculate the M_L (the mean of the natural log of transformed data) and S_L (the standard deviation of the natural log of transformed data) and conduct a parametric reasonable potential analysis, as described above for the Third Path.

(2) If the number of censored values account for 80 percent or more of the total number of effluent values, conduct a non-parametric reasonable potential anlaysis, as described below for the Fifth Path. (A non-parametric analysis becomes necessary when the effluent data are limited, and no assumptions can be made regarding its possible distribution.)

e. Fifth Path

A non-parametric reasonable potential analysis is conducted when the effluent data set contains less than three detected and quantified values, or when the effluent data set contains three or more detected and quantified values but the number of censored values account for 80 percent or more of the total number of effluent values. A non-parametric analysis is conducted by ordering the data, comparing each result to the applicable criterion, and accounting for ties. The sample number is reduced by one for each tie, when the dilution-adjusted method detection limit (MDL) is greater than the criterion. If the adjusted sample number, after accounting for ties, is greater than 15, the pollutant has no reasonable potential to exceed the water quality standards. If the sample number is 15 or less, the analysis is inconclusive, monitoring is required, and any existing effluent limits in the expiring permit are retained.

4. Reasonable Potential Analysis

Table F-11 presents results of the reasonable potential analysis. Data used for this analysis are from October 2003 to December 2007 for most inorganics, and from November 2003 to November 2007 for most organics. A dilution of 150:1 was assumed as explained above. The analysis was performed in accordance with Ocean Plan procedures. The endpoint for each criterion is identified. Results show "reasonable potential" for mercury, and as a result, this Order establishes an effluent limitation for mercury. An effluent limit is retained for chronic toxicity because monitoring under the previous permit showed toxicity levels close to the limit.

As shown in the table, the reasonable potential analysis commonly resulted in Endpoint 3, meaning that the analysis is inconclusive, when a majority of the effluent data is reported as ND (not detected). In these circumstances, the "inconclusive" result is an indication of no concern for a particular pollutant; however, continued monitoring is required during the term of the permit.

a. TCDD Equivalents. The calculations to complete a reasonable potential analysis for TCDD equivalents were more complicated than the analysis for other individual pollutants since each sample is analyzed for 16 congeners (Attachment E Section IV.A). For each of the 18 samples (collected between March 2003 and November 2007) the TCDD equivalent of each congener was calculated. When a congener was identified as DNQ (detected but not quantified), then the detection limit value was used in determining the TCDD equivalent for that sample. For each congener in each sample, the TCDD equivalent was calculated using the TEF and BEF as described in Attachment A TCDD equivalents. To determine the TCDD equivalent for each sample, the TCDD equivalents of each congener in that sample were summed.

The State Water Board has developed a reasonable potential calculator (RPcalc 2.0) for use with the Ocean Plan. The use of this program is described at http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/trirev/stakeholder050505/rphelp20.pdf The calculator is available at the State Water Board's web site: www.waterboards.ca.gov/plnspols/docs/oplans/rpcalc.zip. The calculator was used to determine the need for TCDD equivalents limits in this Order.

To determine the upper 95th upper confidence bound for the 95th percentile the TCDD equivalent value for the set of 18 samples, the TCDD equivalent value for each sample, or zero for samples with no congeners detected, was entered into the RPcalc program. The results, using a dilution ratio of 76:1, showed no reasonable potential for TCDD equivalents. Therefore, there would also be no reasonable potential assuming 150:1 dilution.

b. Chronic Toxicity. The reasonable potential analysis shown in Table F-11 does not show reasonable potential for chronic toxicity when accounting for at least 150:1 dilution; however, USEPA finds reasonable potential by the first path identified above because monitoring data collected during the term of the previous permit showed chronic toxicity at levels close to the limit and because similar excursions could occur in the future.

c. Total Chlorine Residual. On May 17, 1989, the Regional Water Board adopted Order No. 89-71, amending Order No. 88-106 to delete disinfection requirements for the effluent. The Regional Water Board action was based on the Discharger's technical report dated April 3, 1989, *Wastefield Transport and Bacteriological Compliance Studies of the San Francisco Ocean Outfall*. The studies were conducted in 1987 and 1988. The findings indicated that the non-disinfected wastewater discharge from the Discharge Point 001 did not violate the Ocean Plan bacteriological body-contact standards. There is no disinfection of the effluent and thus no potential for disinfectant residuals or by-products, for example from chlorine, to impact the effluent.

Table F-11. Reasonable Potential Analysis Results for the Discharge Point 001

Table B Pollutant	Most Stringent WQO (µg/L)(1)	No. of Samples	No. of Non-Detects	Max Effluent Conc. (µg/L)	Result, Comment
Objectives for Protection of Marine Aquatic Life					
Ammonia	600	93	0	44	Endpoint 2
Arsenic	8	51	34	5.9	Endpoint 2
Cadmium	1	51	32	1.9	Endpoint 2
Chlorinated Phenolics	1	15	15	ND	Endpoint 3
Chromium (VI)	2	72	42	5.4 (DNQ)	Endpoint 2
Acute Toxicity	0.3(6)				Endpoint 2
Chronic Toxicity	1(2)	53	22	50	Endpoint 3(4) **Effluent Limit** and monitoring
Copper	3	51	0	70	Endpoint 2
Cyanide	1	52	9	6.8	Endpoint 2
Endosulfan (total)	0.009	18	18	ND	Endpoint 2
Endrin	0.002	18	18	ND	Endpoint 2
HCH	0.004	18	18	ND	Endpoint 2
Lead	2	51	20	8.6	Endpoint 2
Mercury	0.04	53	0	12	Endpoint 1 –**Effluent limit** and monitoring
Nickel	5	51	3	7.2	Endpoint 2
Non-chlorinated Phenolics	30	15	14	5.0	Endpoint 3
Radioactivity(3)	-	9	3	37	Endpoint 2
Selenium	15	51	37	1.8	Endpoint 2
Silver	0.7	51	21	3.8	Endpoint 2
Total Chlorine Residual	2	0	0	0(5)	Endpoint 2
Zinc	20	51	0	146	Endpoint 2
Objectives for Protection of Human Health – Noncarcinogens					
1,1,1-Trichloroethane	540000	20	20	ND	Endpoint 2
2,4-Dinitrophenol	4.0	15	14	5.0	Endpoint 3

Table B Pollutant	Most Stringent WQO (µg/L)(1)	No. of Samples	No. of Non-Detects	Max Effluent Conc. (µg/L)	Result, Comment
2-Methyl-4,6-Dinitrophenol	220	15	15	ND	Endpoint 3
Acrolein	220	12	11	22	Endpoint 3
Antimony	1200	18	17	0.94	Endpoint 2
Bis(2-Chloroethoxy)Methane	4.4	15	15	ND	Endpoint 3
Bis(2-Chloroisopropyl)Ether	1200	15	15	ND	Endpoint 3
Chlorobenzene	570	20	18	0.44	Endpoint 2
Chromium (III)	190000	51	30	5.4	Endpoint 2
Dichlorobenzenes	5100	19	13	1.2	Endpoint 2
Diethyl Phthalate	33000	15	14	0.47	Endpoint 3
Dimethyl Phthalate	820000	15	15	ND	Endpoint 3
Di-n-Butyl Phthalate	3500	15	15	ND	Endpoint 3
Ethylbenzene	4100	20	16	0.64	Endpoint 2
Fluoranthene	15	17	17	ND	Endpoint 2
Hexachlorocyclopentadiene	58	15	15	ND	Endpoint 3
Nitrobenzene	4.9	15	15	ND	Endpoint 3
Thallium	2	18	18	ND	Endpoint 2
Toluene	85000	20	8	1.6	Endpoint 2
Tributylin	0.0014	17	16	0.008	Endpoint 2
Objectives for Protection of Human Health – Carcinogens					
1,1,2,2-Tetrachloroethane	2.3	20	20	ND	Endpoint 2
1,1,2-Trichloroethane	9.4	20	20	ND	Endpoint 2
1,1-Dichloroethylene	0.9	20	20	ND	Endpoint 2
1,2-Dichloroethane	28	20	19	0.08	Endpoint 2
1,2-Diphenylhydrazine	0.16	15	15	ND	Endpoint 3
1,3-Dichloropropylene	8.9	20	20	ND	Endpoint 2
1,4 Dichlorobenzene	18	19	13	0.84	Endpoint 2
TCDD Equivalents	3.9E-9	18	3	1.8E-09	Endpoint 2
2,4,6-Trichlorophenol	0.29	15	15	ND	Endpoint 3
2,4-Dinitrotoluene	2.6	15	15	ND	Endpoint 3
3,3'-Dichlorobenzidine	0.0081	15	15	ND	Endpoint 3
Acrylonitrile	0.10	13	13	ND	Endpoint 3
Aldrin	2.2E-5	18	18	ND	Endpoint 2
Benzene	5.9	20	20	ND	Endpoint 2
Benzidine	6.9E-5	15	15	ND	Endpoint 3
Beryllium	0.033	18	17	0.086	Endpoint 2
Bis(2-Chloroethyl)Ether	0.045	15	15	ND	Endpoint 3
Bis(2-Ethylhexyl)Phthalate	3.5	15	15	ND	Endpoint 3
Carbon Tetrachloride	0.90	17	17	ND	Endpoint 2
Chlordane	2.3E-5	18	18	ND	Endpoint 2
Chlorodibromomethane	8.6	20	19	0.95	Endpoint 2
Chloroform	130	20	5	9.8	Endpoint 2
DDT (total)	0.00017	18	18	ND	Endpoint 2
Dichlorobromomethane	6.2	18	13	0.65	Endpoint 2
Dieldrin	0.00004	18	18	ND	Endpoint 2
Halomethanes	130	19	14	0.66	Endpoint 2
Heptachlor	0.00005	18	18	ND	Endpoint 2
Heptachlor Epoxide	0.00002	18	18	ND	Endpoint 2
Hexachlorobenzene	0.00021	15	15	ND	Endpoint 3

Table B Pollutant	Most Stringent WQO (µg/L)[1]	No. of Samples	No. of Non-Detects	Max Effluent Conc. (µg/L)	Result, Comment
Hexachlorobutadiene	14	15	15	ND	Endpoint 3
Hexachloroethane	2.5	15	15	ND	Endpoint 3
Isophorone	730	15	15	ND	Endpoint 3
Methylene Chloride	450	20	14	1.6	Endpoint 2
N-Nitrosodimethylamine	7.3	15	15	ND	Endpoint 3
N-Nitrosodi-n-Propylamine	0.38	15	15	ND	Endpoint 3
N-Nitrosodiphenylamine	2.5	15	15	ND	Endpoint 3
PAHs (total)	0.0088	20	18	0.0083	Endpoint 2
PCBs	1.9E-5	18	18	ND	Endpoint 2
Tetrachloroethylene	2.0	20	9	8.4	Endpoint 2
Toxaphene	0.00021	18	18	ND	Endpoint 2
Trichloroethylene	27	20	20	ND	Endpoint 2
Vinyl Chloride	36	20	19	1.3	Endpoint 2

Table notes

(1) Ocean Plan Table B Water Quality Objectives limiting concentrations are 6-month median values.
(2) Chronic toxicity is based on a daily maximum.
(3) Measured in pCi/L, radioactivity not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the CCR§30253.
(4) Reasonable Potential was not found by calculation but was an issue in the previous permit and effluent limits retained, also monitoring is required in the Ocean Plan (Section III.C.c.(4))
(5) Chlorine is not added to the effluent for disinfection, or any other purpose, and there is no monitoring for residual chlorine
(6) The Ocean Plan does not require monitoring for acute toxicity and previous monitoring did not show reasonable potential.

- NA indicates that effluent data is not available.
- ND indicates that the pollutant was not detected.

5. WQBEL Calculations

As described by Section III. C of the Ocean Plan, Effluent limits for Table B pollutants that show reasonable potential are calculated according to the following equation.

$$Ce = Co + Dm\,(Co - Cs)$$

Where

Ce = the effluent limitation (µg/L)

Co = the concentration (the water quality objective) to be met at the completion of initial dilution (µg/L).

Cs = background seawater concentration (µg/L)

Dm = minimum probable initial dilution expressed as parts seawater per part wastewater

a. Mercury

The reasonable potential analysis showed reasonable potential for mercury because the maximum monthly average mercury concentration in the effluent was 12 µg/L, which when accounting for dilution of 150:1, results in a concentration of 0.08 µg/L, which is above the six-month median water quality objective of 0.04 µg/L. Therefore, this Order establishes mercury WQBELs as described below:

Co (6-month median) = 0.04 µg/L
Co (daily maximum) = 0.16 µg/L
Dm = 149 (based on a dilution of 150:1)
Cs = 0.0005 µg/L (based on Ocean Plan Table C)

Ce (6-month median) = Co (6-month median) + Dm (Co – Cs) = 5.9 µg/L
Ce (daily maximum) = Co (daily maximum) + Dm (Co – Cs) = 24 µg/L

b. Chronic Toxicity

The reasonable potential analysis using the Ocean Plan calculation method did not show reasonable potential for chronic toxicity (accounting for at least 150:1 dilution); however, USEPA finds reasonable potential because monitoring under the previous permit showed chronic toxicity at levels close to the limit and since similar excursions may occur that limit is retained in this Order. A chronic toxicity WQBEL may be calculated as follows:

Co (daily maximum) = 1.0 TUc
Dm = 149 (based on a dilution of 150:1)
Cs = 0 TUc (based on Ocean Plan Table C)
Ce (daily maximum) = Co (daily maximum) + Dm (Co – Cs) = 150 TUc

6. Anti-Backsliding/Antidegradation

Most effluent limitations established by this Order are at least as stringent as limitations in the previous permit; and therefore, CWA anti-backsliding requirements are not triggered. As for acute toxicity, monitoring required under the previous permit did not show any reasonable potential. Also, the Ocean Plan does not require acute toxicity limits for this type of discharge, but does require monitoring and an effluent limit for chronic toxicity. Thus, this permit does not contain an acute toxicity limit but does require continued monitoring, and it imposes a chronic toxicity limit.

As for chronic toxicity, the new limit is higher than the limit in the previous permit; however, this is permissible under anti-backsliding regulations. Although the permittee did not exceed the chronic toxicity limit in the previous permit, the previous permit allowed the removal of ammonia prior to chronic toxicity testing. This Order does not allow removal of ammonia prior to toxicity testing because ammonia may contribute to toxicity in the receiving water. Accordingly, the Discharger's toxicity monitoring requirements have been modified. Data provided by the Discharger indicate that a chronic toxicity limit of 76 cannot consistently be met without ammonia removal. Therefore, this Order applies the new dilution factor of 150:1 to calculate the chronic toxicity limit and relies on the backsliding exceptions under CWA Sections 402(o)(2)(B)(i) and 402(o)(2) (E), and 40 CFR 122.44(l)(2)(b)(1) and 122.44(l)(2)(i)(E).

Because this Order does not authorize an increased rate of discharge or increased pollutant loadings to receiving waters, the antidegradation requirements of 40 CFR 131.13 and State Water Board Resolution No. 68-16 are also satisfied.

D. Land Discharge Specifications

Not Applicable.

E. Reclamation Specifications

Not Applicable.

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

This Order is designed to minimize the influence of the discharge on the receiving water. Ocean Plan Section II serves as the basis for the receiving water limitations specified in Section V.A of the Order. These limits are needed to ensure that the receiving water complies with Ocean Plan water quality objectives and therefore protects beneficial uses.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

NPDES regulations at 40 CFR 122.48 require that all NPDES permits specify requirements for recording and reporting monitoring results. CWC §13267 and §13383 authorize the Regional Water Board to require technical and monitoring reports. In addition, the Ocean Discharge Criteria (40 CFR Part 125, subpart M) authorize actions necessary to prevent unreasonable degradation of the marine environment. The Monitoring and Reporting Program (MRP), Attachment E, establishes monitoring and reporting requirements to implement federal and State requirements. The rationale for the monitoring and reporting requirements contained in the MRP for this facility is presented below.

A. Influent Monitoring

In general, influent monitoring requirements are unchanged from the previous permit. Influent monitoring requirements for BOD_5 and TSS are necessary to determine compliance with this Order’s 85 percent removal requirement. Influent monitoring for tributyltin and TCDD equivalents are no longer required because previous monitoring has provided for characterization of these pollutants in influent wastewater.

The influent monitoring location remains unchanged, but this Order revises its name for consistency with other NPDES permits in California.

B. Effluent Monitoring

In general, effluent monitoring requirements for discharges from Discharge Point 001 are retained from the previous permit, with the following exceptions:

- Monitoring for toxic pollutants has been updated to reflect the most recent list of pollutants in Ocean Plan Table B.
- Monitoring for mercury is required one time per month to determine compliance with new mercury effluent limitations.
- The monitoring frequency for chronic toxicity has been set at once per quarter. Monitoring data collected each month during the term of the previous permit showed results consistently below effluent limitations.

The effluent monitoring location for Discharge Point 001 has not changed; however, its name has been changed from E-007 to EFF-001, for consistency with other NPDES permits in California.

Monitoring requirements for discharges at a representative CSOD outfall are retained from the previous permit. However, this Order establishes an additional requirement to monitor for the Table B pollutants not currently monitored at this outfall to further characterize these discharges for future reasonable potential analysis.

C. Whole Effluent Toxicity Testing Requirements

The Discharger is required to conduct chronic toxicity tests as described in the MRP (Attachment E) using the Echinoderm Embryo Development test in accordance with the USEPA approved method in 40 CFR 136 (currently *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms*, August 1995).

The Discharger performed a screening phase study prior to the expiration of the previous permit for the most sensitive West Coast marine species. The results of this study indicated that the giant kelp germination and growth test was the most sensitive, but suggested the test was variable in part due to the availability and quality of field-collected organisms, and suggested the use of the echinoderm embryo development test because gravid species of two alternate echinoderms, the sand dollar and the purple urchin, could alternately be obtained year-round.

This Order retains the requirement to conduct chronic toxicity monitoring with the echinoderm embryo development test and requires the Discharger to re-screen for the most sensitive species once during the term of this Order.

D. Receiving Water Monitoring

Receiving water monitoring is necessary to ensure compliance with the receiving water limits specified in Section V.A of the Order. Requirements to monitor bacteria in shoreline receiving waters and to conduct recreational use surveys, in the Provisions of the Order, Section VI.6.(9), during and immediately after CSOD events are retained from the previous permit. The monitoring requirements in MRP (Attachment E) sections IV, VIII, and X are sufficient to characterize receiving water quality.

E. Other Monitoring Requirements

Requirements of the Southwest Ocean Outfall Offshore Monitoring Program are retained from the previous permit to determine the effect of the discharge on sediment quality in the vicinity of the outfall and to determine whether pollutants are bioaccumulating in fauna. The program includes monitoring at 45 locations, including 24 reference locations that are unaffected by the discharge. Monitoring includes chemical and physical analysis of sediment, analysis of the benthic (bottom) community, and analysis of fish and macroinvertebrate species collected by trawling.

1. Offshore Monitoring Program History

In 1986, the Southwest Ocean Outfall was completed to transport primary treated wastewater from the Richmond-Sunset Plant, which was replaced in 1993 by the Oceanside Plant. Monitoring conducted from 1986 to 1996 indicated that a single reference location was inadequate to fully characterize background conditions and to determine whether observed differences between monitoring locations were attributable to natural variation or to the discharge. These early studies also showed that the season or time of year had the greatest impact on study results, and that the relatively close proximity of the Southwest Ocean Outfall to the mouth of the San Francisco Bay confounded interpretation of monitoring results due to the effects of outflow near the Golden Gate.

Following collaboration between the Discharger and USEPA, when the Discharger's permit was reissued in 1997, the study area was expanded to include multiple reference sites, and monitoring frequency was reduced to once per year, in the Fall. In the permit, seven fixed monitoring sites were retained, and an additional 40 monitoring locations were added using USEPA's Environmental Monitoring Assessment Program (EMAP) random sample site selection process. The expanded study area included reference locations in the Gulf of the Farallones and the Monterey Bay National Marine Sanctuaries.

In 2002, additional benthic monitoring locations, south of the discharge pipe, were included in the program to investigate whether the pipe structure itself was affecting benthic infauna abundance through an induced reef affect. When the Discharger's permit was reissued in 2003, the number of required trawls was reduced from eight to two, following observation of no differences among mobile organisms between outfall and reference locations, and in an effort to reduce mortality of collected organisms. At that time, some sediment monitoring locations were also removed from the program because they were found to be inconsistent with the rest of the study area.

As stated in Order No. R2-2003-0073, "This program will be implemented dynamically to maximize the amount of relevant and useful data that can be gathered within the five-year permit life by allowing the EPA, the Regional Water Board, and the City and

County of San Francisco to agree to program corrections in response to ongoing analyses of monitoring data."

2. Monitoring Results from Previous Permit

In January 2006, the Discharger submitted the most recent summary report covering the years from 1997 through 2004. The report indicates no adverse trends in sediment characteristics as a result of the discharge. The mean particle sizes at the outfall area have not changed since pre-construction and pre-discharge periods, which suggests that the Southwest Ocean Outfall does not affect sediment grain size distribution. Additional data collected in 2005 and 2006 show that the outfall area continues to reflect pre-construction and pre-discharge sediment grain size distribution.

Chemical analysis for total solids; total volatile solids; total organic carbon; total Kjeldahl nitrogen; organic pollutants, such as PAHs, PCBs, and DDTs; and trace metals were used to assess the chemical quality of the sediment. Total volatile solvent measurements correlated with areas with high fractions of silt and clay, while total organic carbon and total Kjeldahl nitrogen results correlated with areas of fine sand. All three parameters are historically highest in the northern reference region, indicating little influence of the Southwest Ocean Outfall discharge on these parameters. Sediment chemical quality data collected in 2005 and 2006 indicate that reference stations exceeded tolerance bounds derived from previous monitoring data for percent silt and clay and total organic carbon, but outfall areas were within tolerance bounds for all constituents.

PAH contaminants were present in the sediments prior to discharge and, over the 8 years of measurements, appear to be transitory and affected by sediment movement via currents and winter storms. Concentrations were compared to the Effects Range Medium (ERM) of Sediment Quality Guidelines, which are concentrations of individual compounds that demonstrate the 50% probability of toxic effects. No ERM values for any individual PAH, PCB, or DDT were exceeded during the eight year period. Trace metal analysis of the sediment resulted in consistent exceedances of the ERM values for nickel during the eights years of monitoring; however, nickel occurs naturally in large amounts in the San Francisco Bay area. Overall, the sediment data for the eight years between 1997 an 2004 indicate that the Southwest Ocean Outfall discharge has not negatively affected sediment quality. In 2005, concentrations of 18 PAHs and three PCBs were detected throughout the study area, and total DDTs were detected at three stations. One DDT and 18 PAH compounds were detected in the sediment in 2006. Cadmium, nickel, zinc, and selenium were significantly lower at outfall stations in 2005 over the 2004 results, while nickel concentrations were elevated at all stations in the study area in 2005 and 2006, similar to previous years. Arsenic, selenium, and silver were significantly higher at outfall stations in 2006 versus 2005, while aluminum and mercury were significantly lower at outfall stations in 2006 versus 2005.

The trend of the benthic community analysis over the eight year period indicated that community abundance was more affected by climate than by the discharge, because decreases in abundance correlated with reduced upwelling of the California Current, associated with oceanographic events like El Niño. Analyses of demersal fish and epibenthic invertebrate communities for the eight year period did not indicate any apparent effects related to the Southwest Ocean Outfall and observed differences in species composition and abundance correlated with El Niño and La Niña events. Benthic infauna community abundance decreased in 2005 and 2006 to the lowest documented overall abundance for the previous ten years. The local upwelling index in 2004 through 2006 was lower than normal, and the sequential years of decreased summer current upwelling occurrences may be related to an overall increase in infauna abundance. Trawl organisms collected in 2005 and 2006 represented a general assortment of native species common to central California near-shore communities; however, the demersal fish community measures of abundance and diversity were at or below the lower tolerance bounds for the outfall location in 2006. Physical anomalies of collected species were similar in all the 2004, 2005, and 2006 sample events.

Samples were screened for physical anomalies, and tissues were analyzed for bioaccumulative substances. Overall organism conditions were similar between the outfall locations and reference locations. The English sole and the Dungeness crab were species selected for bioaccumulation analysis. Three DDTs, 11 PAHs, and 31 PCB congeners were detected in the liver and hepatopancreas tissues. PCB concentrations were statistically significantly higher in the livers of fish collected from the outfall area over those of fish collected in the reference area throughout the study years, and total PAHs frequently exceeded the screening value in all tissue types in organisms from both the reference and outfall areas. There were not any statistically significant trends in bioaccumulation in any organism from either the reference or outfall areas, nor any trends between organism tissue and sediment concentrations. Mercury levels in fish muscle and zinc concentrations in the fish liver at the outfall area were significantly greater than those sampled in the reference area; however, all concentrations were below the mercury screening value the Discharger chose for the purposes of the study (mercury 0.5 ppm wet weight, and zinc 1500 ppm wet weight). Total PAH concentrations above the screening value were detected in every tissue type (except for fish liver) at both the reference and outfall locations in 2005, and were detected above the screening value in fish liver in 2006. Trace metal concentrations in 2005 and 2006 were similar to previous years and were similar to California coastal organisms in other studies.

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with section 122.41, and additional conditions applicable to specified categories of permits in accordance with section 122.42, are provided in Attachment D to the Order.

Section 122.41(a)(1) and (b) through (n) establish conditions that apply to all State issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. Section 123.25(a)(12) allows the state to omit or modify conditions to impose more stringent requirements. In accordance with section 123.25, this Order omits federal conditions that address enforcement authority specified in sections 122.41(j)(5) and (k)(2) because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code section 13387(e).

B. Monitoring and Reporting Program

The rationale for these requirements is described in Section VI, above and in Attachment G, Regional Standard Provisions and Monitoring Requirements for NPDES Wastewater Discharge Permits, July 2009.

C. Special Provisions

1. Reopener Provisions

These provisions are based on 40 CFR Part 123 and allow future modification of this Order and its effluent limitations as necessary.

2. Special Studies, Technical Reports and Additional Monitoring Requirements

a. Combined Sewage Collection System Overflow Study

The combined sewer system commingles storm water and domestic and industrial sewage. Heavy storm events can potentially result in flows that exceed the collection system capacity, at least in some areas. Although all overflows would be captured by the collection system at another point and not be discharged to surface waters, the presence of storm water and sewage on and around streets and sidewalks where human exposure could occur would constitute a nuisance as defined by CWC §13050. Such nuisances are prohibited by Regional Standard Provisions, and Monitoring and Reporting Requirements for NPDES Wastewater Discharge Permits (Attachment G). The purpose of this study is to determine whether nuisance conditions occur during wet weather and, if so, the extent to which they occur and what can be done to minimize or eliminate them.

b. Dilution Model Update and Stratification Data Collection

The available ambient data to determine stratification for the purposes of dilution modeling for this discharge is out-dated and incomplete. This provision requires the Discharger to submit updated data during the next permit reissuance to support new findings related to the most appropriate dilution allowance.

3. Best Management Practices and Pollution Prevention

The provision to continue implementation of a Pollutant Minimization Program is retained from the previous permit and is based on Ocean Plan Section C.9. The provision for pollution prevention is also required as one of the Nine Minimum Controls for combined sewer systems, described in under item 6, below.

4. Construction, Operation, and Maintenance Specifications

a. Wastewater Facilities, Review and Evaluation, and Status Reports

This provision is retained from the previous permit.

b. Operations and Maintenance (O&M) Manual, Review and Status Reports

This provision is based on 40 CFR Part 122 and is retained from the previous permit.

c. Contingency Plan, Review, and Status Reports

This provision is required by Regional Water Board Resolution No. 74-10 and 40 CFR Part 122, and is retained from the previous permit.

5. Special Provisions for Municipal Facilities

a. Pretreatment Program Requirements. This provision requires the Discharger to implement and enforce its approved pretreatment program in accordance with federal pretreatment regulations at 40 CFR Part 403.

b. Sludge Management Practices Requirements. This provision is based on the Basin Plan Chapter IV, Section 14.17, and 40 CFR Parts 257 and 503.

6. Combined Sewer Overflow Control Policy Requirements

The requirements of this provision specify performance criteria for operating the Combined Sewer System under wet weather controls, and are retained from the previous permit. The USEPA *Combined Sewer Overflow Control Policy* (59 FR 18688) regulates the operation of combined sewer systems. The Discharger has designed, constructed, and implemented control and treatment strategies that effectively address wet weather flow conditions, including treatment for 100% of the combined effluent.

The requirements of the USEPA *Combined Sewer Overflow Control Policy* are summarized below:

a. CSO Operation Plan. The Operation Plan is required as part of the Nine Minimum Controls and is revised as necessary to include the long term controls implemented in the long term control plan. This Order retains a provision to revise and update this Plan.

b. Nine Minimum Controls. The Combined Sewer Overflow Control Policy requires "Nine Minimum Controls" to satisfy the CWA technology-based requirements regarding CSOs. These are specifically stated in the provisions of this Order (Section VI.C.6.b) and described generally below .

(1) Conduct proper operations and regular maintenance programs. This control includes a requirement for continuing development and implementation of an Operations Plan.

(2) Maximize use of the collection system for storage. This control refers specifically to the sewer lines, which provide 2.2 million gallons of storage.

(3) Review and modify pretreatment program. This control is intended to minimize the impacts of non-domestic discharges.

(4) Maximize flow to the Plant. Maximizing flow to the Plant maximizes the volume of combined sewer flow treated.

(5) Prohibit CSOs during dry weather. The CWA prohibits CSOs during dry weather, and that prohibition is implemented as one of the Nine Minimum Controls.

(6) Control solid and floatable materials in the CSOs. The control of solids and floatable material is implemented via a baffle system within the combined sewer system and removal of the collected solids captured in the storage/transports.

(7) Develop and implement a Pollution Prevention Program. The Discharger is required to implement a Pollution Prevention Program, as described in section VI.C.3.a. of this Order.

(8) Notify the public of overflows. The Discharger's current notification process fulfills these requirements. The process includes permanent information signs at all beach locations around the perimeter of San Francisco. These signs inform the public in English, Spanish, and Chinese that international NO SWIMMING signs will be posted when it is unsafe to enter the water, and they warn users that bacteria concentrations may be elevated during periods of heavy rainfall. NO SWIMMING signs are posted at beach locations whenever an overflow occurs in the vicinity. These signs remain posted until water sampling indicates that bacteria concentrations have dropped below the level of concern for water contact recreation. Both signs reference the Discharger's toll-free water quality hotline (1-877-SFBEACH), which is updated weekly or whenever beach conditions change. The Discharger also provides color coded indicators (green/open; red/posted) of beach water quality conditions on the Internet (http://beaches.sfwater.org).

(9) Monitor to effectively characterize overflow impacts and the efficacy of CSOD controls. Monitoring requirements established by this Order include all of the Ocean Plan Table B toxic pollutants to better characterize the potential impacts of CSODs on the receiving water.

c. **Long-Term Control Plan.** In conformance with the *Combined Sewer Overflow Control Policy*, the Discharger developed a long-term control plan to select CSOD controls to comply with water quality standards, based on consideration of the Discharger's financial capability. The purpose of the long-term control plan is to fulfill the water quality-based requirements of the Clean Water Act. The Discharger's program is consistent with the USEPA *Combined Sewer Overflow Control Policy* Presumptive Approach, which presumes that an adequate level of control is provided to meet the water quality requirements of the CWA contingent upon the satisfaction of any of the following criteria: (1) no more than an average of four overflow events per year, provided that the permitting authority may allow up to two additional overflow events per year (for the purpose of this criterion, an overflow event is one or more CSOs as a result of a precipitation event that does not receive the minimum treatment provided below); (2) the elimination or capture for treatment of no less than 85 percent by volume of the combined sewage collected in the system during precipitation events on a system-wide annual average basis; or (3) the elimination or removal of no less than the mass of pollutants, identified as causing water quality impairment through the sewer system characterization, monitoring, and modeling effort, for the volumes that would be eliminated or captured for treatment under (2) above. Combined sewer overflow treatment shall be a minimum of primary clarification for removal of floatables and settleable solids, solids and floatables disposal, and if necessary to meet water quality standards, disinfection.

The Discharger will continue to implement the Long-Term Control Plan and will characterize combined sewer discharges and the efficacy of the Long-Term-Control-Plan controls through combined sewer discharge monitoring, a requirement that is carried over from the previous permit.

The CSODs are consistent with the requirements of the Presumptive Approach because the Discharger captures and provides treatment to 100 percent of the combined sewer flow, which is greater than the minimum treatment requirement of 85 percent specified under the Presumptive Approach, and results in zero untreated CSOs per year. The effluent is not disinfected because State Water Board Order No.79-16 concluded that allowing an average of eight CSODs per year from Ocean Plan requirements would serve the public interest and would not compromise beneficial uses of the receiving waters.

7. Sensitive Areas Feasibility Report for Overflows

Under the Combined Sewer Overflow Control Policy, the combined sewer discharge points for the Oceanside plant are located in a sensitive area where primary contact recreation occurs. Section II. C. 3 of the Combined Sewer Overflow Control Policy, “Consideration of Sensitive Areas,” states that the Discharger’s long-term combined sewer overflow control plan should:

a. Prohibit new or significantly increased overflows;

b. (1) Eliminate and relocate overflows that discharge to sensitive areas wherever physically possible and economically achievable, except where elimination or relocation would provide less environmental protection than additional treatment.

(2) Where elimination or relocation is not physically possible and economically achievable, or would provide less environmental protection than additional treatment, provide the level of treatment for remaining

overflows deemed necessary to meet WQS for full protection of existing and designated uses. In any event, the level of control should not be less than those described in Evaluation of Alternatives below; and

c. Where elimination or relocation has been proven not to be physically possible and economically achievable, permitting authorities should require, for each subsequent permit term, a reassessment based on new or improved techniques to eliminate or relocate, or on changed circumstances that influence economic achievability."

The Discharger is to submit a report, no later than two years after the effective date of this Order, implementing the "consideration of sensitive areas" section of the Combined Sewer Overflow Control Policy. At a minimum, the discharger is to assess techniques to eliminate or relocate CSODs to sensitive areas, and discuss the level of treatment for any remaining CSODs necessary to meet water quality standards.

VIII. PUBLIC PARTICIPATION

The Regional Water Board is considering the issuance of waste discharge requirements (WDRs) that will serve as a National Pollutant Discharge Elimination System (NPDES) permit for City and County of San Francisco Oceanside Water Pollution Control Plant and Collection System, including the Westside Wet Weather Facilities. As a step in the WDR adoption process, Regional Water Board staff has developed tentative WDRs. The Regional Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided an opportunity to submit their written comments and recommendations. Notification was provided through a public notice in the San Francisco Recorder during the time period June 8 to June 14, 2009.

Staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments must be submitted either in person or by mail or email to

Derek Whitworth
San Francisco Bay Regional Water Quality Control Board
1515 Clay St., Suite 1400
Oakland, CA 994612

Phone: 510 622 2349
Email: DWhitworth@waterboards.ca.gov

Written comments must be received at the Regional Water Board offices by 5:00 p.m. on July 6, 2009, to be given full consideration and to be fully responded to by Regional Water Board staff.

B. Public Hearings

The Regional Water Board will hold a public hearing on the tentative WDRs during its regular meeting on the following date and time and at the following location:

Date: August 12, 2009
Time: 9:00 a.m.
Location: Elihu Harris State Office Building
1515 Clay Street, 1st Floor Auditorium
Oakland, CA 94612

Interested persons are invited to attend. At this public hearing, the Regional Water Board will hear testimony, if any, on this Tentative Order.. Oral testimony will be heard; however, for accuracy of the record, important testimony should be in writing.

The Order may then be adopted by the Regional Water Board and USEPA at the subsequent hearing to be held on September 9, 2009, at the same time and place.

Please be aware that dates and venues may change. One can access the current agenda for any changes at: www.waterboards.gov/sanfranciscobay.

C. Waste Discharge Requirements Petitions

Any aggrieved person may petition the State Water Resources Control Board to review the decision of the Regional Water Board regarding the final WDRs. The petition must be submitted within 30 days of the Regional Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

D. Information and Copying

The Report of Waste Discharge, related documents, tentative effluent limitations and special provisions, comments received, and other information are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged by calling 510-622-2300.

E. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Regional Water Board, reference this facility, and provide a name, address, and phone number.

F. Additional Information

Requests for additional information or questions regarding this order should be directed to Derek Whitworth at 510-622-2349 or email DWhitworth@waterboards.ca.gov.

Appendix 1

Ocean Discharge Criteria Evaluation
NPDES Permit CA0037681
City and County of San Francisco
Oceanside Water Pollution Control Plant (Southwest Ocean Outfall)
Prepared by EPA, Region 9 Water Division
April 27, 2009

Background and Purpose

The purpose of this analysis is to provide supporting documentation for the EPA's evaluation of unreasonable degradation of the marine environment under Section 403 of the Clean Water Act (CWA) for the City and County of San Francisco's Oceanside draft permit. This draft permit is jointly proposed by the EPA and the State of California's San Francisco Bay Regional Water Quality Control Board (Water Board). This analysis applies to the discharge to Federal waters from the Southwest Ocean Outfall.

EPA Region 9 is proposing to comply with the CWA evaluation of unreasonable degradation for this discharge by applying State water quality standards contained in the California Ocean Plan (COP) to the discharge from the Southwest Ocean Outfall, with the exception of the pollutant TCDD equivalents (dioxin). In calculating NPDES permit limitations and conditions for dioxin for this discharge, EPA is using the COP numeric criterion for this pollutant, as well as the COP standard implementation procedures, such as dilution procedures. However, we are proposing to use additional, more recent scientific information that has not yet been considered for inclusion in the COP water quality standards, based on EPA's ocean discharge criteria regulations at 40 CFR 125.122(a). For the calculation of NPDES permit limitations for dioxin, we are proposing to use recently updated toxicity equivalency factors (TEFs), published by the World Health Organization in 2005, as well as the congener-specific bioconcentration equivalency factors (BEFs) used for the Great Lakes System. This approach to developing NPDES permit limits for dioxin was recommended in the "Bay Area Clean Water Agencies' Draft Dioxin Issue Paper: Expert Panel Response and Recommendations," dated April 4, 2008. It incorporates recent scientific information for dioxins on a congener-specific basis, while continuing to use the COP criterion and standards implementation procedures. Region 9's use of the TEFs and BEFs in the draft permit at this time does not constitute EPA endorsement of this approach in other situations.

Because we are proposing to supplement the State water quality standards with some additional information for dioxin, we have developed an analysis of the 10 factors under 40 CFR 125.122(a) to determine unreasonable degradation of the marine environment. The definition of unreasonable degradation of the marine environment in 40 CFR 125.121(e) states:

Unreasonable degradation of the marine environment means:

(1) Significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities,
(2) Threat to human health through direct exposure to pollutants or through consumption of exposed aquatic organisms, or
(3) Loss of esthetic, recreational, scientific or economic values which is unreasonable in relation to the benefit derived from the discharge.

The remainder of this evaluation discusses each of the 10 factors and describes our conclusion that the discharge of dioxin will not cause unreasonable degradation of the marine environment under the Federal regulations.

Evaluation of the Ten Ocean Discharge Criteria under 40 CFR 125.122(a)(1)-(10)

Factor 1: Quantities, Composition, and Potential for Bioaccumulation or Persistence of Pollutants to be Discharged

The quantities and composition of the discharge reflect the main source of dioxins to the plant influent, which appears to be stormwater collected in the combined sewer system. In addition to effluent monitoring, the prior NPDES permit for the Southwest Ocean Outfall required a sampling program to assess dioxin in the City's wastewater discharged to the ocean, and the discharger completed a City-wide dioxin monitoring and assessment report in 2000 (Rourke et. al., 2000). The City's combined sewer system commingles wastewater from homes and businesses with stormwater. The sampling results show that stormwater has significantly higher concentrations of dioxins than dry weather wastewater influent flowing to the plant.

Because all of the City's stormwater receives some level of treatment prior to discharge, the discharge of dioxin to the environment is less than would be expected in a similar community with separate storm sewers. In fact the City's monitoring report (Rourke et. al., 2000) estimated that the wastewater control facilities remove more than 80% of dioxin contained in all stormwater runoff from the City. Communities with separate storm sewers are not categorically required to provide treatment and therefore generally remove no dioxin from their stormwater.

According to the discharger's report, influent to the City's Southeast plant was significantly higher in dioxin on wet weather days than the influent to the Oceanside plant. The sampling report attributed this result to the fact that the service area for the Southeast plant is primarily industrial, so the eastern side of the City would be expected to have a heavier loading due to emissions from diesel engines and other combustion sources. Influent to the Southeast plant during wet weather was on average 35 pg/l TEQ. The report measured average untreated dry weather influent to the Oceanside plant as 1.3 pg/l TEQ, while the average influent during wet weather was 16 pg/l TEQ. At the Oceanside Plant, wet weather effluent (primary/secondary blend) averaged 1.7 pg/l TEQ, while dry weather effluent was less than 0.06 pg/l.

The quantities and composition of the dioxin discharge from the Southwest Ocean Outfall are fairly well characterized, as the discharger has monitored Southwest Ocean Outfall effluent for the dioxin congeners specified in the COP for over 10 years. However, because the detection levels for available quantitation methods (EPA method 1613 is typically used) are often one or more orders of magnitude higher than the water quality criterion, there is some scientific uncertainty associated with the analysis. Of the 18 sample points used to develop this draft permit, the sample taken on February 13, 2007 contained the highest measured level of TCDD equivalents at 1.35x10-7ug/l with the BEFs and TEFs applied, and 1.0x10-6 ug/l with only TEFs applied. On this day, 6 dioxin congeners were detected: 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8-HxCDF, 1,2,3,6,7,8-HxCDF, 2,3,4,6,7,8-HxCDF, OCDD, and OCDF. The most toxic congener, 2,3,7,8-TCDD, was not detected on any of the days. On most days, most of the congeners were not detected, with the exception of OCDD, which is the most commonly detected congener in the effluent.

Results from the dry weather effluent monitoring data required as a condition of the previous NPDES permit show levels of dioxin consistent with dry weather data from other wastewater treatment plants. Using EPA method 1613, the samples shows a majority of non-detect values, with the congener OCDD most commonly detected. The Water Board and EPA applied COP reasonable potential procedures to the dry weather effluent data, with the addition of updated TEF values and the use of the default Great Lakes BEF values. The result of the analysis was no reasonable potential for the discharge of dioxin to cause or contribute to a water quality exceedance, and thus a water quality-based effluent limitation for TCDD equivalents is not required.

Factor 1 also includes the potential for bioaccumulation or persistence. Dioxin is a bioaccumulative and persistent pollutant. The COP water quality criterion was developed to take this into account, and the BEFs quantify the bioaccumulative properties of each congener regulated under the COP. EPA and the Water Board appropriately considered the bioaccumulative properties of the dioxin congeners in the development of the proposed NPDES permit provisions. Additionally, the location of the outfall along with the diffuser ensures that mixing and dispersion occur, and thus it is unlikely that dioxin in the water column or sediments will build to levels expected to threaten human health due to the consumption of exposed aquatic organisms.

In summary, because the main source of dioxin to the Southwest Ocean Outfall discharge appears to be stormwater and because all the stormwater receives treatment, EPA believes the discharge of dioxin to the environment is less than that from other similar communities with separate storm sewers. While the introduction of dioxins continues to be of concern on a global scale, the dioxin contribution from the Southwest Ocean Outfall discharge is not likely to be a significant source in comparison to that from other urban communities.

Factor 2: Potential for Biological, Physical, or Chemical Transport

Biological transport could occur through the bioaccumulative properties of dioxin. This is taken into account by the COP criterion, as human health impacts through the consumption of aquatic organisms are the bases for the most limiting COP criterion for dioxin relevant to this discharge.

As is the case for many organic pollutants in wastewater, dioxin is associated with effluent suspended solids. Thus, physical transport can occur through the movement of sediment, as well as through the water column. The Westside Wet Weather Facilities treatment, which consists of solids settling, is effective in removing some dioxin from the discharge (Rourke et. al., 2000).

Because dioxins are persistent compounds that remain stable in the environment, chemical transport is not significant.

The Southwest Ocean Outfall discharges 3.4 to 3.6 nautical miles from the shore, which provides dilution, mixing, and dispersion of pollutants into the open ocean environment. These processes decrease the likelihood that dioxin concentrations in the water column or in sediment would build to levels of concern. The San Francisco Bay is listed as impaired for dioxins under section 303(d) of the CWA, but the receiving waters for the Southwest Ocean Outfall are not listed as impaired. The San Francisco Bay is surrounded by urban development, with more sources of dioxins and fewer opportunities for dispersion into the ocean than the Southwest Ocean Outfall discharge. A comparison of data from the San Francisco Bay's Regional Monitoring Program to sediment and fish tissue data collected as part of the prior NPDES permit's Southwest Ocean Outfall receiving water monitoring requirements concludes that organic pollutants in fish and sediments from San Francisco Bay were higher than those in fish and sediments on the coast (Melwani, undated).

Although the Southwest Ocean Outfall receiving water monitoring does not directly measure dioxins in the sediment and fish tissue of the receiving waters, analysis of bioaccumulative compounds such as mercury and PCBs, including dioxin-like PCBs, was conducted. Based on data collected over ten years, the discharger's analysis did not find any upward trends in the levels of bioaccumulative pollutants in sediments or fish tissue, or any differences between the outfall stations and the reference stations that would indicate an outfall effect (SFPUC, 2006). Thus, EPA does not believe the potential for biological, physical, or chemical transport will cause unreasonable degradation of the ocean environment.

Factor 3: Composition and Vulnerability of Biological Communities

The discharger has conducted benthic infauna community monitoring as well as trawl studies. Fishes collected in the study area represent a general assortment of native species common to central California near-shore waters, with occasional occurrences of species from warmer, southern waters. The biological communities in the vicinity of the discharge appear to be similar to those in other sandy bottom ocean environments off the coast of central California. Federally-listed species under the Endangered Species Act as well as Essential Fish Habitat species under the Magnuson-Stevens Fishery Conservation and Management Act occur in the vicinity of the discharge. EPA is in the process of informal consultation with NOAA Fisheries for this permit reissuance. EPA received a "not likely to adversely affect" determination from NOAA Fisheries for the last two re-issuances of this NPDES permit. Accordingly, EPA is unaware of any specific concerns regarding dioxin for species of concern in the vicinity of the discharge.

Factor 4: Importance of the Receiving Water to the Surrounding Biological Community

EPA is unaware of any unique habitat in the area of the discharge, such as spawning sites, kelp beds, or "hauling out" sites for marine mammals.

Factor 5: Existence of Special Aquatic Sites

The Monterey Bay National Marine Sanctuary (MBNMS) is located in the vicinity of the discharge. However, the Southwest Ocean Outfall discharge itself is not located within the sanctuary boundary. Instead, it is located within an exclusion zone that extends from off the north coast of San Mateo County and the City and County of San Francisco between Point Bonita and Point San Pedro (NOAA 1992, 1999a). Accordingly, the discharge from the Southwest Ocean Outfall is not expected to have a significant adverse effect on the MBNMS.

Factor 6: Potential Impacts on Human Health

As described in factor 10 below, the proposed NPDES permit is based on a water quality criterion for dioxin TEQ developed for the COP which considers the risk to human health from consuming fish and shellfish. Because dioxin congeners are persistent, bioaccumulative pollutants, the discharger will continue to monitor Southwest Ocean Outfall effluent for the presence of dioxin congeners. However, the reasonable potential analysis conducted using reasonable potential procedures developed for COP water quality objectives indicate that dioxin in the Southwest Ocean Outfall effluent has no reasonable potential to cause or contribute to the exceedance of the receiving water quality standard for dioxin.

Factor 7: Recreational and Commercial Fisheries

Recreational and commercial fishing is common in the Pacific Ocean right outside the San Francisco Bay. For this reason, the discharger has been monitoring sediments and fish tissue for bioaccumulative pollutants for over 10 years as part of the Southwest Ocean Outfall monitoring program. No significant outfall effects or upward trends in pollutant concentrations have been found.

Factor 8: Coastal Zone Management Plan

The California Coastal Zone Management Plan (CZMP) incorporates the COP. Because the COP implements water quality standards for dioxin in the Southwest Ocean Outfall discharge, the COP contains the most relevant and specific CZMP requirements. As previously stated, this draft permit proposes to implement the COP criteria and policies, including the policy on dilution, with the addition of the application of TEFs and BEFs for determining reasonable potential for dioxin under the NPDES program.

The Coastal Zone Management Act requires that states make consistency determinations for any federally licensed or permitted activity affecting the coastal zone of a state with an approved CZMP. California's Coastal Management Program was approved in 1978 and established the California Coastal Commission (CCC) as lead agency for program implementation. However, CCC staff has stated that the CCC does not conduct consistency reviews for wastewater treatment plants that operate at secondary treatment levels and thus the CCC will not be providing a consistency determination for the proposed permit

Factor 9: Other Factors Relating to Effects of the Discharge

EPA is proposing to include additional, more recent scientific information that has not yet been considered for inclusion in the COP water quality standards, based on EPA's ocean discharge criteria regulations at 40 CFR 125.122(a). For the calculation of NPDES permit limitations for dioxin, we are proposing to use recently updated toxicity equivalency factors (TEFs), published by the World Health Organization in 2005, as well as the congener-specific bioconcentration equivalency factors (BEFs) used for the Great Lakes System. As explained above, this approach for developing NPDES permit limits for dioxin was recommended in the "Bay Area Clean Water Agencies' Draft Dioxin Issue Paper: Expert Panel Response and Recommendations," dated April 4, 2008, and it incorporates updated scientific information for dioxins on a congener-specific basis, while continuing to use the COP criterion and standards implementation procedures. While Region 9 has the discretion to use these factors under the ocean discharge regulations, Region 9's use of the TEFs and BEFs in the draft permit at this time does not constitute EPA endorsement of this approach in other situations.

Factor 10: Marine Water Quality Criteria Under CWA 304(a)(1)

The current recommended EPA marine water quality criteria for dioxin are 5.1E-09 ug/l for consumption of organisms only, and 5.0E-09 ug/l for consumption of water and organisms. These recommended criteria are based on a carcinogenicity of 10-6 risk. The water quality criteria adopted for dioxin in the COP is 3.9E-09 ug/l for TCDD equivalents on a 30 day average basis. Applying the TEFs and BEFs as well as a conservative 76:1 dilution, under the COP reasonable potential (RP) procedure, which closely parallels the RP procedure in "EPA's Technical Support Document for Water Quality-Based Toxics Control (TSD, USEPA 1991)," EPA and the Water Board conclude the discharge does not have RP for dioxin, and thus the draft permit contains no numeric limits for dioxin. Because the COP criterion for dioxin is more stringent than the EPA recommended criteria, this discharge would not be expected to cause exceedances of the EPA criteria.

Conclusion: Determination of No Unreasonable Degradation of the Marine Environment

Based on consideration of the ten factors discussed above, Region 9 has determined that no unreasonable degradation of the marine environment will result from the discharges of dioxin through the Southwest Ocean Outfall as proposed under NPDES permit CA003768, with all the limitations, conditions, and monitoring requirements in effect.

EPA recognizes that bioaccumulative pollutants such as dioxin are of concern in the receiving waters of the Pacific Ocean, as commercial and recreational fishing takes place in these waters. However, monitoring over a 10 year period has not shown increasing concentrations of bioaccumulative substances in sediment or fish tissue in the vicinity of the discharge. Further, EPA expects that the contribution of dioxins from the Southwest Ocean Outfall discharge is lower than in other urban areas of similar size, due to the City's stormwater treatment facilities and residential service area which, unlike industrial areas, is expected to generate fewer dioxins. The proposed NPDES permit will require continued effluent monitoring for dioxin congeners. The Southwest Ocean Outfall monitoring program will continue to monitor for selected bioaccumulative pollutants in sediment and fish tissue, including dioxin-like PCBs. Finally, because stormwater is significantly higher in dioxin than dry-weather flows, the proposed permit requirement that the discharger develop options to reduce pollutant loading in stormwater, such as green infrastructure efforts, is expected to reduce dioxin loading to the receiving water.

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ATTACHMENT G
REGIONAL STANDARD PROVISIONS, AND MONITORING
AND REPORTING REQUIREMENTS
(SUPPLEMENT TO ATTACHMENT D)

For

NPDES WASTEWATER DISCHARGE PERMITS

July 2009

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

REGIONAL STANDARD PROVISIONS, AND MONITORING AND REPORTING REQUIREMENTS
(SUPPLEMENT TO ATTACHMENT D)

FOR

NPDES WASTEWATER DISCHARGE PERMITS

APPLICABILITY

This document applies to dischargers covered by a National Pollutant Discharge Elimination System (NPDES) permit. This document does not apply to Municipal Separate Storm Sewer System (MS4) NPDES permits.

The purpose of this document is to supplement the requirements of Attachment D, Standard Provisions. The requirements in this supplemental document are designed to ensure permit compliance through preventative planning, monitoring, recordkeeping, and reporting. In addition, this document requires proper characterization of issues as they arise, and timely and full responses to problems encountered. To provide clarity on which sections of Attachment D this document supplements, this document is arranged in the same format as Attachment D.

I. STANDARD PROVISIONS - PERMIT COMPLIANCE

A. Duty to Comply – Not Supplemented

B. Need to Halt or Reduce Activity Not a Defense – Not Supplemented

C. Duty to Mitigate – This supplements I.C. of Standard Provisions (Attachment D)

1. **Contingency Plan -** The Discharger shall maintain a Contingency Plan as originally required by Regional Water Board Resolution 74-10 and as prudent in accordance with current municipal facility emergency planning. The Contingency Plan shall describe procedures to ensure that existing facilities remain in, or are rapidly returned to, operation in the event of a process failure or emergency incident, such as employee strike, strike by suppliers of chemicals or maintenance services, power outage, vandalism, earthquake, or fire. The Discharger may combine the Contingency Plan and Spill Prevention Plan into one document. Discharge in violation of the permit where the Discharger has failed to develop and implement a Contingency Plan as described below will be the basis for considering the discharge a willful and negligent violation of the permit pursuant to California Water Code Section 13387. The Contingency Plan shall, at a minimum, contain the provisions of a. through g. below.

    a. Provision of personnel for continued operation and maintenance of sewerage facilities during employee strikes or strikes against contractors providing services.

b. Maintenance of adequate chemicals or other supplies and spare parts necessary for continued operations of sewerage facilities.

c. Provisions of emergency standby power.

d. Protection against vandalism.

e. Expeditious action to repair failures of, or damage to, equipment and sewer lines.

f. Report of spills and discharges of untreated or inadequately treated wastes, including measures taken to clean up the effects of such discharges.

g. Programs for maintenance, replacement, and surveillance of physical condition of equipment, facilities, and sewer lines.

2. **Spill Prevention Plan -** The Discharger shall maintain a Spill Prevention Plan to prevent accidental discharges and minimize the effects of such events. The Spill Prevention Plan shall:

a. Identify the possible sources of accidental discharge, untreated or partially treated waste bypass, and polluted drainage;

b. Evaluate the effectiveness of present facilities and procedures, and state when they became operational; and

c. Predict the effectiveness of the proposed facilities and procedures, and provide an implementation schedule containing interim and final dates when they will be constructed, implemented, or operational.

This Regional Water Board, after review of the Contingency and Spill Prevention Plans or their updated revisions, may establish conditions it deems necessary to control accidental discharges and to minimize the effects of such events. Such conditions may be incorporated as part of the permit upon notice to the Discharger.

D. Proper Operation & Maintenance – This supplements I.D of Standard Provisions (Attachment D)

1. **Operation and Maintenance (O&M) Manual -** The Discharger shall maintain an O&M Manual to provide the plant and regulatory personnel with a source of information describing all equipment, recommended operational strategies, process control monitoring, and maintenance activities. To remain a useful and relevant document, the O&M Manual shall be kept updated to reflect significant changes in treatment facility equipment and operational practices. The O&M Manual shall be maintained in usable condition and be available for reference and use by all relevant personnel and Regional Water Board staff.

2. **Wastewater Facilities Status Report -** The Discharger shall regularly review, revise, or update, as necessary, its Wastewater Facilities Status Report. This report shall document how the Discharger operates and maintains its wastewater collection, treatment, and disposal facilities to ensure that all facilities are adequately staffed, supervised, financed, operated,

maintained, repaired, and upgraded as necessary to provide adequate and reliable transport, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the Discharger's service responsibilities.

3. **Proper Supervision and Operation of Publicly Owned Treatment Works (POTWs) -** POTWs shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Division 4, Chapter 14, Title 23 of the California Code of Regulations.

E. Property Rights – Not Supplemented

F. Inspection and Entry – Not Supplemented

G. Bypass – Not Supplemented

H. Upset – Not Supplemented

I. Other – This section is an addition to Standard Provisions (Attachment D)

1. Neither the treatment nor the discharge of pollutants shall create pollution, contamination, or nuisance as defined by California Water Code Section 13050.

2. Collection, treatment, storage, and disposal systems shall be operated in a manner that precludes public contact with wastewater, except in cases where excluding the public is infeasible, such as private property. If public contact with wastewater could reasonably occur on public property, warning signs shall be posted.

3. If the Discharger submits a timely and complete Report of Waste Discharge for permit reissuance, this permit continues in force and effect until a new permit is issued or the Regional Water Board rescinds the permit.

J. Storm Water – This section is an addition to Standard Provisions (Attachment D)

These provisions apply to facilities that do not direct all storm water flows from the facility to the wastewater treatment plant headworks.

1. **Storm Water Pollution Prevention Plan (SWPP Plan)**

The SWPP Plan shall be designed in accordance with good engineering practices and shall address the following objectives:

a. To identify pollutant sources that may affect the quality of storm water discharges; and

b. To identify, assign, and implement control measures and management practices to reduce pollutants in storm water discharges.

The SWPP Plan may be combined with the existing Spill Prevention Plan as required in accordance with Section C.2. The SWPP Plan shall be retained on-site and made available upon request of a representative of the Regional Water Board.

2. Source Identification

The SWPP Plan shall provide a description of potential sources that may be expected to add significant quantities of pollutants to storm water discharges, or may result in non-storm water discharges from the facility. The SWPP Plan shall include, at a minimum, the following items:

a. A topographical map (or other acceptable map if a topographical map is unavailable), extending one-quarter mile beyond the property boundaries of the facility, showing the wastewater treatment facility process areas, surface water bodies (including springs and wells), and discharge point(s) where the facility's storm water discharges to a municipal storm drain system or other points of discharge to waters of the State. The requirements of this paragraph may be included in the site map required under the following paragraph if appropriate.

b. A site map showing the following:

   1) Storm water conveyance, drainage, and discharge structures;

   2) An outline of the storm water drainage areas for each storm water discharge point;

   3) Paved areas and buildings;

   4) Areas of actual or potential pollutant contact with storm water or release to storm water, including but not limited to outdoor storage and process areas; material loading, unloading, and access areas; and waste treatment, storage, and disposal areas;

   5) Location of existing storm water structural control measures (i.e., berms, coverings, etc.);

   6) Surface water locations, including springs and wetlands; and

   7) Vehicle service areas.

c. A narrative description of the following:

   1) Wastewater treatment process activity areas;

   2) Materials, equipment, and vehicle management practices employed to minimize contact of significant materials of concern with storm water discharges;

   3) Material storage, loading, unloading, and access areas;

   4) Existing structural and non-structural control measures (if any) to reduce pollutants in storm water discharges; and

   5) Methods of on-site storage and disposal of significant materials.

d. A list of pollutants that have a reasonable potential to be present in storm water discharges in significant quantities.

3. Storm Water Management Controls

The SWPP Plan shall describe the storm water management controls appropriate for the facility and a time schedule for fully implementing such controls. The appropriateness and priorities of controls in the SWPP Plan shall reflect identified potential sources of pollutants. The description of storm water management controls to be implemented shall include, as appropriate:

a. Storm water pollution prevention personnel

Identify specific individuals (and job titles) that are responsible for developing, implementing, and reviewing the SWPP Plan.

b. Good housekeeping

Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm drain conveyance system.

c. Spill prevention and response

Identify areas where significant materials can spill into or otherwise enter storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, and cleanup equipment and procedures shall be identified, as appropriate. The necessary equipment to implement a cleanup shall be available, and personnel shall be trained in proper response, containment, and cleanup of spills. Internal reporting procedures for spills of significant materials shall be established.

d. Source control

Source controls include, for example, elimination or reduction of the use of toxic pollutants, covering of pollutant source areas, sweeping of paved areas, containment of potential pollutants, labeling of all storm drain inlets with "No Dumping" signs, isolation or separation of industrial and non-industrial pollutant sources so that runoff from these areas does not mix, etc.

e. Storm water management practices

Storm water management practices are practices other than those that control the sources of pollutants. Such practices include treatment or conveyance structures, such as drop inlets, channels, retention and detention basins, treatment vaults, infiltration galleries, filters, oil/water separators, etc. Based on assessment of the potential of various sources to contribute pollutants to storm water discharges in significant quantities, additional storm water management practices to remove pollutants from storm water discharges shall be implemented and design criteria shall be described.

f. Sediment and erosion control

Measures to minimize erosion around the storm water drainage and discharge points, such as riprap, revegetation, slope stabilization, etc., shall be described.

g. Employee training

Employee training programs shall inform all personnel responsible for implementing the SWPP Plan. Training shall address spill response, good housekeeping, and material management practices. New employee and refresher training schedules shall be identified.

h. Inspections

All inspections shall be done by trained personnel. Material handling areas shall be inspected for evidence of, or the potential for, pollutants entering storm water discharges. A tracking or follow up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorded. Inspection records shall be retained for five years.

i. Records

A tracking and follow-up procedure shall be described to ensure that adequate response and corrective actions have been taken in response to inspections.

4. Annual Verification of SWPP Plan

An annual facility inspection shall be conducted to verify that all elements of the SWPP Plan are accurate and up-to-date. The results of this review shall be reported in the Annual Report to the Regional Water Board described in Section V.C.f.

K. Biosolids Management – This section is an addition to Standard Provisions (Attachment D)

Biosolids must meet the following requirements prior to land application. The Discharger must either demonstrate compliance or, if it sends the biosolids to another party for further treatment or distribution, must give the recipient the information necessary to ensure compliance.

1. Exceptional quality biosolids meet the pollutant concentration limits in Table III of 40 CFR Part 503.13, Class A pathogen limits, and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8). Such biosolids do not have to be tracked further for compliance with general requirements (503.12) and management practices (503.14).

2. Biosolids used for agricultural land, forest, or reclamation shall meet the pollutant limits in Table I (ceiling concentrations) and Table II or Table III (cumulative loadings or pollutant concentration limits) of 503.13. They shall also meet the general requirements (503.12) and management practices (503.14) (if not exceptional quality biosolids) for Class A or Class B pathogen levels with associated access restrictions (503.32) and one of the 10 vector attraction reduction requirements in 503.33(b)(1)-(b)(10).

3. Biosolids used for lawn or home gardens must meet exceptional quality biosolids limits.

4. Biosolids sold or given away in a bag or other container must meet the pollutant limits in either Table III or Table IV (pollutant concentration limits or annual pollutant loading rate limits) of 503.13. If Table IV is used, a label or information sheet must be attached to the biosolids packing that explains Table IV (see 503.14). The biosolids must also meet the Class A pathogen limits and one of the vector attraction reduction requirements in 503.33(b)(1)-(b)(8).

II. STANDARD PROVISIONS – PERMIT ACTION – Not Supplemented

III. STANDARD PROVISIONS – MONITORING

A. Sampling and Analyses – This section is a supplement to III.A and III.B of Standard Provisions (Attachment D)

1. Use of Certified Laboratories

Water and waste analyses shall be performed by a laboratory certified for these analyses in accordance with California Water Code Section 13176.

2. Use of Appropriate Minimum Levels

Table C lists the suggested analytical methods for the 126 priority pollutants and other toxic pollutants that should be used, unless a particular method or minimum level (ML) is required in the MRP.

For priority pollutant monitoring, when there is more than one ML value for a given substance, the Discharger may select any one of those cited analytical methods for compliance determination provided the ML is below the effluent limitation and the water quality objective. If no ML value is below the effluent limitation and water quality objective, then the Regional Water Board will assign the lowest ML value indicated in Table C, and its associated analytical method for inclusion in the MRP. For effluent monitoring, this alternate method shall also be U.S. EPA-approved (such as the 1600 series) or one of those listed in Table C. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

3. Frequency of Monitoring

The minimum schedule of sampling analysis is specified in the MRP portion of the permit.

a. Timing of Sample Collection

i. The Discharger shall collect samples of influent on varying days selected at random and shall not include any plant recirculation or other sidestream wastes, unless otherwise stipulated by the MRP.

ii. The Discharger shall collect samples of effluent on days coincident with influent sampling unless otherwise stipulated by the MRP or the Executive Officer. The Executive Officer may approve an alternative sampling plan if it is demonstrated to be representative of plant discharge flow and in compliance with all other permit requirements.

iii. The Discharger shall collect grab samples of effluent during periods of day-time maximum peak effluent flows (or peak flows through secondary treatment units for facilities that recycle effluent flows).

iv. Effluent sampling for conventional pollutants shall occur on at least one day of any multiple-day bioassay test the MRP requires. During the course of the test, on at least one day, the Discharger shall collect and retain samples of the discharge. In the event a bioassay test does not comply with permits limits, the Discharger shall analyze these retained samples for pollutants that could be toxic to aquatic life and for which it has effluent limits.

1) The Discharger shall perform bioassay tests on final effluent samples; when chlorine is used for disinfection, bioassay tests shall be performed on effluent after chlorination-dechlorination; and

2) The Discharger shall analyze for total ammonia nitrogen and calculate the amount of un-ionized ammonia whenever test results fail to meet the percent survival specified in the permit.

b. Conditions Triggering Accelerated Monitoring

i. If the results from two consecutive samples of a constituent monitored in a 30-day period exceed the monthly average limit for any parameter (or if the required sampling frequency is once per month and the monthly sample exceeds the monthly average limit), the Discharger shall, within 24 hours after the results are received, increase its sampling frequency to daily until the results from the additional sampling shows that the parameter is in compliance with the monthly average limit.

ii. If any maximum daily limit is exceeded, the Discharger shall increase its sampling frequency to daily within 24 hours after the results are received that indicate the exceedance of the maximum daily limit until two samples collected on consecutive days show compliance with the maximum daily limit.

iii. If final or intermediate results of an acute bioassay test indicate a violation or threatened violation (e.g., the percentage of surviving test organisms of any single acute bioassay test is less than 70 percent), the Discharger shall initiate a new test as soon as practical, and the Discharger shall investigate the cause of the mortalities and report its findings in the next self-monitoring report (SMR).

iv. The Discharger shall calibrate chlorine residual analyzers against grab samples as frequently as necessary to maintain accurate control and reliable operation. If an effluent violation is detected, the Discharger shall collect grab samples at least every 30 minutes until compliance with the limit is achieved, unless the Discharger monitors chlorine residual continuously. In such cases, the Discharger shall continue to conduct continuous monitoring as required by its permit.

v. When any type of bypass occurs, the Discharger shall collect samples on a daily basis for all constituents at affected discharge points that have effluent limits for the duration of the bypass, unless otherwise stipulated by the MRP.

c. Storm Water Monitoring

The requirements of this section only apply to facilities that are not covered by an NPDES permit for storm water discharges and where not all site storm drainage from process areas (i.e., areas of the treatment facility where chemicals or wastewater could come in contact with storm water) is directed to the headworks. For storm water not directed to the headworks during the wet season (October 1 to April 30), the Discharger shall:

i. Conduct visual observations of the storm water discharge locations during daylight hours at least once per month during a storm event that produces significant storm water discharge to observe the presence of floating and suspended materials, oil and grease, discoloration, turbidity, and odor, etc.

ii. Measure (or estimate) the total volume of storm water discharge, collect grab samples of storm water discharge from at least two storm events that produce significant storm water discharge, and analyze the samples for oil and grease, pH, TSS, and specific conductance.

The grab samples shall be taken during the first 30 minutes of the discharge. If collection of the grab samples during the first 30 minutes is impracticable, grab samples may be taken during the first hour of the discharge, and the Discharger shall explain in the Annual Report why the grab sample(s) could not be taken in the first 30 minutes.

iii. Testing for the presence of non-storm water discharges shall be conducted no less than twice during the dry season (May 1 to September 30) at all storm water discharge locations. Tests may include visual observations of flows, stains, sludges, odors, and other abnormal conditions; dye tests; TV line surveys; or analysis and validation of accurate piping schematics. Records shall be maintained describing the method used, date of testing, locations observed, and test results.

iv. Samples shall be collected from all locations where storm water is discharged. Samples shall represent the quality and quantity of storm water discharged from the facility. If a facility discharges storm water at multiple locations, the Discharger may sample a reduced number of locations if it establishes and documents through the monitoring program that storm water discharges from different locations are substantially identical.

v. Records of all storm water monitoring information and copies of all reports required by the permit shall be retained for a period of at least three years from the date of sample, observation, or report.

d. Receiving Water Monitoring

The requirements of this section only apply when the MRP requires receiving water sampling.

i. Receiving water samples shall be collected on days coincident with effluent sampling for conventional pollutants.

ii. Receiving water samples shall be collected at each station on each sampling day during the period within one hour following low slack water. Where sampling during lower slack water is impractical, sampling shall be performed during higher slack water. Samples shall be collected within the discharge plume and down current of the discharge point so as to be representative, unless otherwise stipulated in the MRP.

iii. Samples shall be collected within one foot of the surface of the receiving water, unless otherwise stipulated in the MRP.

B. Biosolids Monitoring – This section supplements III.B of Standard Provisions (Attachment D)

When biosolids are sent to a landfill, sent to a surface disposal site, or applied to land as a soil amendment, they must be monitored as follows:

1. Biosolids Monitoring Frequency

Biosolids disposal must be monitored at the following frequency:

Metric tons biosolids/365 days	Frequency
0-290	Once per year
290-1500	Quarterly
1500-15,000	Six times per year
Over 15,000	Once per month

(Metric tons are on a dry weight basis)

2. Biosolids Pollutants to Monitor

Biosolids shall be monitored for the following constituents:

Land Application: arsenic, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, selenium, and zinc

Municipal Landfill: Paint filter test (pursuant to 40 CFR 258)

Biosolids-only Landfill or Surface Disposal Site (if no liner and leachate system): arsenic, chromium, and nickel

C. Standard Observations – This section is an addition to III of Standard Provisions (Attachment D)

1. Receiving Water Observations

The requirements of this section only apply when the MRP requires standard observations of the receiving water. Standard observations shall include the following:

a. *Floating and suspended materials* (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence, source, and size of affected area.

b. *Discoloration and turbidity*: description of color, source, and size of affected area.

c. *Odor*: presence or absence, characterization, source, distance of travel, and wind direction.

d. *Beneficial water use*: presence of water-associated waterfowl or wildlife, fisherpeople, and other recreational activities in the vicinity of each sampling station.

e. *Hydrographic condition*: time and height of corrected high and low tides (corrected to nearest National Oceanic and Atmospheric Administration location for the sampling date and time of sample collection).

f. *Weather conditions*:

1) Air temperature; and

2) Total precipitation during the five days prior to observation.

2. Wastewater Effluent Observations

The requirements of this section only apply when the MRP requires wastewater effluent standard observations. Standard observations shall include the following:

a. *Floating and suspended material of wastewater origin* (e.g., oil, grease, algae, and other macroscopic particulate matter): presence or absence.

b. *Odor*: presence or absence, characterization, source, distance of travel, and wind direction.

3. Beach and Shoreline Observations

The requirements of this section only apply when the MRP requires beach and shoreline standard observations. Standard observations shall include the following:

a. *Material of wastewater origin*: presence or absence, description of material, estimated size of affected area, and source.

b. *Beneficial use*: estimate number of people participating in recreational water contact, non-water contact, or fishing activities.

4. Land Retention or Disposal Area Observations

The requirements of this section only apply to facilities with on-site surface impoundments or disposal areas that are in use. This section applies to both liquid and solid wastes, whether confined or unconfined. The Discharger shall conduct the following for each impoundment:

a. Determine the amount of freeboard at the lowest point of dikes confining liquid wastes.

b. Report evidence of leaching liquid from area of confinement and estimated size of affected area. Show affected area on a sketch and volume of flow (e.g., gallons per minute [gpm]).

c. Regarding odor, describe presence or absence, characterization, source, distance of travel, and wind direction.

d. Estimate number of waterfowl and other water-associated birds in the disposal area and vicinity.

5. Periphery of Waste Treatment and/or Disposal Facilities Observations

The requirements of this section only apply when the MRP specifies periphery standard observations. Standard observations shall include the following:

a. *Odor*: presence or absence, characterization, source, and distance of travel.

b. *Weather conditions*: wind direction and estimated velocity.

IV. STANDARD PROVISIONS – RECORDS

A. Records to be Maintained – This supplements IV.A of Standard Provisions (Attachment D)

The Discharger shall maintain records in a manner and at a location (e.g., wastewater treatment plant or Discharger offices) such that the records are accessible to Regional Water Board staff. The minimum period of retention specified in Section IV, Records, of the Federal Standard Provisions shall be extended during the course of any unresolved litigation regarding the subject discharge, or when requested by the Regional Water Board or Regional Administrator of USEPA, Region IX.

A copy of the permit shall be maintained at the discharge facility and be available at all times to operating personnel.

B. Records of monitoring information shall include – This supplements IV.B of Standard Provision (Attachment D)

1. Analytical Information

Records shall include analytical method detection limits, minimum levels, reporting levels, and related quantification parameters**.**

2. Flow Monitoring Data

For all required flow monitoring (e.g., influent and effluent flows), the additional records shall include the following, unless otherwise stipulated by the MRP:

a. Total volume for each day; and

b. Maximum, minimum, and average daily flows for each calendar month.

3. Wastewater Treatment Process Solids

a. For each treatment unit process that involves solids removal from the wastewater stream, records shall include the following:

1) Total volume or mass of solids removed from each unit (e.g., grit, skimmings, undigested biosolids) for each calendar month or other time period as appropriate, but not to exceed annually; and

2) Final disposition of such solids (e.g., landfill, other subsequent treatment unit).

b. For final dewatered biosolids from the treatment plant as a whole, records shall include the following:

1) Total volume or mass of dewatered biosolids for each calendar month;

2) Solids content of the dewatered biosolids; and

3) Final disposition of dewatered biosolids (disposal location and disposal method).

4. Disinfection Process

For the disinfection process, these additional records shall be maintained documenting process operation and performance:

a. For bacteriological analyses:

1) Wastewater flow rate at the time of sample collection; and

2) Required statistical parameters for cumulative bacterial values (e.g., moving median or geometric mean for the number of samples or sampling period identified in this Order).

b. For the chlorination process, when chlorine is used for disinfection, at least daily average values for the following:

1) Chlorine residual of treated wastewater as it enters the contact basin (mg/L);

2) Chlorine dosage (kg/day); and

3) Dechlorination chemical dosage (kg/day).

5. **Treatment Process Bypasses**

A chronological log of all treatment process bypasses, including wet weather blending, shall include the following:

a. Identification of the treatment process bypassed;

b. Dates and times of bypass beginning and end;

c. Total bypass duration;

d. Estimated total bypass volume; and

e. Description of, or reference to other reports describing, the bypass event, the cause, the corrective actions taken (except for wet weather blending that is in compliance with permit conditions), and any additional monitoring conducted.

6. **Treatment Facility Overflows**

This section applies to records for overflows at the treatment facility. This includes the headworks and all units and appurtenances downstream. The Discharger shall retain a chronological log of overflows at the treatment facility and records supporting the information provided in section V.E.2.

C. Claims of Confidentiality – Not Supplemented

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information – Not Supplemented

B. Signatory and Certification Requirements – Not Supplemented

C. Monitoring Reports – This section supplements V.C of Standard Provisions (Attachment D)

1. Self-Monitoring Reports

For each reporting period established in the MRP, the Discharger shall submit an SMR to the Regional Water Board in accordance with the requirements listed in this document and at the frequency the MRP specifies. The purpose of the SMR is to document treatment performance, effluent quality, and compliance with the waste discharge requirements of this Order.

a. Transmittal letter

Each SMR shall be submitted with a transmittal letter. This letter shall include the following:

1) Identification of all violations of effluent limits or other waste discharge requirements found during the reporting period;

2) Details regarding violations: parameters, magnitude, test results, frequency, and dates;

3) Causes of violations;

4) Discussion of corrective actions taken or planned to resolve violations and prevent recurrences, and dates or time schedule of action implementation (if previous reports have been submitted that address corrective actions, reference to the earlier reports is satisfactory);

5) Data invalidation (Data should not be submitted in an SMR if it does not meet quality assurance/quality control standards. However, if the Discharger wishes to invalidate any measurement after it was submitted in an SMR, a letter shall identify the measurement suspected to be invalid and state the Discharger's intent to submit, within 60 days, a formal request to invalidate the measurement. This request shall include the original measurement in question, the reason for invalidating the measurement, all relevant documentation that supports invalidation [e.g., laboratory sheet, log entry, test results, etc.], and discussion of the corrective actions taken or planned [with a time schedule for completion] to prevent recurrence of the sampling or measurement problem.);

6) If the Discharger blends, the letter shall describe the duration of blending events and certify whether blended effluent was in compliance with the conditions for blending; and

7) Signature (The transmittal letter shall be signed according to Section V.B of this Order, Attachment D – Standard Provisions.).

b. Compliance evaluation summary

Each report shall include a compliance evaluation summary. This summary shall include each parameter for which the permit specifies effluent limits, the number of samples taken during the monitoring period, and the number of samples that exceed applicable effluent limits.

c. Results of analyses and observations

1) Tabulations of all required analyses and observations, including parameter, date, time, sample station, type of sample, test result, method detection limit, method minimum level, and method reporting level, if applicable, signed by the laboratory director or other responsible official.

2) When determining compliance with an average monthly effluent limitation and more than one sample result is available in a month, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of detected but not quantified (DNQ) or nondetect (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

i. The data set shall be ranked from low to high, reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

ii. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

If a sample result, or the arithmetic mean or median of multiple sample results, is below the reporting limit, and there is evidence that the priority pollutant is present in the effluent above an effluent limitation and the Discharger conducts a Pollutant Minimization Program, the Discharger shall not be deemed out of compliance.

3) Dioxin-TEQ Reporting: The Discharger shall report for each dioxin and furan congener the analytical results of effluent monitoring, including the quantifiable limit (reporting level), and the method detection limit, and the measured concentration. Estimated concentrations shall be reported for individual congeners, but shall be set equal to zero in determining the dioxin-TEQ value. The Discharger shall multiply each measured or estimated congener concentration by its respective toxicity equivalency factor (TEF) shown in Table A and report the sum of these values.

Table A: Toxic Equivalency Factors for 2,3,7,8-TCDD Equivalents

Congener	**TEF**
2,3,7,8-TetraCDD	1
1,2,3,7,8-PentaCDD	1.0
1,2,3,4,7,8-HexaCDD	0.1
1,2,3,6,7,8-HexaCDD	0.1
1,2,3,7,8,9-HexaCDD	0.1
1,2,3,4,6,7,8-HeptaCDD	0.01
OctaCDD	0.0001
2,3,7,8-TetraCDF	0.1
1,2,3,7,8-PentaCDF	0.05
2,3,4,7,8-PentaCDF	0.5
1,2,3,4,7,8-HexaCDF	0.1
1,2,3,6,7,8-HexaCDF	0.1
1,2,3,7,8,9-HexaCDF	0.1
2,3,4,6,7,8-HexaCDF	0.1
1,2,3,4,6,7,8-HeptaCDF	0.01
1,2,3,4,7,8,9-HeptaCDF	0.01
OctaCDF	0.0001

d. Data reporting for results not yet available

The Discharger shall make all reasonable efforts to obtain analytical data for required parameter sampling in a timely manner. Certain analyses require additional time to complete analytical processes and report results. For cases where required monitoring parameters require additional time to complete analytical processes and reports, and results are not available in time to be included in the SMR for the subject monitoring period, the Discharger shall describe such circumstances in the SMR and include the data for these parameters and relevant discussions of any observed exceedances in the next SMR due after the results are available.

e. Flow data

The Discharger shall provide flow data tabulation pursuant to Section IV.B.2.

f. Annual self-monitoring report requirements

By the date specified in the MRP, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year. The report shall contain the following:

1) Annual compliance summary table of treatment plant performance, including documentation of any blending events;

2) Comprehensive discussion of treatment plant performance and compliance with the permit (This discussion shall include any corrective actions taken or planned, such as changes to facility equipment or operation practices that may be needed to achieve compliance, and any other actions taken or planned that are intended to improve performance and reliability of the Discharger's wastewater collection, treatment, or disposal practices.);

3) Both tabular and graphical summaries of the monitoring data for the previous year if parameters are monitored at a frequency of monthly or greater;

4) List of approved analyses, including the following:

   (i) List of analyses for which the Discharger is certified;

   (ii) List of analyses performed for the Discharger by a separate certified laboratory and copies of reports signed by the laboratory director of that laboratory shall not be submitted but retained onsite;

   (iii) List of "waived" analyses, as approved;

5) Plan view drawing or map showing the Discharger's facility, flow routing, and sampling and observation station locations;

6) Results of annual facility inspection to verify that all elements of the SWPP Plan are accurate and up to date (only required if the Discharger does not route all storm water to the headworks of its wastewater treatment plant); and

7) Results of facility report reviews (The Discharger shall regularly review, revise, and update, as necessary, the O&M Manual, the Contingency Plan, the Spill Prevention Plan, and Wastewater Facilities Status Report so that these documents remain useful and relevant to current practices. At a minimum, reviews shall be conducted annually. The Discharger shall include, in each Annual Report, a description or summary of review and evaluation procedures, recommended or planned actions, and an estimated time schedule for implementing these actions. The Discharger shall complete changes to these documents to ensure they are up-to-date.).

g. Report submittal

The Discharger shall submit SMRs to:

California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612
Attn: NPDES Wastewater Division

h. Reporting data in electronic format

The Discharger has the option to submit all monitoring results in an electronic reporting format approved by the Executive Officer. If the Discharger chooses to submit SMRs electronically, the following shall apply:

1) *Reporting Method*: The Discharger shall submit SMRs electronically via a process approved by the Executive Officer (see, for example, the letter dated December 17, 1999, "Official Implementation of Electronic Reporting System [ERS]" and the progress report letter dated December 17, 2000).

2) *Monthly or Quarterly Reporting Requirements*: For each reporting period (monthly or quarterly as specified in the MRP), the Discharger shall submit an electronic SMR to the Regional Water Board in accordance with the provisions of Section V.C.1.a-e, except for requirements under Section V.C.1.c(1) where ERS does not have fields for dischargers to input certain information (e.g., sample time). However, until USEPA approves the electronic signature or other signature technologies, Dischargers that use ERS shall submit a hard copy of the original transmittal letter, an ERS printout of the data sheet, and a violation report (a receipt of the electronic transmittal shall be retained by the Discharger). This electronic SMR submittal suffices for the signed tabulations specified under Section V.C.1.c(1).

3) *Annual Reporting Requirements*: Dischargers who have submitted data using the ERS for at least one calendar year are exempt from submitting the portion of the annual report required under Section V.C.1.f(1) and (3).

D. Compliance Schedules – Not supplemented

E. Twenty-Four Hour Reporting – This section supplements V.E of Standard Provision (Attachment D)

1. Spill of Oil or Other Hazardous Material Reports

a. Within 24 hours of becoming aware of a spill of oil or other hazardous material that is not contained onsite and completely cleaned up, the Discharger shall report by telephone to the Regional Water Board at (510) 622-2369.

b. The Discharger shall also report such spills to the State Office of Emergency Services [telephone (800) 852-7550] only when the spills are in accordance with applicable reporting quantities for hazardous materials.

c. The Discharger shall submit a written report to the Regional Water Board within five working days following telephone notification unless directed otherwise by Regional Water Board staff. A report submitted electronically is acceptable. The written report shall include the following:

1) Date and time of spill, and duration if known;

2) Location of spill (street address or description of location);

3) Nature of material spilled;

4) Quantity of material involved;

5) Receiving water body affected, if any;

6) Cause of spill;

7) Estimated size of affected area;

8) Observed impacts to receiving waters (e.g., oil sheen, fish kill, water discoloration);

9) Corrective actions taken to contain, minimize, or clean up the spill;

10) Future corrective actions planned to be taken to prevent recurrence, and schedule of implementation; and

11) Persons or agencies notified.

2. Unauthorized Discharges from Municipal Wastewater Treatment Plants[1]

The following requirements apply to municipal wastewater treatment plants that experience an unauthorized discharge at their treatment facilities and are consistent with and supercede requirements imposed on the Discharger by the Executive Officer by letter of May 1, 2008, issued pursuant to California Water Code Section 13383.

a. Two (2)-Hour Notification

For any unauthorized discharges that result in a discharge to a drainage channel or a surface water, the Discharger shall, as soon as possible, but not later than two (2) hours after becoming aware of the discharge, notify the State Office of Emergency Services (telephone 800-852-7550), the local health officers or directors of environmental health with jurisdiction over the affected water bodies, and the Regional Water Board. The notification to the Regional Water Board shall be via the Regional Water Board's online reporting system at www.wbers.net, and shall include the following:

[1] California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

1) Incident description and cause;

2) Location of threatened or involved waterway(s) or storm drains;

3) Date and time the unauthorized discharge started;

4) Estimated quantity and duration of the unauthorized discharge (to the extent known), and the estimated amount recovered;

5) Level of treatment prior to discharge (e.g., raw wastewater, primary treated, undisinfected secondary treated, and so on); and

6) Identity of the person reporting the unauthorized discharge.

b. 24-hour Certification

Within 24 hours, the Discharger shall certify to the Regional Water Board, at www.wbers.net, that the State Office of Emergency Services and the local health officers or directors of environmental health with jurisdiction over the affected water bodies have been notified of the unauthorized discharge.

c. 5-Day Written Report

Within five business days, the Discharger shall submit a written report, via the Regional Water Board's online reporting system at www.wbers.net, that includes, in addition to the information required above, the following:

1) Methods used to delineate the geographical extent of the unauthorized discharge within receiving waters;

2) Efforts implemented to minimize public exposure to the unauthorized discharge;

3) Visual observations of the impacts (if any) noted in the receiving waters (e.g., fish kill, discoloration of water) and the extent of sampling if conducted;

4) Corrective measures taken to minimize the impact of the unauthorized discharge;

5) Measures to be taken to minimize the chances of a similar unauthorized discharge occurring in the future;

6) Summary of Spill Prevention Plan or O&M Manual modifications to be made, if necessary, to minimize the chances of future unauthorized discharges; and

7) Quantity and duration of the unauthorized discharge, and the amount recovered.

d. Communication Protocol

To clarify the multiple levels of notification, certification, and reporting, the current communication requirements for unauthorized discharges from municipal wastewater treatment plants are summarized in Table B that follows.

F. Planned Changes – Not supplemented

G. Anticipated Noncompliance – Not supplemented

H. Other Noncompliance – Not supplemented

I. Other Information – Not supplemented

VI. STANDARD PROVISIONS – ENFORCEMENT – Not Supplemented

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS – Not Supplemented

Table B

Summary of Communication Requirements for Unauthorized Discharges[1] from Municipal Wastewater Treatment Plants

Discharger is required to:	Agency Receiving Information	Time frame	Method for Contact
1. Notify	State Office of Emergency Services (OES)	As soon as possible, but not later than **2 hours** after becoming aware of the unauthorized discharge.	Telephone – (800) 852-7550 (obtain a control number from OES)
	Local health department	As soon as possible, but not later than **2 hours** after becoming aware of the unauthorized discharge.	Depends on local health department
	Regional Water Board	As soon as possible, but not later than **2 hours** after becoming aware of the unauthorized discharge.	Electronic[2] www.wbers.net
2. Certify	Regional Water Board	As soon as possible, but not later than **24 hours** after becoming aware of the unauthorized discharge.	Electronic[3] www.wbers.net
3. Report	Regional Water Board	Within **5 business days** of becoming aware of the unauthorized discharge.	Electronic[4] www.wbers.net

[1] California Code of Regulations, Title 23, Section 2250(b), defines an unauthorized discharge to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting from the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.

[2] In the event that the Discharger is unable to provide online notification within 2 hours of becoming aware of an unauthorized discharge, it shall phone the Regional Water Board's spill hotline at (510) 622-2369 and convey the same information contained in the notification form. In addition, within 3 business days of becoming aware of the unauthorized discharge, the Discharger shall enter the notification information into the Regional Water Board's online system in electronic format.

[3] In most instances, the 2-hour notification will also satisfy 24-hour certification requirements. This is because the notification form includes fields for documenting that OES and the local health department have been contacted. In other words, if the Discharger is able to complete all the fields in the notification form within 2 hours, certification requirements are also satisfied. In the event that the Discharger is unable to provide online certification within 24 hours of becoming aware of an unauthorized discharge, it shall phone the Regional Water Board's spill hotline at (510) 622-2369 and convey the same information contained in the certification form. In addition, within 3 business days of becoming aware of the unauthorized discharge, the Discharger shall enter the certification information into the Regional Water Board's online system in electronic format.

[4] If the Discharger cannot satisfy the 5-day reporting requirements via the Regional Water Board's online reporting system, it shall submit a written report (preferably electronically in pdf) to the appropriate Regional Water Board case manager. In cases where the Discharger cannot satisfy the 5-day reporting requirements via the online reporting system, it must still complete the Regional Water Board's online reporting requirements within 15 calendar days of becoming aware of the unauthorized discharge.

VIII. DEFINITIONS – This section is an addition to Standard Provisions (Attachment D)

More definitions can be found in Attachment A of this NPDES Permit.

1. Arithmetic Calculations

   a. Geometric mean is the antilog of the log mean or the back-transformed mean of the logarithmically transformed variables, which is equivalent to the multiplication of the antilogarithms. The geometric mean can be calculated with either of the following equations:

   $$\text{Geometric Mean} = Anti\log\left(\frac{1}{N}\sum_{i=1}^{N} Log(C_i)\right)$$

   or

   $$\text{Geometric Mean} = (C_1 * C_2 * \ldots * C_N)^{1/N}$$

   Where "N" is the number of data points for the period analyzed and "C" is the concentration for each of the "N" data points.

   b. Mass emission rate is obtained from the following calculation for any calendar day:

   $$\text{Mass emission rate (lb/day)} = \frac{8.345}{N}\sum_{i=1}^{N} Q_i C_i$$

   $$\text{Mass emission rate (kg/day)} = \frac{3.785}{N}\sum_{i=1}^{N} Q_i C_i$$

   In which "N" is the number of samples analyzed in any calendar day and "Q_i" and "C_i" are the flow rate (MGD) and the constituent concentration (mg/L) associated with each of the "N" grab samples that may be taken in any calendar day. If a composite sample is taken, "C_i" is the concentration measured in the composite sample and "Q_i" is the average flow rate occurring during the period over which the samples are composited. The daily concentration of a constituent measured over any calendar day shall be determined from the flow-weighted average of the same constituent in the combined waste streams as follows:

   $$C_d = \text{Average daily concentration} = \frac{1}{Q_t}\sum_{i=1}^{N} Q_i C_i$$

   In which "N" is the number of component waste streams and "Q" and "C" are the flow rate (MGD) and the constituent concentration (mg/L) associated with each of the "N" waste streams. "Q_t" is the total flow rate of the combined waste streams.

   c. Maximum allowable mass emission rate, whether for a 24-hour, weekly 7-day, monthly 30-day, or 6-month period, is a limitation expressed as a daily rate determined with the formulas in the paragraph above, using the effluent concentration limit specified in the permit for the period and the specified allowable flow.

d. POTW removal efficiency is the ratio of pollutants removed by the treatment facilities to pollutants entering the treatment facilities (expressed as a percentage). The Discharger shall determine removal efficiencies using monthly averages (by calendar month unless otherwise specified) of pollutant concentration of influent and effluent samples collected at about the same time and using the following equation (or its equivalent):

Removal Efficiency (%) = 100 × [1-(Effluent Concentration/Influent Concentration)]

2. Biosolids means the solids, semi-liquid suspensions of solids, residues, screenings, grit, scum, and precipitates separated from or created in wastewater by the unit processes of a treatment system. It also includes, but is not limited to, all supernatant, filtrate, centrate, decantate, and thickener overflow and underflow in the solids handling parts of the wastewater treatment system.

3. Blending is the practice of recombining wastewater that has been biologically treated with wastewater that has bypassed around biological treatment units.

4. Bottom sediment sample is (1) a separate grab sample taken at each sampling station for the determination of selected physical-chemical parameters, or (2) four grab samples collected from different locations in the immediate vicinity of a sampling station while the boat is anchored and analyzed separately for macroinvertebrates.

5. Composite sample is a sample composed of individual grab samples collected manually or by an automatic sampling device on the basis of time or flow as specified in the MRP. For flow-based composites, the proportion of each grab sample included in the composite sample shall be within plus or minus five percent (+/-5%) of the representative flow rate of the waste stream being measured at the time of grab sample collection. Alternatively, equal volume grab samples may be individually analyzed with the flow-weighted average calculated by averaging flow-weighted ratios of each grab sample analytical result. Grab samples comprising time-based composite samples shall be collected at intervals not greater than those specified in the MRP. The quantity of each grab sample comprising a time-based composite sample shall be a set of flow proportional volumes as specified in the MRP. If a particular time-based or flow-based composite sampling protocol is not specified in the MRP, the Discharger shall determine and implement the most representative sampling protocol for the given parameter subject to Executive Officer approval.

6. Depth-integrated sample is defined as a water or waste sample collected by allowing a sampling device to fill during a vertical traverse in the waste or receiving water body being sampled. The Discharger shall collect depth-integrated samples in such a manner that the collected sample will be representative of the waste or water body at that sampling point.

7. Flow sample is an accurate measurement of the average daily flow volume using a properly calibrated and maintained flow measuring device.

8. Grab sample is an individual sample collected in a short period of time not exceeding 15 minutes. Grab samples represent only the condition that exists at the time the wastewater is collected.

9. Initial dilution is the process that results in the rapid and irreversible turbulent mixing of wastewater with receiving water around the point of discharge.

10. Overflow is the intentional or unintentional spilling or forcing out of untreated or partially treated wastes from a transport system (e.g., through manholes, at pump stations, and at collection points) upstream from the treatment plant headworks or from any part of a treatment plant facility.

11. Priority pollutants are those constituents referred to in 40 CFR Part 122 as promulgated in the Federal Register, Vol. 65, No. 97, Thursday, May 18, 2000, also known as the California Toxics Rule, the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses.

12. Storm water means storm water runoff, snow melt runoff, and surface runoff and drainage. It excludes infiltration and runoff from agricultural land.

13. Toxic pollutant means any pollutant listed as toxic under federal Clean Water Act section 307(a)(1) or under 40 CFR 401.15.

14. Untreated waste is raw wastewater.

15. Waste, waste discharge, discharge of waste, and discharge are used interchangeably in the permit. The requirements of the permit apply to the entire volume of water, and the material therein, that is disposed of to surface and ground waters of the State of California.

Table C

List of Monitoring Parameters and Analytical Methods

CTR No.	Pollutant/Parameter	Analytical Method[1]	Minimum Levels[2] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
1.	Antimony	204.2					10	5	50	0.5	5	0.5		1000
2.	Arsenic	206.3				20		2	10	2	2	1		1000
3.	Beryllium						20	0.5	2	0.5	1			1000
4.	Cadmium	200 or 213				10	0.5	10	0.25	0.5				1000
5a.	Chromium (III)	SM 3500												
5b.	Chromium (VI)	SM 3500				10	5							1000
6.	Copper	200.9					25	5	10	0.5	2			1000
7.	Lead	200.9					20	5	5	0.5	2			10,000
8.	Mercury	1631 (note)[3]												
9.	Nickel	249.2					50	5	20	1	5			1000
10.	Selenium	200.8 or SM 3114B or C						5	10	2	5	1		1000
11.	Silver	272.2					10	1	10	0.25	2			1000
12.	Thallium	279.2					10	2	10	1	5			1000
13.	Zinc	200 or 289					20		20	1	10			
14.	Cyanide	SM 4500 CN^- C or I				5								
15.	Asbestos (only required for dischargers to MUN waters)[4]	0100.2 [5]												
16.	2,3,7,8-TCDD and 17 congeners (Dioxin)	1613												
17.	Acrolein	603	2.0	5										
18.	Acrylonitrile	603	2.0	2										
19.	Benzene	602	0.5	2										
33.	Ethylbenzene	602	0.5	2										

[1] The suggested method is the USEPA Method unless otherwise specified (SM = Standard Methods). The discharger may use another USEPA-approved or recognized method if that method has a level of quantification below the applicable water quality objective. Where no method is suggested, the Discharger has the discretion to use any standard method.

[2] Minimum levels are from the *State Implementation Policy*. They are the concentration of the lowest calibration standard for that technique based on a survey of contract laboratories. Laboratory techniques are defined as follows: GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; LC = High Pressure Liquid Chromatography; Color = Colorimetric; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; ICP = Inductively Coupled Plasma; ICPMS = Inductively Coupled Plasma/Mass Spectrometry; SPGFAA = Stabilized Platform Graphite Furnace Atomic Absorption (i.e., U.S. EPA 200.9); Hydride = Gaseous Hydride Atomic Absorption; CVAA = Cold Vapor Atomic Absorption; DCP = Direct Current Plasma.

[3] The Discharger shall use ultra-clean sampling (USEPA Method 1669) and ultra-clean analytical methods (USEPA Method 1631) for mercury monitoring. The minimum level for mercury is 2 ng/l (or 0.002 ug/l).

[4] MUN = Municipal and Domestic Supply. This designation, if applicable, is in the Findings of the permit.

[5] *Determination of Asbestos Structures over 10 [micrometers] in Length in Drinking Water Using MCE Filters*, U.S. EPA 600/R-94-134, June 1994.

CTR No.	Pollutant/Parameter	Analytical Method[1]	Minimum Levels[2] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
39.	Toluene	602	0.5	2										
20.	Bromoform	601	0.5	2										
21.	Carbon Tetrachloride	601	0.5	2										
22.	Chlorobenzene	601	0.5	2										
23.	Chlorodibromomethane	601	0.5	2										
24.	Chloroethane	601	0.5	2										
25.	2-Chloroethylvinyl Ether	601	1	1										
26.	Chloroform	601	0.5	2										
75.	1,2-Dichlorobenzene	601	0.5	2										
76.	1,3-Dichlorobenzene	601	0.5	2										
77.	1,4-Dichlorobenzene	601	0.5	2										
27.	Dichlorobromomethane	601	0.5	2										
28.	1,1-Dichloroethane	601	0.5	1										
29.	1,2-Dichloroethane	601	0.5	2										
30.	1,1-Dichloroethylene or 1,1-Dichloroethene	601	0.5	2										
31.	1,2-Dichloropropane	601	0.5	1										
32.	1,3-Dichloropropylene or 1,3-Dichloropropene	601	0.5	2										
34.	Methyl Bromide or Bromomethane	601	1.0	2										
35.	Methyl Chloride or Chloromethane	601	0.5	2										
36.	Methylene Chloride or Dichlorormethane	601	0.5	2										
37.	1,1,2,2-Tetrachloroethane	601	0.5	1										
38.	Tetrachloroethylene	601	0.5	2										
40.	1,2-Trans-Dichloroethylene	601	0.5	1										
41.	1,1,1-Trichloroethane	601	0.5	2										
42.	1,1,2-Trichloroethane	601	0.5	2										
43.	Trichloroethene	601	0.5	2										
44.	Vinyl Chloride	601	0.5	2										
45.	2-Chlorophenol	604	2	5										
46.	2,4-Dichlorophenol	604	1	5										
47.	2,4-Dimethylphenol	604	1	2										
48.	2-Methyl-4,6-Dinitrophenol or Dinitro-2-methylphenol	604	10	5										
49.	2,4-Dinitrophenol	604	5	5										
50.	2-Nitrophenol	604		10										
51.	4-Nitrophenol	604	5	10										
52.	3-Methyl-4-Chlorophenol	604	5	1										
53.	Pentachlorophenol	604	1	5										
54.	Phenol	604	1	1		50								
55.	2,4,6-Trichlorophenol	604	10	10										
56.	Acenaphthene	610 HPLC	1	1	0.5									
57.	Acenaphthylene	610 HPLC		10	0.2									
58.	Anthracene	610 HPLC		10	2									
60.	Benzo(a)Anthracene or 1,2 Benzanthracene	610 HPLC	10	5										
61.	Benzo(a)Pyrene	610 HPLC		10	2									
62.	Benzo(b)Fluoranthene or 3,4 Benzofluoranthene	610 HPLC		10	10									

CTR No.	Pollutant/Parameter	Analytical Method[1]	Minimum Levels[2] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
63.	Benzo(ghi)Perylene	610 HPLC		5	0.1									
64.	Benzo(k)Fluoranthene	610 HPLC		10	2									
74.	Dibenzo(a,h)Anthracene	610 HPLC		10	0.1									
86.	Fluoranthene	610 HPLC	10	1	0.05									
87.	Fluorene	610 HPLC		10	0.1									
92.	Indeno(1,2,3-cd) Pyrene	610 HPLC		10	0.05									
100.	Pyrene	610 HPLC		10	0.05									
68.	Bis(2-Ethylhexyl)Phthalate	606 or 625	10	5										
70.	Butylbenzyl Phthalate	606 or 625	10	10										
79.	Diethyl Phthalate	606 or 625	10	2										
80.	Dimethyl Phthalate	606 or 625	10	2										
81.	Di-n-Butyl Phthalate	606 or 625		10										
84.	Di-n-Octyl Phthalate	606 or 625		10										
59.	Benzidine	625		5										
65.	Bis(2-Chloroethoxy)Methane	625		5										
66.	Bis(2-Chloroethyl)Ether	625	10	1										
67.	Bis(2-Chloroisopropyl)Ether	625	10	2										
69.	4-Bromophenyl Phenyl Ether	625	10	5										
71.	2-Chloronaphthalene	625		10										
72.	4-Chlorophenyl Phenyl Ether	625		5										
73.	Chrysene	625		10	5									
78.	3,3'-Dichlorobenzidine	625		5										
82.	2,4-Dinitrotoluene	625	10	5										
83.	2,6-Dinitrotoluene	625		5										
85.	1,2-Diphenylhydrazine (note)[6]	625		1										
88.	Hexachlorobenzene	625	5	1										
89.	Hexachlorobutadiene	625	5	1										
90.	Hexachlorocyclopentadiene	625	5	5										
91.	Hexachloroethane	625	5	1										
93.	Isophorone	625	10	1										
94.	Naphthalene	625	10	1	0.2									
95.	Nitrobenzene	625	10	1										
96.	N-Nitrosodimethylamine	625	10	5										
97.	N-Nitrosodi-n-Propylamine	625	10	5										
98.	N-Nitrosodiphenylamine	625	10	1										
99.	Phenanthrene	625		5	0.05									
101.	1,2,4-Trichlorobenzene	625	1	5										
102.	Aldrin	608	0.005											
103.	α-BHC	608	0.01											
104.	β-BHC	608	0.005											
105.	γ-BHC (Lindane)	608	0.02											
106.	δ-BHC	608	0.005											
107.	Chlordane	608	0.1											
108.	4,4'-DDT	608	0.01											
109.	4,4'-DDE	608	0.05											

[6] Measurement for 1,2-Diphenylhydrazine may use azobenzene as a screen: if azobenzene is measured at >1 ug/l, then the Discharger shall analyze for 1,2-Diphenylhydrazine.

CTR No.	Pollutant/Parameter	Analytical Method[1]	Minimum Levels[2] (µg/l)											
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA	DCP
110.	4,4'-DDD	608	0.05											
111.	Dieldrin	608	0.01											
112.	Endosulfan (alpha)	608	0.02											
113.	Endosulfan (beta)	608	0.01											
114.	Endosulfan Sulfate	608	0.05											
115.	Endrin	608	0.01											
116.	Endrin Aldehyde	608	0.01											
117.	Heptachlor	608	0.01											
118.	Heptachlor Epoxide	608	0.01											
119-125	PCBs: Aroclors 1016, 1221, 1232, 1242, 1248, 1254, 1260	608	0.5											
126.	Toxaphene	608	0.5											

ATTACHMENT H

Pretreatment Program Provisions

1. The Discharger shall implement all pretreatment requirements contained in 40 CFR 403, as amended. The Discharger shall be subject to enforcement actions, penalties, and fines as provided in the Clean Water Act (33 USC 1351 et seq.), as amended. The Discharger shall implement and enforce its Approved Pretreatment Program or modified Pretreatment Program as directed by the Regional Water Board's Executive Officer or the USEPA. The USEPA and/or the State may initiate enforcement action against an industrial user for noncompliance with applicable standards and requirements as provided in the Clean Water Act.

2. The Discharger shall enforce the requirements promulgated under Sections 307(b), 307(c), 307(d) and 402(b) of the Clean Water Act. The Discharger shall cause industrial users subject to Federal Categorical Standards to achieve compliance no later than the date specified in those requirements or, in the case of a new industrial user, upon commencement of the discharge.

3. The Discharger shall perform the pretreatment functions as required in 40 CFR Part 403 and amendments or modifications thereto including, but not limited to:

   i) Implement the necessary legal authorities to fully implement the pretreatment regulations as provided in 40 CFR 403.8(f)(1);

   ii) Implement the programmatic functions as provided in 40 CFR 403.8(f)(2);

   iii) Publish an annual list of industrial users in significant noncompliance as provided per 40 CFR 403.8(f)(2)(vii);

   iv) Provide for the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3); and

   v) Enforce the national pretreatment standards for prohibited discharges and categorical standards as provided in 40 CFR 403.5 and 403.6, respectively.

4. The Discharger shall submit annually a report to USEPA Region 9, the State Water Board and the Regional Water Board describing its pretreatment program activities over the previous twelve months. In the event that the Discharger is not in compliance with any conditions or requirements of the Pretreatment Program, the Discharger shall also include the reasons for noncompliance and a plan and schedule for achieving compliance. The report shall contain, but is not limited to, the information specified in Appendix A entitled, "Requirements for Pretreatment Annual Reports," which is made a part of this Order. The annual report is due on the last day of February each year.

5. The Discharger shall submit semiannual pretreatment reports to USEPA Region 9, the State Water Board and the Regional Water Board describing the status of its significant industrial users (SIUs). The report shall contain, but not is limited to, the information specified in Appendix B entitled, "Requirements for Semiannual Pretreatment Reports," which is made part of this Order. The semiannual reports are due July 31st (for the period January through June) and January 31st (for the period July through December) of each year. The Executive Officer may exempt a Discharger from the semiannual reporting requirements on a case by case basis subject to State Water Board and USEPA's comment and approval.

6. The Discharger may combine the annual pretreatment report with the semiannual pretreatment report (for the July through December reporting period). The combined report shall contain all of the information requested in Appendices A and B and will be due on January 31st of each year.

7. The Discharger shall conduct the monitoring of its treatment plant's influent, effluent, and sludge as described in Appendix C entitled, "Requirements for Influent, Effluent and Sludge Monitoring," which is made part of this Order. The results of the sampling and analysis, along with a discussion of any trends, shall be submitted in the semiannual reports. A tabulation of the data shall be included in the annual pretreatment report. The Executive Officer may require more or less frequent monitoring on a case by case basis.

APPENDIX A

REQUIREMENTS FOR PRETREATMENT ANNUAL REPORTS

The Pretreatment Annual Report is due each year on the last day of February. [If the annual report is combined with the semiannual report (for the July through December period) the submittal deadline is January 31st of each year.] The purpose of the Annual Report is 1) to describe the status of the Publicly Owned Treatment Works (POTW) pretreatment program and 2) to report on the effectiveness of the program, as determined by comparing the results of the preceding year's program implementation. The report shall contain at a minimum, but is not limited to, the following information:

1) **Cover Sheet**

The cover sheet must contain the name(s) and National Pollutant Discharge Elimination Discharge System (NPDES) permit number(s) of those POTWs that are part of the Pretreatment Program. Additionally, the cover sheet must include: the name, address and telephone number of a pretreatment contact person; the period covered in the report; a statement of truthfulness; and the dated signature of a principal executive officer, ranking elected official, or other duly authorized employee who is responsible for overall operation of the POTW (40 CFR 403.12(j)).

2) **Introduction**

The Introduction shall include any pertinent background information related to the Discharger, the POTW and/or the industrial user base of the area. Also, this section shall include an update on the status of any Pretreatment Compliance Inspection (PCI) tasks, Pretreatment Performance Evaluation tasks, Pretreatment Compliance Audit (PCA) tasks, Cleanup and Abatement Order (CAO) tasks, or other pretreatment-related enforcement actions required by the Regional Water Board or the USEPA. A more specific discussion shall be included in the section entitled, "Program Changes."

3) **Definitions**

This section shall contain a list of key terms and their definitions that the Discharger uses to describe or characterize elements of its pretreatment program.

4) **Discussion of Upset, Interference and Pass Through**

This section shall include a discussion of Upset, Interference or Pass Through incidents, if any, at the POTW(s) that the Discharger knows of or suspects were caused by industrial discharges. Each incident shall be described, at a minimum, consisting of the following information:

a) a description of what occurred;
b) a description of what was done to identify the source;
c) the name and address of the IU responsible
d) the reason(s) why the incident occurred;
e) a description of the corrective actions taken; and
f) an examination of the local and federal discharge limits and requirements for the purposes of determining whether any additional limits or changes to existing requirements may be necessary to prevent other Upset, Interference or Pass Through incidents.

5) **Influent, Effluent and Sludge Monitoring Results**

This section shall provide a summary of the analytical results from the "Influent, Effluent and Sludge Monitoring" as specified in Appendix C. The results should be reported in a summary matrix that lists monthly influent and effluent metal results for the reporting year.

A graphical representation of the influent and effluent metal monitoring data for the past five years shall also be provided with a discussion of any trends.

6) **Inspection and Sampling Program**

This section shall contain at a minimum, but is not limited to, the following information:

a) Inspections: the number of inspections performed for each type of IU; the criteria for determining the frequency of inspections; the inspection format procedures;
b) Sampling Events: the number of sampling events performed for each type of IU; the criteria for determining the frequency of sampling; the chain of custody procedures.

7) **Enforcement Procedures**

This section shall provide information as to when the approved Enforcement Response Plan (ERP) had been formally adopted or last revised. In addition, the date the finalized ERP was submitted to the Regional Water Board shall also be given.

8) **Federal Categories**

This section shall contain a list of all of the federal categories that apply to the Discharger. The specific category shall be listed including the subpart and 40 CFR section that applies. The maximum and average limits for the each category shall be provided. This list shall indicate the number of Categorical Industrial Users (CIUs) per category and the CIUs that are being regulated pursuant to the category. The information and data used to determine the limits for those CIUs for which a combined waste stream formula is applied shall also be provided.

9) **Local Standards**

This section shall include a table presenting the local limits.

10) **Updated List of Regulated SIUs**

This section shall contain a complete and updated list of the Discharger's Significant Industrial Users (SIUs), including their names, addresses, and a brief description of the individual SIU's type of business. The list shall include all deletions and additions keyed to the list as submitted in the previous annual report. All deletions shall be briefly explained.

11) **Compliance Activities**

a) **Inspection and Sampling Summary:** This section shall contain a summary of all the inspections and sampling activities conducted by the Discharger over the past year to gather information and data regarding the SIUs. The summary shall include:

(1) the number of inspections and sampling events conducted for each SIU;

(2) the quarters in which these activities were conducted; and

(3) the compliance status of each SIU, delineated by quarter, and characterized using all applicable descriptions as given below:

(a) in consistent compliance;

(b) in inconsistent compliance;

(c) in significant noncompliance;

(d) on a compliance schedule to achieve compliance, (include the date final compliance is required);

(e) not in compliance and not on a compliance schedule;

(f) compliance status unknown, and why not.

b) **Enforcement Summary:** This section shall contain a summary of the compliance and enforcement activities during the past year. The summary shall include the names of all the SIUs affected by the following actions:

(1) Warning letters or notices of violations regarding SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(2) Administrative Orders regarding the SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(3) Civil actions regarding the SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(4) Criminal actions regarding the SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(5) Assessment of monetary penalties. Identify the amount of penalty in each case and reason for assessing the penalty.

(6) Order to restrict/suspend discharge to the POTW.

(7) Order to disconnect the discharge from entering the POTW.

12) **Baseline Monitoring Report Update**

This section shall provide a list of CIUs that have been added to the pretreatment program since the last annual report. This list of new CIUs shall summarize the status of the respective Baseline Monitoring Reports (BMR). The BMR must contain all of the information specified in 40 CFR 403.12(b). For each of the new CIUs, the summary shall indicate when the BMR was due; when the CIU was notified by the POTW of this requirement; when the CIU submitted the report; and/or when the report is due.

13) **Pretreatment Program Changes**

This section shall contain a description of any significant changes in the Pretreatment Program during the past year including, but not limited to: legal authority, local limits, monitoring/ inspection program and frequency, enforcement protocol, program's administrative structure, staffing level, resource requirements and funding mechanism. If the manager of the pretreatment program changes, a revised organizational chart shall be included. If any element(s) of the program is in the process of being modified, this intention shall also be indicated.

14) **Pretreatment Program Budget**

This section shall present the budget spent on the Pretreatment Program. The budget, either by the calendar or fiscal year, shall show the amounts spent on personnel, equipment, chemical analyses and any other appropriate categories. A brief discussion of the source(s) of funding shall be provided.

15) **Public Participation Summary**

This section shall include a copy of the public notice as required in 40 CFR 403.8(f)(2)(vii). If a notice was not published, the reason shall be stated.

16) **Sludge Storage and Disposal Practice**

This section shall have a description of how the treated sludge is stored and ultimately disposed. The sludge storage area, if one is used, shall be described in detail. Its location, a description of the containment features and the sludge handling procedures shall be included.

17) **PCS Data Entry Form**

The annual report shall include the PCS Data Entry Form. This form shall summarize the enforcement actions taken against SIUs in the past year. This form shall include the following information: the POTW name, NPDES Permit number, period covered by the report, the number of SIUs in significant noncompliance (SNC) that are on a pretreatment compliance schedule, the number of notices of violation and administrative orders issued against SIUs, the number of civil and criminal judicial actions against SIUs, the number of SIUs that have been published as a result of being in SNC, and the number of SIUs from which penalties have been collected.

18) **Other Subjects**

Other information related to the Pretreatment Program that does not fit into one of the above categories should be included in this section.

Signed copies of the reports shall be submitted to the Regional Administrator at USEPA, the State Water Board and the Regional Water Board at the following addresses:

Regional Administrator
United States Environmental Protection Agency
Region 9, Mail Code: WTR-7
Clean Water Act Compliance Office
Water Division
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Regulatory Unit
State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento, CA 95814

Pretreatment Coordinator
NPDES Permits Division
SF Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

APPENDIX B:

REQUIREMENTS FOR SEMIANNUAL PRETREATMENT REPORTS

The semiannual pretreatment reports are due on July 31st (for pretreatment program activities conducted from January through June) and January 31st (for pretreatment activities conducted from July through December) of each year, unless an exception has been granted by the Regional Water Board's Executive Officer. The semiannual reports shall contain, at a minimum, but is not limited to, the following information:

1) **Influent, Effluent and Sludge Monitoring**

The influent, effluent and sludge monitoring results shall be included in the report. The analytical laboratory report shall also be included, with the QA/QC data validation provided upon request. A description of the sampling procedures and a discussion of the results shall be given. (Please see Appendix C for specific detailed requirements.) The contributing source(s) of the parameters that exceed NPDES limits shall be investigated and discussed. In addition, a brief discussion of the contributing source(s) of all organic compounds identified shall be provided.

The Discharger has the option to submit all monitoring results via an electronic reporting format approved by the Executive Officer. The procedures for submitting the data will be similar to the electronic submittal of the NPDES self-monitoring reports as outlined in the December 17, 1999 Regional Water Board letter, Official Implementation of Electronic Reporting System (ERS). The Discharger shall contact the Regional Water Board's ERS Project Manager for specific details in submitting the monitoring data.

If the monitoring results are submitted electronically, the analytical laboratory reports (along with the QA/QC data validation) should be kept at the discharger's facility.

2) **Industrial User Compliance Status**

This section shall contain a list of all Significant Industrial Users (SIUs) that were not in consistent compliance with all pretreatment standards/limits or requirements for the reporting period. The compliance status for the previous reporting period shall also be included. Once the SIU has determined to be out of compliance, the SIU shall be included in the report until consistent compliance has been achieved. A brief description detailing the actions that the SIU undertook to come back into compliance shall be provided.

For each SIU on the list, the following information shall be provided:

a. Indicate if the SIU is subject to Federal categorical standards; if so, specify the category including the subpart that applies.

b. For SIUs subject to Federal Categorical Standards, indicate if the violation is of a categorical or local standard.

c. Indicate the compliance status of the SIU for the two quarters of the reporting period.

d. For violations/noncompliance occurring in the reporting period, provide (1) the date(s) of violation(s); (2) the parameters and corresponding concentrations exceeding the limits and the discharge limits for these parameters and (3) a brief summary of the noncompliant event(s) and the steps that are being taken to achieve compliance.

3) **POTW's Compliance with Pretreatment Program Requirements**

This section shall contain a discussion of the Discharger's compliance status with the Pretreatment Program Requirements as indicated in the latest Pretreatment Compliance Audit (PCA) Report, Pretreatment Compliance Inspection (PCI) Report or Pretreatment Performance Evaluation (PPE) Report. It shall contain a summary of the following information:

a. Date of latest PCA, PCI or PPE and report.
b. Date of the Discharger's response.
c. List of unresolved issues.
d. Plan and schedule for resolving the remaining issues.

The reports shall be signed by a principal executive officer, ranking elected official, or other duly authorized employee who is responsible for the overall operation of the Publicly Owned Treatment Works (POTW) (40 CFR 403.12(j)). Signed copies of the reports shall be submitted to the Regional Administrator at USEPA, the State Water Board and the Regional Water Board at the following addresses:

Regional Administrator
United States Environmental Protection Agency
Region 9, Mail Code: WTR-7
Clean Water Act Compliance Office
Water Division
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Regulatory Unit
State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento, CA 95814

Pretreatment Coordinator
NPDES Permits Division
SF Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

APPENDIX C

REQUIREMENTS FOR INFLUENT, EFFLUENT AND SLUDGE MONITORING

The Discharger shall conduct sampling of its treatment plant's influent, effluent and sludge at the frequency as shown in Table E-5 of the Monitoring and Reporting Program (MRP, Attachment E).

The monitoring and reporting requirements of the POTW's Pretreatment Program are in addition to those specified in Table E-2 (influent) and Table E-3 (effluent) of the MRPTable 1 of the SMP. Any subsequent modifications of the requirements specified in Tables E-2 and E-3 shall be adhered to and shall not affect the requirements described in this Appendix unless written notice from the Regional Water Board is received. When sampling periods coincide, one set of test results, reported separately, may be used for those parameters that are required to be monitored by both Tables E-2 and E-3 in the Pretreatment Program. The Pretreatment Program monitoring reports shall be sent to the Pretreatment Program Coordinator.

1. Influent and Effluent Monitoring

The Discharger shall monitor for the parameters using the required test methods listed in Table E-5 (the pretreatment table) Any test method substitutions must have received prior written Regional Water Board approval. Influent and Effluent sampling locations shall be the same as those sites specified in the MRP.

2. Influent and Effluent Monitoring

The Discharger shall monitor for the parameters using the required test methods listed in Table E-5 (the pretreatment table) of the MRP. Any test method substitutions must have received prior written Regional Water Board approval. Influent and Effluent sampling locations shall be the same as those sites specified in the MRP.

The influent and effluent sampled should be taken during the same 24-hour period. All samples must be representative of daily operations. Grab samples shall be used for volatile organic compounds, cyanide and phenol. In addition, any samples for oil and grease, polychlorinated biphenyls, dioxins/furans, and polynuclear aromatic hydrocarbons shall be grab samples. For all other pollutants, 24-hour composite samples must be obtained through flow-proportioned composite sampling. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto. For effluent monitoring, the reporting limits for the individual parameters shall be at or below the minimum levels (MLs) as stated in the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2000) [also known as the State Implementation Policy (SIP)]; any revisions to the MLs shall be adhered to. If a parameter does not have a stated minimum level, then the Discharger shall conduct the analysis using the lowest commercially available and reasonably achievable detection levels.

The following standardized report format should be used for submittal of the influent and effluent monitoring report. A similar structured format may be used but will be subject to Regional Water Board approval. The monitoring reports shall be submitted with the Semiannual Reports.

A. Sampling Procedures – This section shall include a brief discussion of the sample locations, collection times, how the sample was collected (i.e., direct collection using vials or bottles, or other types of collection using devices such as automatic samplers, buckets, or beakers), types of containers used, storage procedures and holding times.

Include description of prechlorination and chlorination/dechlorination practices during the sampling periods.

B. Method of Sampling Dechlorination – A brief description of the sample dechlorination method prior to analysis shall be provided.

C. Sample Compositing – The manner in which samples are composited shall be described. If the compositing procedure is different from the test method specifications, a reason for the variation shall be provided.

D. Data Validation – All quality assurance/quality control (QA/QC) methods to be used shall be discussed and summarized. These methods include, but are not limited to, spike samples, split samples, blanks and standards. Ways in which the QA/QC data will be used to qualify the analytical test results shall be identified. A certification statement shall be submitted with this discussion stating that the laboratory QA/QC validation data has been reviewed and has met the laboratory acceptance criteria. The QA/QC validation data shall be submitted to the Regional Water Board upon request.

E. A tabulation of the test results shall be provided.

F. Discussion of Results – The report shall include a complete discussion of the test results. If any pollutants are detected in sufficient concentration to upset, interfere or pass through plant operations, the type of pollutant(s) and potential source(s) shall be noted, along with a plan of action to control, eliminate, and/or monitor the pollutant(s). Any apparent generation and/or destruction of pollutants attributable to chlorination/dechlorination sampling and analysis practices shall be noted.

3. **Sludge Monitoring**

Sludge should be sampled in the same 24-hour period during which the influent and effluent are sampled except as noted in (C) below. The same parameters required for influent and effluent analysis shall be included in the sludge analysis. The sludge analyzed shall be a composite sample of the sludge for final disposal consisting of:

A. Sludge lagoons – 20 grab samples collected at representative equidistant intervals (grid pattern) and composited as a single grab, or

B. Dried stockpile – 20 grab samples collected at various representative locations and depths and composited as a single grab, or

C. Dewatered sludge- daily composite of 4 representative grab samples each day for 5 days taken at equal intervals during the daily operating shift taken from a) the dewatering units or b) from each truckload, and shall be combined into a single 5-day composite.

The USEPA manual, POTW Sludge Sampling and Analysis Guidance Document, August 1989, containing detailed sampling protocols specific to sludge is recommended as a guidance for sampling procedures. The USEPA manual Analytical Methods of the National Sewage Sludge Survey, September 1990, containing detailed analytical protocols specific to sludge, is recommended as a guidance for analytical methods.

In determining if the sludge is a hazardous waste, the Dischargers shall adhere to Article 2, "Criteria for Identifying the Characteristics of Hazardous Waste," and Article 3, "Characteristics of Hazardous Waste," of Title 22, California Code of Regulations, Sections 66261.10 to 66261.24 and all amendments thereto.

Sludge monitoring reports shall be submitted with the appropriate Semiannual Report. The following standardized report format should be used for submittal of the report. A similarly structured form may be used but will be subject to Regional Water Board approval.

A. Sampling procedures – Include sample locations, collection procedures, types of containers used, storage/refrigeration methods, compositing techniques and holding times. Enclose a map of sample locations if sludge lagoons or stockpiled sludge is sampled.

B. Data Validation – All quality assurance/quality control (QA/QC) methods to be used shall be discussed and summarized. These methods include, but are not limited to, spike samples, split samples, blanks and standards. Ways in which the QA/QC data will be used to qualify the analytical test results shall be identified. A certification statement shall be submitted with this discussion stating that the laboratory QA/QC validation data has been reviewed and has met the laboratory acceptance criteria. The QA/QC validation data shall be submitted to the Regional Water Board upon request.

C. Test Results – Tabulate the test results and include the percent solids.

D. Discussion of Results – The report shall include a complete discussion of test results. If the detected pollutant(s) is reasonably deemed to have an adverse effect on sludge disposal, a plan of action to control, eliminate, and/or monitor the pollutant(s) and the known or potential source(s) shall be included. Any apparent generation and/or destruction of pollutants attributable to chlorination/ dechlorination sampling and analysis practices shall be noted.

The Discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants that the permittee believes may be causing or contributing to Interference, Pass Through or adversely impacting sludge quality.

NPDES PERMIT

CONTENTS

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
AND
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 9

NPDES Permit

FOR

CITY AND COUNTY OF SAN FRANCISCO
OCEANSIDE TREATMENT PLANT,
SOUTHWEST OCEAN OUTFALL,
AND
WESTSIDE WET WEATHER FACILITIES

NPDES PERMIT NO. CA 0037681

Order No. R2-2003-0073

Adopted on August 20, 2003

Effective starting October 1, 2003
Expires on September 30, 2008

ORDER NO. R2-2003-0073
NPDES PERMIT NO. CA0037681

REISSUING WASTE DISCHARGE REQUIREMENTS FOR:
OCEANSIDE WATER POLLUTION CONTROL PLANT, AND
WESTSIDE WET WEATHER COMBINED SEWER SYSTEM
SAN FRANCISCO, SAN FRANCISCO COUNTY

FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board), and the U.S. Environmental Protection Agency, Region 9 (hereinafter called U.S. EPA), find that:

1. ***Discharger and Permit Applications***
The City and County of San Francisco, hereinafter called the Discharger or the City, has applied to the Board and the U.S. EPA for re-issuance of the permit and waste discharge requirements to discharge treated wastewater to waters of the State and the United States under the National Pollutant Discharge Elimination System (NPDES) program for the Oceanside Water Pollution Control Plant (Oceanside WPCP) including the Westside Wet Weather Combined Sewer System (NPDES Permit No. CA 0037681).

2. ***Permit Coverage***
The City is the owner and operator of the Oceanside WPCP and the Westside Combined Sewer System (Westside CSS), a wastewater collection, treatment and disposal system which serves the west side of San Francisco. The Permit covers all discharges from the Discharger's Oceanside WPCP and Westside CSS to the Pacific Ocean. These flows originate from domestic and industrial wastewater from the west side of San Francisco and a small portion from the adjacent North San Mateo County Sanitation District. The Southwest Ocean Outfall (SWOO) carries effluent from the Oceanside WPCP and most flow from the Westside CSS to the Pacific Ocean, 3.75 miles offshore. This is considered Federal waters since it is beyond the three-mile limit of the State's territorial sea. The wet weather combined sewer discharge points are at the shoreline and are in State waters. These discharges were previously covered by Order No. 97-044.

3. ***Combined Sewer***
The Discharger collects wastewater in a combined sewer system. This means that domestic sewage, industrial wastewater, and stormwater runoff are collected in the same pipes (combined sewer). Most other communities in California have a separated sewer system: one set of pipes for domestic sewage and industrial waste and another set for stormwater. The City has complied with federally mandated upgrades to secondary level treatment of its dry weather wastewater treatment plants to comply with the Clean Water Act (CWA) as required of Publicly Owned Treatment Works (POTW). The combined sewer system facilities are not POTWs subject to the secondary treatment regulations of 40 Code of Federal Regulation (CFR) Section 133. The U.S. EPA's Office of General Counsel has classified facilities that treat combined sewer overflows as point sources subject to Section 301(b)(1)(A), 301 (b)(1)(C), and 301(b)(2) of the CWA. Under wet weather conditions, the City's combined sewer system must comply with the Federal Combined

Sewer Overflow Control Policy, (59 CFR 18688). Operators of combined sewer systems must implement long-term control plans consistent with the policy in order to minimize CSOs. This includes providing storage capacity or treatment for wet weather flows, maximizing flows to treatment facilities, and minimizing combined sewer overflows.

Facilities Detail

4. Facility Location and Description

a. Oceanside WPCP

The Oceanside WPCP is located at 3500 Great Highway in San Francisco. It is a secondary wastewater treatment plant with a peak secondary treatment capacity of 43 million gallons per day (MGD). During wet weather, the Oceanside wet weather facilities provide primary treatment up to an additional 22 MGD of mixed storm water and sewage.

b. Westside CSS Facilities

The City collects storm water runoff mixed with domestic and industrial wastewater in the Westside Wet Weather Facilities. The Westside system includes three large storage/transports: Westside Transport, Richmond Transport, and Lake Merced Transport. The Westside Transport is a 2.5-mile long box-like structure located beneath the Great Highway and has a storage capacity of 49.3 million gallons (MG). The Richmond Transport, located to the north, has a storage capacity of 12 MG; and the Lake Merced Transport located to the south, has a storage capacity of 10 MG. The combined storage capacity in all three transports (including 2.2 MG of sewers) is 73.5 million gallons. See Table 2 in the Fact Sheet for a breakdown in storage capacity.

The locations of the above facilities are shown in Attachments A (Discharge Facility Location Map), B (Combined Sewer Overflow Structures), and C (Discharge Facility Treatment Process Diagram).

5. Discharge Classification

The U.S. EPA and the Board have classified discharges from the Oceanside Water Pollution Control Plant and the Wet Weather CSS as major discharges.

6. Dry and Wet Weather Classification

a. Wet Weather Day

i. Definition: Wet weather day is defined as any day in which one of the following conditions exists as a result of rainfall:
   1. Instantaneous influent flow to the Oceanside WPCP exceeds 43 mgd; or
   2. The average daily influent flow concentration of TSS or BOD is less than 100 mg/L on the day the discharge occurs; or
   3. The Westside storage/transport flow elevation exceeds 0 feet[1] in the west box or 18 feet in the east box

1 Flow is only decanted to the west box from the east box when the east box storage level exceeds 18 feet.

b. Dry Weather Day

ii. Definition: any day in the year that is not defined as a wet weather day.

iii. During dry weather, all the wastewater collected is treated to secondary levels at the Oceanside WPCP and discharged through the SWOO.

7. ***Oceanside WPCP Treatment Volume***

The Discharger presently discharges an average dry weather flow of 18 MGD from the Oceanside WPCP for discharge through the SWOO. See attachment C for diagram of dry weather treatment. Secondary treatment capacity is maximized at 43 MGD. Wet weather flows in excess of 43 MGD up to 65 MGD receive primary treatment at the Oceanside WPCP and are discharged to the SWOO along with the secondary effluent.

8. ***Westside CSS Treatment Volume***

Wet Weather flow treated at the Oceanside WPCP is maximized at 60 to 65 MGD. Flows above 65 MGD and up to 175 MGD receive flow-through treatment within the CSO structures and are discharged to the SWOO. Flows above 175 MGD also receive flow-through treatment within the CSO structures but are discharged at the shoreline (see later discussion, Finding 10.b.). Flow-through treatment in the CSO storage structures is equivalent to primary treatment in that solids are allowed to settle and a baffle system acts to retain floatable materials prior to discharge. See Attachment D for diagram of wet weather treatment.

9. ***Treatment Process Description***

a. Oceanside WPCP

All flow to the plant is pumped from the Westside Pump Station after coarse screening. The plant treatment process consists of a headworks with fine bar screens and grit removal, primary sedimentation tanks, pure oxygen aeration basins, and secondary clarifiers. During dry weather, all wastewater receives secondary level treatment via a pure oxygen activated sludge process (an average dry weather flow of 18 MGD, peak secondary treatment capacity of 43 MGD). During wet weather, additional treatment capacity is available for flows up to 65 MGD. These excess wet weather flows receive primary treatment using clarifiers prior to discharge to the ocean outfall. The Oceanside WPCP treatment process schematic is included as Attachment C of this order.

b. Westside CSS

During larger storms, when the Oceanside WPCP reaches maximum treatment capacity (65 MGD), storm flows that cannot be stored in the Westside storage/transport system (>73.5 MG) will pass over a weir and under a baffle into a second (west) box, called the decant structure; settleable solids and floatable materials remain in the first (east) box, and are flushed to the treatment plant after the storm subsides. The excess effluent is "decanted" from the east box to the west box and then pumped via the Westside Pump Station to the SWOO. Flows exceeding the discharge capacity of the SWOO (175 MGD contingent upon box levels and head pressure) are discharged to the shoreline via seven overflow structures. (See Attachment D for a diagram of the wet weather facilities.) This decanted effluent has received flow-through treatment equivalent to primary which includes screening (at pump stations) and removal of settleable solids and floatable pollutants.

In summary, wet weather combined sewer flows receive the following level of treatment on an annual basis. Percentages are based on the Westside System Model's estimate of the annual wet weather volume of wastewater (3,500 MG) from the Westside CSS.

1. Approximately 50% of the combined flow receives a combination of primary and secondary treatment at the Oceanside WPCP. The effluent generally meets secondary standards, and is discharged to the SWOO.

2. Approximately 37% of the combined flow receives "flow-through" treatment (equivalent to primary treatment) in the decant process of the Westside storage/transport and is discharged to the SWOO. A weir and baffle system retains settleable solids and floatable materials in the storage/transport structure, which are then flushed to the treatment plant after the rainstorm subsides.

3. Approximately 13% of the combined flow receives "flow-through" treatment (equivalent to primary treatment) in the storage/transport structures and is discharged to the shoreline via any of seven CSO structures.

Prior to the completion of the control program in 1997, over 80% of these flows were discharged untreated at the shoreline as combined sewer overflows (Table 1 in the Fact Sheet shows the decline in the number of overflows since 1992).

c. Deletion of Disinfection Requirements
On May 17, 1989, the Board adopted Order No. 89-71, amending Order No. 88-106 to delete the disinfection requirements. The Board action was based on the final technical report dated April 3, 1989, submitted by the Discharger entitled "Wastefield Transport and Bacteriological Compliance Studies of The San Francisco Ocean Outfall." The studies were conducted in 1987 and 1988. The findings indicate that the present non-disinfected wastewater discharge from the SWOO does not violate the California Ocean Plan bacteriological body-contact standards; these standards have not changed since the 1983 version. Monitoring since 1986 supports this conclusion. Therefore, this order does not require disinfection of the wastewater discharged.

10. Discharge Process

a. Oceanside WPCP
The Oceanside WPCP has the capacity to treat 65 MGD of combined storm water and wastewater during wet weather conditions. Up to 43 MGD receive secondary treatment, and the remaining flow receives primary treatment. All dry weather and wet weather flow from the Oceanside WPCP is discharged into the Pacific Ocean via the SWOO (E-007).

b. Westside Wet Weather CSS
i. The storage/transport structures operate to transport combined sewage and street runoff to the Oceanside WPCP during dry weather periods. During wet weather, these structures provide storage for additional storm water and wastewater flow, while pumping facilities

continue to transfer flow to the treatment facility. In the event that the capacities of the treatment plant and storage structures are exceeded, the combined storm water and wastewater receive the equivalent of primary treatment in the transport structures and are discharged into the Pacific Ocean via the SWOO or any of the seven (7) shoreline CSO structures (CSW 001 to CSW 007).

ii. Discharges from these structures occur only when the storm flow exceeds the combined storage capacity of the storage/transports and the capacity of the pumping facilities to transfer flows to the treatment plant and the SWOO.

11. Discharge Locations

The discharge locations are listed in Table 1.

Table 1. Discharge Locations

Outfall	Distance from shore/ Depth (Feet)	Receiving Water	Latitude	Longitude
Waste 001 – Waste 006 Discharge E-001, E-002, E-003, E-004, E-005, E-006	These discharges are not regulated by this permit and are only incorporated for reference. They are regulated in permit number CA0037664 for the City and County of San Francisco Southeast Water Pollution Control Plant, North Point Wet Weather Facility and Bayside Wet Weather Facilities.			
Waste 007 Discharge E-007 Oceanside WPCP (Southwest Ocean Outfall)	3.75 miles/80 feet MLLW	Pacific Ocean	37° 42.30'	122° 34.65'
Combined Sewer Overflow Sites				
Waste CSO 001 Discharge CSW-001	Shoreline Outfall	Fort Funston, Ocean Beach, Pacific Ocean	37° 42.915'	122° 30.272'
Waste CSO 002 Discharge CSW-002	Shoreline Outfall	Ocean Beach, Pacific Ocean	37° 34.270'	122° 30.481'
Waste CSO 003 Discharge CSW-003	Shoreline Outfall	Ocean Beach, Pacific Ocean	37° 45.834'	122° 30.695'
Waste CSO 004 Discharge CSW-004	Shoreline Outfall	Mile Rock, Pacific Ocean	37° 47.085'	122° 30.613'
Waste CSO 005 Discharge CSW-005	Shoreline Outfall	China Beach, Pacific Ocean	37° 47.264'	122° 29.504'
Waste CSO 006 Discharge CSW-006	Shoreline Outfall	Baker Beach, Pacific Ocean	37° 47.365'	122° 29.272'
Waste CSO 007 Discharge CSW-007	Shoreline Outfall	Baker Beach, Pacific Ocean	37° 47.368'	122° 29.220'
Waste CSO 008	Discharge Eliminated			

Outfall	Distance from shore/ Depth (Feet)	Receiving Water	Latitude	Longitude
Waste CSO 009 – CSO 043 Discharges CSN-009 – CSN-017; CSC-018 – CSC-035; CSS-037 – CSS-043	These discharges are not regulated by this permit and are only incorporated for reference. They are regulated in permit number CA0037664 City and County of San Francisco Southeast Water Pollution Control Plant, North Point Wet Weather Facility and Bayside Wet Weather Facilities.			
CSO-012, 014, 016, 020, 021, 034, 036, and 039	These discharges have been eliminated			

CSN = Combined Sewer North Drainage Basin
CSC = Combined Sewer Central Drainage Basin
CSS = Combined Sewer Southeast Drainage Basin
CSW = Combined Sewer Westside Drainage Basin

12. Solids Treatment, Handling and Disposal

a. Oceanside WPCP

Primary and secondary sludges are blended and thickened using gravity belt thickeners, and then anaerobically digested. The digested biosolids are dewatered and re-used or disposed of at permitted sites.

b. Westside Wet Weather CSS

All solids which settle out in the storage/transports are flushed to the Oceanside WPCP for treatment after the rainstorm subsides.

Combined Sewer Overflow

13. CSO Definition

U.S. EPA's 1994 CSO Control Policy defines CSOs as the following: "A CSO is the discharge from a Combined Sewer System (CSS) at a point prior to the POTW Treatment Plant. A combined sewer system is elsewhere defined as a wastewater collection system owned by a State or municipality...which conveys sanitary wastewater and storm water through a single-pipe system to a POTW." (FR, Vol 59, No. 75, Tuesday, April 19, 1994, 18689, Section I.A). According to this definition, the discharges described in the Findings above are considered "CSOs". Since the term "CSO" has generally applied to untreated discharges from a CSS, these discharges will be referred to as "treated CSOs" because of the flow-through treatment they receive.

14. Non-POTW Classification

U.S. EPA's Office of General Counsel has classified facilities that treat combined sewer overflows as point sources subject to Section 301(b)(1)(A) of the Clean Water Act. Thus, they are not Publicly Owned Treatment Works (POTWs) subject to the secondary treatment regulations of 40 Code of Federal Regulations (CFR) Section 133. This opinion is supported by subsequent case law (646 F.2d 568(1980); Montgomery Environmental Coalition V. Costle).

15. ***Facility Design and Annual Overflows***
In 1979, the San Francisco Bay Regional Water Quality Control Board "Board" issue Order No. 79-12 (See Attachment I) and the State Water Resources Control Board "State Board" issued Order 79-16 (See Attachment H) for the wet weather facilities; State Board Order No. 79-16 and Regional Board Order No. 79-12 found that a long term average of 8 overflows per year would provide adequate overall protection of beneficial uses. . The Westside CSS facilities have been designed so that dependent upon rainfall conditions, on average these shoreline discharges will occur 8 times per year. This overflow frequency was the criterion used to size the storage/transport and treatment facilities. The Discharger is responsible for operating wet weather facilities, storage, transport and pumping facilities at maximum efficiency in order to maximize treatment of wet weather flow. Treated CSOs to the shoreline will occur only when the storm flow exceeds the combined storage capacity of the storage/transports and the capacity of the pumping facilities to transfer flows to the Oceanside WPCP or the SWOO. The combined sewer flows discharged at the shoreline will have received flow-through treatment for the removal of settleable solids and floatable materials. The State Board Order No. 79-16 defined an overflow as the shoreline discharge from the combined sewer collection system. To be considered a discrete overflow event, the overflow must be separated by six hours in time from any other overflow.

The Discharger has successfully designed and completed construction of its wet weather facilities based upon criteria contained in Order No. 79-16. The system was designed and built based upon historical rainfall data to not exceed the overflow frequencies specified in Order No. 79-16. As specified in Order No. 79-12 and subsequent permits for these facilities, these long-term design criteria (the long term average of 8 overflows) will not be used to determine compliance or non-compliance nor used to negate the exception to the Ocean Plan. The Board and the U.S. EPA recognize that some years are wetter than others and may contribute more flow than anticipated in the system design criteria. The Discharger is required to maximize treatment and shall be considered in compliance as defined by adherence to the Wet Weather Effluent Performance Criteria in Section C of this permit, the Operations Plan, and other permit conditions. The operation and implementation of these facilities satisfies CSO Control Policy requirements. Specifically, these facilities implement the nine minimum controls as well as implement a completed long-term control plan as described in the CSO Control Policy (59 CFR 18688).

16. ***Capture and Storage of Wet Weather Flows***
The storage and transport structures, which surround the City like a moat, were designed with the capacity to capture and hold wet weather flows for later treatment and prevent shoreline overflows. The system capacity was measured, designed, and constructed based upon the previous 70 year rainfall history pattern for San Francisco to capture flows as necessary to achieve the criteria specified in State Board Order No. 79-16. In 1997, the Discharger completed the major components of the Wastewater Master Plan, and is in compliance with the Federal CSO Control Policy.

17. ***Sanitary Sewage Fraction of Overflows***
Wet weather flows are intermittent in nature and subject to a high degree of variability throughout the wet weather season. The sanitary fraction in controlled overflows averages 6% of the total flow.

18. Beach Postings and Bacteria Monitoring
In the event of any CSO events, the Discharger will post the beach as a preventative measure, and conduct shoreline monitoring for total coliform bacteria, E-coli (a surrogate of fecal coliform), and enterococcus pursuant to the Self-Monitoring requirements of this order, until these levels drop below the criteria contained in Section II of the attached Self-Monitoring Plan (SMP). Previous sampling indicates that elevated bacteria levels tend to be located only in the vicinity of the outfalls following a CSO discharge, and tend to decrease rapidly, typically within 24 hours after a CSO event. When the levels of all three indicators drop below these criteria, the Discharger may remove the beach postings. According to the draft U.S. EPA guidance document "Implementation Guidance for Ambient Water Quality Criteria for Bacteria," E-coli and enterococcus are considered better indicators of gastrointestinal illness than total coliform. Therefore, monitoring under this permit will include all three indicators – total coliform, E-coli (as a surrogate for fecal coliform), and enterococcus. Additionally, routine monitoring for these indicators will be conducted weekly regardless of the occurrence of CSO events. See Part B of the SMP Section II. and Section III and XII. in the Fact Sheet for further explanation on bacterial monitoring.

Applicable Plans, and Policies

19. Ocean Plan
The State Board adopted an amended Water Quality Control Plan for the ocean waters of California (Ocean Plan) on November 16, 2001. This updated and consolidated plan represents the master water quality control planning document for the State of California. The U. S. EPA approved the revised Ocean Plan on December 3, 2001. A summary of the regulatory provisions is contained in Title 23 of the California Code of Regulations, Section 3912. The Ocean Plan identifies beneficial uses and water quality objectives for ocean waters, which are those waters outside of enclosed bays, estuaries and lagoons and within the three-mile territorial marine waters of the State. The Ocean Plan also identifies discharge prohibitions intended to protect beneficial uses. The SWOO discharge is outside the State's territorial waters and the Ocean Plan does not apply at the point of discharge. For reasons described in Finding 29, this order implements water quality objectives borrowed from the California Ocean Plan.

Beneficial Uses
The Ocean Plan designates the following beneficial uses for the ocean waters of the state:
- Industrial water supply
- Water contact and non-contact recreation, including aesthetic enjoyment
- Navigation
- Commercial and sport fishing
- Mariculture
- Preservation and enhancement of designated Areas of Special Biological Significance (ASBS)
- Rare and endangered species
- Marine habitat
- Fish migration
- Fish spawning and shellfish harvesting

20. Combined Sewer Overflow Policy (CSO)

On April 11, 1994, U.S. EPA adopted the *Combined Sewer Overflow (CSO) Control Policy* (59 Federal Register 18688-18698). The CSO Control Policy was recently incorporated into the Federal CWA by the Wet Weather Water Quality Act of 2000 [House .Resolution (H.R.) 828] which is part of H.R. 4577, an omnibus funding bill. The CWA at Section 402(q)(1) now states: "...Each permit...pursuant to this Act...for a discharge from a municipal combined storm and sanitary sewer shall conform to the CSO Control Policy..." The CSO policy establishes a consistent national approach for controlling discharges from CSOs to the nation's water through the NPDES permit program. CSOs are defined as the discharge from the combined sewer system at a point prior to the POTW Treatment Plant (see Federal Register, Vol 59 No. 75, Tuesday, April 19, 1994 Section I.A.). A discharger's long-term CSO control plan includes the design and construction of additional facilities which constitute the CSO controls envisioned by the CSO Control Policy.

The CSO Policy initiates a two-phased process with higher priority given to more environmentally sensitive areas. During the first phase, the Discharger is required to implement the nine minimum controls. (See Finding 40.) These controls constitute the technology-based requirements of the CWA as applied to combined sewer facilities: best practicable control technology currently available (BPT), best conventional pollutant control technology, (BCT), and best available technology economically achievable, (BAT). These nine minimum controls can reduce the frequency of CSOs and reduce their effects on receiving water quality. During the second phase, the Discharger is required to complete and implement a long-term CSO control plan. The long-term CSO control plan includes the design and construction of additional facilities which constitute the CSO controls envisioned by the CSO Control Policy. In addition, the Discharger is required to continue the implementation of the nine minimum controls, properly operate and maintain the completed CSO controls in accordance with the operational plan, and continue to implement the post-construction monitoring program, e.g., CSO Monitoring.

21. Master Plan

In 1971 and 1974, the Discharger developed the "Master Plan for Wastewater Management" and "Master Plan Environmental Impact Statement and Report," respectively. These documents set the groundwork for the Discharger's wastewater control program by identifying the need for upgraded treatment levels and the principle of storing accumulated combined sewage flow during wet weather for later treatment at the wastewater treatment plant.

22. Operations & Maintenance Manual

An Operations and Maintenance Manual is maintained by the Discharger for purposes of providing plant and regulatory personnel with a source of information describing all equipment, recommended operation strategies, process control monitoring, and maintenance activities. In order to remain a useful and relevant document, this Order requires the Discharger to update the manual regularly to reflect significant changes in treatment facility equipment and operation practices.

Other Regulatory Bases

23. ***Water Quality Criteria/Objectives***
Water quality objectives used to determine reasonable potential in this permit for E-007 (Southwest Ocean Outfall) during dry weather are based on the, *Quality Criteria for Water* (U.S. EPA 440/5-86-001, 1986 and subsequent amendments, "Gold Book"); applicable Federal Regulations (40 CFR Parts 122 and 131); December 27, 2002 "National Recommended Water Quality Criteria" compilation (Federal Register Vol. 63, No. 237, pp. 68354-68364). Additionally, parameters borrowed from the California Ocean Plan were incorporated. Discussion of the specific bases and rationale for effluent limits included in the permit are addressed in pages Section X of the Fact Sheet, which is incorporated by reference as part of this Order. (Also see Finding 29 – Basis for Water Quality Standards Applied to Discharge from SWOO.)

24. ***BCT/BAT Determination***
U.S. EPA establishes some technology-based requirements by issuing industry-wide effluent guidelines. For CSOs, no effluent guidelines have been promulgated for BPT, BCT, or BAT. In the absence of effluent guidelines, the permit writer must use Best Professional Judgment (BPJ) to determine the level of treatment that BPT, BCT, and BAT represent. For the 1997 permit, the U.S. EPA performed a BPJ analysis (see Attachment 1 of Fact Sheet). The Board and the U.S. EPA continue to concur with the original findings of the BPJ analysis. These findings are as follows:
    a. The completed Westside CSS facilities will provide overflow reduction at a cost in excess of that which would be required by BPT/BCT/BAT; and
    b. No additional treatment facilities can be justified on a BPT/BCT/BAT cost basis; and
    c. By including requirements in the NPDES permit to ensure the continued implementation of the nine minimum control technologies outlined in the CSO Policy, U.S. EPA and the Board have established the technology-based requirements mandated by the Clean Water Act and the California Water Code.

25. ***U.S. EPA Guidance Documents***
Other U.S. EPA guidance documents used in the development of this permit may include in part:

- Technical Support Document for Water Quality Based Toxics Control (TSD) (March 1991) ;
- Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, October 1, 1993;
- Whole Effluent Toxicity (WET) Control Policy, July 1994;
- National Policy Regarding Whole Effluent Toxicity Enforcement, August 14, 1995;
- Clarifications Regarding Flexibility in 40 CFR Part 136 Whole Effluent Toxicity (WET) Test Methods, April 10, 1996;
- Regions 9 & 10 Guidance for Implementing Whole Effluent Toxicity Programs Final, May 31, 1996;
- Whole Effluent Toxicity (WET) Implementation Strategy, November 19, 2002;
- *Combined Sewer Overflows, Guidance For Nine Minimum Controls*, EPA 832-B-95-003, May 1995;
- *Manual, Combined Sewer Overflow Control,* EPA/625/R-93/007, September 1993

- *Combined Sewer Overflows, Guidance For Permit Writers*, EPA 832-B-95-008, September 1995;
- *Combined Sewer Overflows, Guidance For Long-Term Control Plan*, EPA 832-B-95-002, September 1995;
- *Guidance: Coordinating CSO Long-Term Planning with Water Quality Standards Reviews,* EPA-833-R-01-002, July 31, 2001.

General Basis for Effluent Limitations

26. Federal Water Pollution Control Act
Effluent limitations and toxic effluent standards are established pursuant to sections 301 through 305, and 307 of the Federal Water Pollution Control Act and amendments thereto are applicable to the discharges herein.

27. 40 CFR 133
The secondary technology based limits for conventional pollutants for dry weather discharges at E-007 (SWOO) are established in accordance with 40 CFR 133, and the prior permit. During wet weather, the CSO Control Policy requirements apply.

28. State Board Order No 79-16
The State Board, in Order No. 79-16, determined that the combined sewer system, designed to capture 100% of the combined sewage and storm water runoff, and attaining a long-term average overflow frequency specified in that order, and maximizing treatment through appropriately sized facilities, would not compromise beneficial uses. The Discharger has successfully and adequately designed, built, and implemented control and treatment strategies that effectively address wet weather flow conditions.

29. Basis for Water Quality Standards Applied to Discharge from SWOO
Though the discharge is located 0.3 to 1.5 miles beyond State Waters, compliance with parameters borrowed from the Ocean Plan is required immediately after initial dilution. This requirement will assure that under worst-case conditions the receiving waters are protected. In addition state standards will be met within state waters. In addition, compliance with numbers borrowed from the Ocean Plan immediately after initial dilution is required to provide the basis for EPA's determination that the discharge will not cause unreasonable degradation of the marine environment as required by section 403 of the Act. Section 403(a) of the Act prohibits discharge to Ocean Waters except in compliance with guidelines established under section 403(c) of the Act. Section 403(c) of the Act requires that guidelines be promulgated for determining the degradation of marine waters. Federal Regulations at 40 CFR 125.122(b) (Determination of unreasonable degradation of the marine environment) state:

> *Discharges in compliance...with state water quality standards shall be presumed not to cause unreasonable degradation of the marine environment, for any specific pollutants or conditions specified in the... standard.*

The Ocean Plan is not directly applicable to the discharge from the SWOO at the point of discharge because the discharge occurs outside of state waters. However, because the discharge is in compliance with numeric standards promulgated for ocean discharges within state waters (i.e. the 2001 California Ocean Plan) and because these standards address the criteria listed under 403(c)(1)of the Act, EPA concludes that compliance with numbers borrowed from the Ocean Plan provides a reasonable basis for concluding that the discharge from the SWOO is entitled to the presumption that it does not cause unreasonable degradation for the pollutants and conditions provided for in the Ocean Plan. EPA's review of the application and monitoring data supplied by the City of San Francisco provides no basis for rebutting this presumption. Therefore, EPA determines that the discharge is permitted under section 403 of the Act.

30. ***Applicable Water Quality Objectives – State Waters***
The Ocean Plan objectives apply to the shoreline CSOs to a limited extent. In Order WQ 79-16, the State Board granted an exception to bacterial water contact and shellfish harvesting standards in the California Ocean Plan for the shoreline CSOs. This exception was granted by the State Board because of the impracticality of shoreline discharges from a combined sewer system meeting these requirements. Order WQ 79-16 states that the exception will not compromise protection of ocean waters for beneficial uses, and the public interest will be served. The exception was conditional. Order WQ 79-16 limits the number of overflows to eight per year as a long term average. Also, it requires the Discharger to post beaches in the event of overflows until bacterial standards are met, operate facilities to conform with the physical, chemical, biological and radioactivity receiving water objectives of the Ocean Plan, and implement source control program for industrial users. Since Order 79-16, State Board has revised the Ocean Plan several times. The bacterial, physical, chemical, biological and radioactive objectives have remained relatively unchanged with two exceptions: 1) the addition of a list of numeric toxic pollutants to the chemical objectives, and 2) the addition of a narrative biological objective for bioaccumulation. Furthermore, the current Ocean Plan adopted 2001, specifies in III.A.4. that "not withstanding any other provisions in this plan, discharges from the City of San Francisco's combined sewer system are subject to the U.S. EPA's Combined Sewer Overflow Policy." Because the City has exceeded the minimum level of treatment outlined under Section II.C.4.A of the 1994 CSO Control Policy ("Presumption" approach), the wet weather facilities are "presumed to provide an adequate level of control to meet the water quality-based requirements of the CWA." Therefore, there are no numerical effluent limits applied to the treated shoreline CSOs. The City, however, is required to maintain and operate the Westside CSS facilities in accordance with its long term control plan to assure compliance with the CSO Control Policy as described previously.

The U.S. EPA approved the exception (as required in the Ocean Plan) in their letter of August 17, 1979.

31. ***Water Quality Based Effluent Limitations – Dry Weather***
During dry weather as defined by Finding 6.b., toxic substances in Discharge E-007 are regulated by water quality based effluent limitations (WQBELs) derived from the California Ocean Plan. WQBELs in this Order are revised and updated from the limits in the previous permit order and their presence in this Order is based on Reasonable Potential Analysis factors. Numeric WQBELs are required for all constituents that have reasonable potential to cause or contribute to an excursion above any State water quality objective. Numeric WQBELs are included in this permit for acute toxicity and for chronic toxicity.

32. ***Maximum Daily Effluent Limits – Dry Weather***
Maximum Daily Effluent Limits (MDEL) are used in this permit to protect against acute water quality effects. It is impracticable to use weekly average limitations to guard against acute effects. Weekly averages are effective for monitoring the performance of biological wastewater treatment plants, whereas the MDELs are necessary for preventing fish kills or mortality to aquatic organisms.

NPDES regulations and U.S. EPA's Technical Support Document (TSD) provide the basis to establish MDELs. NPDES regulations at 40 Code of Federal Regulations section 122.45(d) state: "For continuous discharges, all permit effluent limitations, standards, and prohibitions, including those necessary to achieve water quality standards, shall *unless impracticable* be stated as:

> (1) Maximum daily and average monthly discharge limitations for all discharges other than publicly owned treatment works; and
> (2) Average weekly and average monthly discharge limitations for POTWs." (Emphasis added.)

The TSD (page 96) states daily maximum is appropriate for two reasons:

a. The basis for the 7-day average for POTWs derives from the secondary treatment requirements. This basis is not related to the need for assuring achievement of water quality standards.
b. The 7-day average, which could comprise up to seven or more daily samples, could average out peak toxic concentrations and therefore the discharge's potential for causing acute toxic effects would be missed. A maximum daily limit would be toxicologically protective of potential acute toxicity impacts.

33. ***Technology Based Effluent Limits – Dry Weather***
Most permit effluent limits for conventional pollutants for the dry weather E-007 SWOO discharge are technology based. Limits in this permit based on the Secondary Treatment Regulations at 40 CFR 133.102 are the same as those in the prior permit for the following constituents: Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Grease and Oil, Turbidity, and pH. The acute toxicity limit is now a water quality-based limitation. Technology-based effluent limitations are put in place to ensure that full secondary treatment is achieved by the wastewater treatment facility.

34. ***303(d) Listed Constituents***
On June 6, 2003, the U.S. EPA approved a revised list of impaired waterbodies prepared by the State. The list [hereinafter referred to as the 2002 303(d) list] was prepared in accordance with Section 303(d) of the federal Clean Water Act to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. Currently the receiving waters for the discharges covered by this permit are not impaired or listed on the 303(d) list.

35. ***Reasonable Potential Methodology***
This reasonable potential analysis applies to dry weather effluent from the Oceanside WPCP (E-

007), but does not apply to wet weather effluent wastes from E-007, or to wastes CSO 001 through CSO 007. As specified by the CSO Policy, it is presumed that these wet weather discharges do not have reasonable potential to cause or contribute to an excursion above any state water quality standard as long as the Discharger implements and maintains the Nine Minimum Control measures, as well as the long-term control plan through implementation of the Wet Weather Operations Plan (also see Section C).

The Ocean Plan sets forth the water quality standards which are directly applicable to most discharges into state waters. U.S. EPA has determined that based on compliance with section 403 of the Act, it is necessary to borrow these standards for the discharge from the SWOO into Federal Waters.

The method for determining reasonable potential used in this permit closely follows the protocol described in U.S. EPA's *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991 (TSD). The method projects a maximum effluent concentration with dilution, using a statistical approach that estimates the 99th percentile of the lognormal distribution of effluent concentrations. This maximum is then compared to an appropriate water quality objective. If the projected maximum is less than the water quality objective, there is no reasonable potential for the effluent to cause an excursion above the water quality standard.

CSO Control Policy Requirements – Wet Weather Controls

36. ***Conformance to CSO Control Policy***
The Discharger is served almost 100% by combined sewers and thus is directly affected by the CSO Control Policy. In 1997, U.S. EPA and the Board reviewed this Policy together with documentation submitted by the Discharger and have made the following determinations:

a. The Discharger has demonstrated implementation of the nine minimum control technologies as specified in the Policy.
b. The Discharger has completed its Master Plan CSO control program and has otherwise demonstrated compliance with section I.C.1 of the CSO Control Policy. Therefore, the Discharger is not required to complete a (new) CSO long-term plan.
c. The Discharger has demonstrated compliance with the "Presumption" Approach for compliance during wet weather with water quality standards. (See Finding 38 for a discussion of the "Presumption" Approach.)
d. The Discharger's implementation of its wastewater Master Plan appropriately considered sensitive areas as required in the CSO Control Policy.
e. During wet weather, the Discharger operates its Oceanside WPCP at the maximum capacity compatible with safe operation and thus is in compliance with the CSO Control Policy provisions which allow for the discharge during wet weather of combined sewer flows which have received primary-only treatment.

In summary, the Board and U.S. EPA have determined that the Discharger's integrated approach to controlling storm flows is consistent with the CSO Control Policy.

37. Long-term Control Plan *(water quality-based requirements)*

In conformance with the CSO Control Policy, the Discharger developed a long-term control plan to select CSO controls to comply with water quality standards, based on consideration of the Discharger's financial capability. The purpose of this long-term control plan is to comply with the water quality requirements of the CWA. The CSO Control Policy provides two alternative approaches – the "demonstration" and the "presumption" approaches – that provide communities with targets for CSO controls that achieve compliance with the CWA, particularly protection of water quality and designated beneficial uses. The Discharger's program, which is already complete, complies with the presumption approach. This approach is defined in the CSO Control Policy as follows:

" '*Presumption Approach*'
A program that meets any of the criteria listed below would be presumed to provide an adequate level of control to meet the water quality-based requirements of the CWA, provided the permitting authority determines that such presumption is reasonable in light of the data and analysis conducted in the characterization, monitoring, and modeling of the system and the consideration of sensitive areas described above. These criteria are provided because data and modeling of wet weather events often do not give a clear picture of the level of CSO controls necessary to protect WQS [Water Quality Standards].

i. No more than an average of four overflow events per year, provided that the permitting authority may allow up to two additional overflow events per year. For the purpose of this criterion, an overflow event is one or more overflows from a CSS [Combined Sewer System] *as the result of a precipitation event that does not receive the minimum treatment specified below; or*

ii. The elimination or the capture for treatment of no less than 85% by volume of the combined sewage collected in the CSS during precipitation events on a system-wide annual average basis; or

iii. The elimination or removal of no less than the mass of the pollutants, identified as causing water quality impairment through the sewer system characterization, monitoring, and modeling effort, for the volumes that would be eliminated or captured for treatment under paragraph ii above.

Combined sewer overflows remaining after implementation of the nine minimum controls and within the criteria specified at II.C.4.a.i or ii, should receive a minimum of:

a. Primary clarification (Removal of floatables and settleable solids may be achieved by any combination-of treatment technologies or methods that are shown to be equivalent to primary clarification.);
b. Solids and floatables disposal; and
c. Disinfection of effluent, if necessary, to meet WQS, protect designated uses and protect human health, including removal of harmful disinfection chemical residuals, where necessary."

38. Conformance to "Presumption Approach"

The completed Master Plan Program exceeds the specifications of the Presumption Approach. The Discharger captures and provides treatment to 100% of the combined sewer flows rather than the 85% identified in option ii. As defined in the CSO Control Policy, the Discharger has no remaining untreated overflow events; the overflows that occur in the City receives treatment (within the storage/transports) consisting of removal of floatable and settleable solids.

39. ***Implementation of Long-term Control Plan***
The wet weather conditions in this Order require continued implementation of the long-term plan and operation of all wastewater facilities such that pollutant removal from combined flow is maximized.

40. ***Nine Minimum Controls***
The nine minimum controls in the CSO Control Policy are required by the permit to meet the technology-based requirements of the CWA for wet weather discharges and listed as follows:

a. Conduct proper operation and regular maintenance programs for the combined sewer system (CSS) and the CSO outfalls;
b. Maximize use of the collection system for storage;
c. Review and modify pretreatment programs to ensure that CSO impacts are minimized;
d. Maximize flow to the POTW for treatment;
e. Prohibit CSOs during dry weather;
f. Control solids and floatable materials in CSOs;
g. Develop and implement pollution prevention programs that focus on contaminant reduction activities;
h. Notify the public; and
i. Monitor to effectively characterize CSO impacts and the efficacy of CSO controls.

Specific Basis for Effluent Limitations

41. ***Dilution and Assimilative Capacity***
The Reasonable Potential Analysis for SWOO and the effluent limitations used a dilution factor of 76:1 for all toxic constituents. As provided in the TSD, different dilution factors may be considered for different toxic constituents depending on the nature of the compound. For non-bioaccumulative constituents (or non-bioconcentratable pollutants using TSD terminology), 76:1 is a highly conservative approach since it does not take into account the average exposures on which the risk assumptions are based for the chronic criteria. For bioconcentratable pollutants, the TSD recommends restrictions on the dilution factor to prevent tissue contamination of organisms. Since sediment and tissue data from the SWOO Report show no elevation in concentrations of a select list of bioconcentratable pollutants in the vicinity of the SWOO compared to reference sites, some dilution above zero is appropriate for the SWOO (See Southwest Ocean Outfall Regional Monitoring Program, Five Year Summary Report, 1997-2001, Water Quality Bureau, 2003. City and County of San Francisco, Public Utilities Commission). Thus, 76:1 was also used for bioconcentratable constituents as it maintains past and current conditions for the Discharger. Future permits may use more appropriate dilution factors based on EPA and State guidance and discussions between the Discharger and EPA and the Board. For additional information on the City's monitoring program for bioaccumalative pollutants see Section X: Initial Dilution in the Fact Sheet.

42. ***Receiving Water Ambient Background Data Used in the RPA***
Ambient background values are utilized in the reasonable potential analysis (RPA) for E-007 during dry weather. For RPA, the ambient background seawater concentrations listed in Table C of the Ocean Plan are used. These are arsenic (3 ug/l), copper (2 ug/l), mercury (0.0005 ug/l), silver (0.16 ug/l), and zinc (8 ug/l); for all other constituents, the Ocean Plan considers the background concentration to be zero.

43. ***Reasonable Potential Analysis (RPA)***
40 CFR 122.44(d)(1)(I) requires the permit to include limits for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard." The City submitted RPA calculations that were reviewed and analyzed by the U.S. EPA and the Board (see Finding 44). The RPA assessed constituents of concern identified in Table B of the Ocean Plan; no constituents showed a reasonable potential to exceed the most stringent of the Ocean Plan standards (see Finding 44). Monitoring is required for most of these constituents. A re-opener provision is included in this permit that allows numeric limits to be added to the permit for any constituent of the Ocean Plan that in the future exhibits reasonable potential to cause or contribute to an exceedance of a water quality standard. This determination will be made by the Board and U.S. EPA based on monitoring results.

44. ***Summary of RPA Data and Results***
The following tables summarize the results of the reasonable potential calculations.
Table 2 summarizes information for metals, and Table 3 summarizes the organics information. Using even the most conservative water quality objective (Ocean Plan's 6-month median or 30-day average), no metals or organics exhibit reasonable potential. For some organics, there is not enough information to make a reasonable potential determination. For a number of organic pollutants, detection limits are higher than water quality standards even with dilution, and all samples collected are below detection limits. These situations are reflected in the last column of Table 3 as "undetermined." For TCDD equivalents (dioxin), three samples yielded quantifiable results, and 5 samples did not. Although the analysis showed no reasonable potential (assuming non-detects = 0), because detection limits are fairly high, reasonable potential is considered to be "undetermined." U.S. EPA and the Board recognize that uncertainties exist, and have included acute and chronic toxicity limits in the permit to ensure that any effluent toxicity is quickly identified and controlled.

TABLE 2
Summary of Reasonable Potential Analysis for Metals (in ug/l)

Constituent	Ocean Plan Objectives (6-month median)	Ocean Plan Objectives (24-hour)	Maximium Effluent Concentration	Projected Maximum with 76:1 Dilution	Reasonable Potential
Arsenic	8	32	5	3.1	No
Cadmium	1	4	0.88	0.03	No
Chromium	2	8	7.5	0.27	No
Copper	3	12	25.6	0.22	No

Constituent	Ocean Plan Objectives (6-month median)	Ocean Plan Objectives (24-hour)	Maximium Effluent Concentration	Projected Maximum with 76:1 Dilution	Reasonable Potential
Lead	2	8	7.1	0.19	No
Mercury	0.04	0.16	0.048	0.0016	No
Nickel	5	20	4.4	0.07	No
Selenium	15	60	4.61	0.06	No
Silver	0.7	2.8	1.7	0.19	No
Zinc	20	80	100.7	9.87	No

Constituent	Ocean Plan Objectives (30-day average)	Maximium Effluent Concentration	Projected Maximum with 76:1 Dilution	Reasonable Potential
Antimony	1,200	<1.0	0.0241	No
Beryllium	0.33	<1.0	0.0241	No
Thallium	2	<1.0	0.0241	No

TABLE 3
Summary of Reasonable Potential Analysis for Organics (in ug/l)

Constituent	Ocean Plan Objectives (30-day average)	Ocean Plan Objectives (6-month median)	Maximium Effluent Concentration	Projected Maximum with 76:1 Dilution	Reasonable Potential
Tributyltin	0.0014		0.011	0.0006	No
TCDD Equivalent (TEQ) pg/l	0.0039		0.07	0.0034	Undetermined
Ammonia (mg/l)		600	36.20	1.7418	No
2-Methyl 4, 6-Dinitrophenol	220		<0.64	0.0154	No
PAHs	0.0088		<0.14	0.0034	No
Carbon Tetrachloride	0.90		<0.5	0.0120	No
1,2-Dichloroethane	28		<0.5	0.0120	No
Chloroform	130		8.7	0.4186	No
Phenolics		30	<0.5	0.0120	No
Toluene	85,000		<0.5	0.0674	No
Benzene	5.9		<0.5	0.0120	No
Acrolein	220		<50	1.2029	No
Acrylonitrile	0.10		<50	1.2029	undetermined
Bis(2-Chloro ethyl) Ether	0.045		<0.91	0.0219	No
Bis(2-Chloroethoxy) Methane	4.4		<1.01	0.0243	No
Bis (2-Chloroisopropyl) Ether	1,200		<0.85	0.0204	No
Chlorobenzene	570		<0.5	0.0120	No
Diethyl Phthalate	33,000		<0.32	0.0077	No
Dimethyl Phthalate	820,000		<0.35	0.0084	No
1,2-Diphenylhydrazine	0.16			No data	undetermined
Ethylbenzene	4100		<0.5	0.0120	No

Constituent	Ocean Plan Objectives (30-day average)	Ocean Plan Objectives (6-month median)	Maximium Effluent Concentration	Projected Maximum with 76:1 Dilution	Reasonable Potential
Fluoranthene	15		<0.04	0.0010	No
Hexachlorocyclopentadiene	58		<0.33	0.0079	No
Hexachlorobutadiene	14		<0.55	0.0132	No
Hexachloroethane	2.5		<0.59	0.0142	No
Isophorone	730		<0.91	0.0219	No
Dichloromethane	450		<3	0.0722	No
N-Nitrosodiphenylamine	2.5		<20	0.8111	undetermined (Only 3 data)
N-Nitrosodimethylamine	7.3		<20	1.0676	undetermined (Only 2 data)
Nitrobenzene	4.9		<0.91	0.0219	No
Tetrachloroethylene	2.0		3.2	0.1540	No
1,1-Dichloroethylene	0.9		<0.5	0.0120	No
1,1,1-Trichloroethane	540,000		<0.5	0.0120	No
1,1,2-Trichloroethane	9.4		<0.5	0.0120	No
1,1,2,2-Tetrachloroethane	2.3		<0.5	0.0120	No
1.4-Dichlorobenzene	18		<0.5	0.0120	No
2,4-Dinitrotoluene	2.6		<0.96	0.0231	No
2,4-Dinitrophenol	4.0		<0.4	0.741	No
2,4,6-Trichlorophenol	0.29		<0.69	0.0166	No
3,3-Dichloro-Benzidine	0.0081		<2.77	0.0666	Undetermined
Bis(2-Ethylhexyl)Phthalate	3.5		<0.97	0.0233	No
Di-N-Butylphthalate	3500		<0.96	0.0231	No
Benzidine	0.000069		<0.05	0.0013	Undetermined
Vinyl Chloride	36		<0.5	0.0120	No
Trichloroethylene	27		<0.5	0.0120	No
Aldrin (ng/l)	0.022		<2.02	0.0486	Undetermined
Chlordane (ng/l)	0.023		<3.4	0.0818	Undetermined
DDT/DDD/DDE (ng/l)	0.17		<5.9	0.1419	No
Dieldrin (ng/l)	0.04		<1.93	0.0464	Undetermined
Endosulfan (ng/l)		9.0	<2.84	0.068	No
Endrin (ng/l)		2.0	<2.08	0.0500	No
Toxaphene (ng/l)	0.21		<35	0.842	Undetermined
Heptachlor (ng/l)	0.05		<1.0	0.0024	No
PCBs (ng/l)	0.019		<35	0.8420	Undetermined
Hexachlorobenzene (ng/l)	0.21		<5	0.1203	No
1,3-Dichloropropene	8.9		<0.5	0.0120	No
Hexachlorocyclohexane (HCH)		0.004	<0.33	0.0079	Undetermined
Halomethanes	130		<0.5	0.0120	No
Dichlorobenzenes	5100		<0.5	0.0289	No
Dieldrin (ng/l)	0.04		<1.93	0.0464	Undetermined
Endosulfan (ng/l)		9.0	<2.84	0.068	No

45. ***Limits for Acute and Chronic Toxicity***
Based on the reasonable potential calculations using conservative assumptions and the TSD methodology, no reasonable potential was found for the metals or organic pollutants. However, based on the origin of the effluent as domestic and industrial wastewater, acute toxicity and chronic toxicity limitations are contained in the permit on a professional judgment basis.

46. ***Whole Effluent Toxicity Monitoring***
Sections 308(a) and 402 of the Clean Water Act provide authority to U.S. EPA or the State to require that NPDES permittees/applicants use biological monitoring methods and provide chemical toxicity and in-stream biological data when necessary for the establishment of effluent limits, the detection of violations, or the assurance of compliance with water quality standards. Both acute and chronic toxicity will be measured in accordance with the 2001 Ocean Plan, as described in Section I of the Self Monitoring Program. Limitations for acute and chronic toxicity have been included in this permit.

Programs

47. ***Pollution Prevention and Pollutant Minimization***
The Discharger submitted to the Board a program plan which described the implementation of its Water Pollution Prevention Program. This ongoing program is intended to prevent the disposal of toxic substances to the sewer system. The Discharger is currently in the process of developing a new comprehensive wastewater master plan. The "Screening of Feasible Technologies" (SOFT), 2000 draft report should be finalized for use in the master plan process. The Discharger is encouraged to continue to work with interested stakeholders in the development of the master plan. See Reassessment of Treated Overflows in the Fact Sheet for more information on SOFT. Specific activities associated with that program are presented in detail in Provision 3.

48. ***Pretreatment Program***
The Discharger has implemented and is maintaining a U.S. EPA approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR 403) and the requirements specified in Attachment E "Pretreatment Requirements" and its revisions thereafter.

Analysis of Impacts

49. ***Endangered Species Consultation***
U.S. EPA conducted a consultation with NOAA and U.S Fish and Wildlife Service according to Section 7(a)(2) of the Endangered Species Act (ESA). NOAA and U.S Fish and Wildlife Service concurred with U.S. EPA's "will not adversely affect" determination. (See Attachment J for ESA species letter and Response to Comments for additional information)

Permit Administration

50. ***Previous Order***
The Discharger was previously regulated by Waste Discharge Requirements in Order No. 97-044, effective May 9, 1997. This Order supercedes and rescinds the requirements of Order No. 97-044.

51. ***NPDES Permit***
This Order serves as an NPDES Permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code. In addition, adoption of this Order is exempt from CEQA pursuant to California Code of Regulations, Title 11, section 15301, involving negligible or no expansion of use of an existing facility.

52. ***Notification***
The Discharger and interested agencies and persons have been notified of the Board's intent to reissue requirements for the existing discharge and have been provided an opportunity to submit their written views and recommendations.

53. ***Fact Sheet and Response to Comments***
The Fact sheet and Response to Comments for this Order are hereby incorporated by reference as part of this Order.

54. ***Third Party Review of Pollution Prevention Program***
The Board staff intends to require an objective third party to establish model programs, and to review program proposals and reports for adequacy. This is to encourage use of Pollution Prevention measures and does not abrogate the Board's responsibility for regulation and review of the Discharger's Pollution Prevention Program. Board staff will work with the Discharger and other interested parties to identify the appropriate third party for this effort.

55. ***Public Hearing***
The Board and U.S. EPA in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code and regulations adopted hereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted hereunder, that the Discharger shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The discharge of treated wastewater from sources, or at locations, or in a manner different from that described in the Findings of this Order is prohibited, except as noted in Prohibition A.3.

2. Discharge of wastewater is prohibited unless discharged through the Southwest Ocean Outfall diffuser at 37° 42' 18" North latitude, 122° 34' 39" West longitude (start of diffuser), except discharges occurring on a wet weather day (as defined in Finding 6.a. above.)

3. Bypass of the secondary treatment facilities at Oceanside WPCP is prohibited, except during a wet weather day or as provided in Standard Provision #13.

4. Discharge of effluent from the Oceanside WPCP which does not receive an initial dilution of at least 76:1 is prohibited.

5. Discharge of CSO-001 through CSO-007 outside of the wet weather period as defined in Finding 6.a is prohibited.

6. The discharge of average dry weather flows from the Oceanside WPCP greater than 43 mgd is prohibited. The Discharger shall determine the average dry weather flow over three consecutive dry weather months each year.

7. The discharge of waste shall not create a condition of pollution or nuisance as defined in the California Water Code.

8. Degradation of harvestable shellfish in the area as a result of dry weather discharge is prohibited.

B. DRY WEATHER EFFLUENT LIMITATIONS

Representative samples of combined effluent discharged through the SWOO at sampling station E-007 (see "Self-Monitoring Plan"), shall not exceed the following limits during dry weather discharges:

1. **Technology-Based Limits based on the Secondary Treatment** Regulation at 40 CFR 133.102 and 133.103, and the previous permit limits.

a. Constituent	Units	Monthly Average	Weekly Average	Daily Maximum	Instan-taneous Maximum
Biochemical Oxygen Demand (BOD_5)	mg/l	30	45	---	
Total Suspended Solids (TSS)	mg/l	30	45	---	
Grease and Oil	mg/l	25	40	---	75
Turbidity	NTU	75	100	225	---
pH		within 6 to 9 at all times			

b. BOD_5 and TSS 85% removal

The arithmetic mean of the biochemical oxygen demand (five-day, 20°C) (BOD_5) and total suspended solids (TSS) concentration, for effluent samples collected in a calendar month shall not exceed 15 percent of the arithmetic mean of the respective values for influent samples collected at approximately the same times during the same period. Measurements taken on wet weather days shall not be included in calculating percent removal.

2. **Water Quality-Based Limits**: Limits on acute and chronic toxicity are derived from the 2001 Ocean Plan. Acute and chronic Toxicity shall be measured in accordance with the attached Self Monitoring Program.

Constituent	Units	Daily Maximum.
Acute Toxicity	**TUa**	2.58
Chronic Toxicity	**TUc_2**	76

C. WET WEATHER EFFLUENT PERFORMANCE CRITERIA (Operation requirements for wet weather facilities)

Wet Weather Performance Requirements

1. The Discharger shall capture for treatment, or storage and subsequent treatment, 100% of the Westside combined sewage volume collected in the combined sewage system during precipitation events under design conditions. Captured combined sewage shall be directed either to the Oceanside WPCP or to the storage/transports. All combined sewage captured shall receive a minimum of the following treatment:

   a. Flow-through treatment (storage/transports)
   b. Primary treatment (Oceanside WPCP)
   c. Secondary treatment (Oceanside WPCP)

2. The Discharger shall provide documentation that addresses the following criteria for wet weather flows as part of the Monthly Self Monitoring Report requirements:

3. Wet Weather Operation of Westside Facilities

   a. WESTSIDE DRAINAGE BASIN: Oceanside WPCP operation depends on rainfall, forecasts, and storage conditions in the Westside Transport, Lake Merced Transport and Richmond Transport structures.
      1). Oceanside WPCP will have an influent flow rate of at least 43 MGD prior to initiating decant from the Westside Transport into the Pacific Ocean via the SWOO.
      2). SWOO will have an influent flow rate of at least 165 MGD within 2 hours of a discharge into the Pacific Ocean from CSW 002 or CSW 003.
      3). Sea Cliff Pump Station I is operated at maximum capacity before an overflow occurs from CSW 005.
      4). Sea Cliff Pump Station II is operated at maximum capacity before an overflow occurs from CSW 007.

   b. POST RAIN ACTIVITIES
      1). Post Wet Weather Event - Treatment at the Oceanside WPCP will continue until the Westside Drainage Basin storage/transports are substantially empty of stormwater flows.

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2 A TUc equals 100 divided by the no observable effect level (NOEL). The NOEL is determined from IC, EC, or NOEC values. Monitoring and TRE requirements may be modified by the Executive Officer in response to the degree of toxicity detected in the effluent or in ambient waters related to the discharge.

a). If the National Weather Service predicts a 30% chance of rain during the next 24 Hours:
   i. Pumping will be maximized from Westside storage and transport via the Westside Station (WSS) to the SWOO and Oceanside WPCP until the level of sewage/stormwater in the East Box is between 5-10 feet.
   ii. Pumping will be maximized from Westside storage and transport via WSS to SWOO and OSP until the level of sewage/stormwater in the West Box is essentially zero.

b). If the National Weather Service does not predict rain
   i. Pumping will be maximized from Westside storage and transport until the level of sewage/stormwater in the West Box is essentially zero and total flow to Oceanside WPCP is less than 43 MGD.

D. RECEIVING WATER LIMITATIONS (DRY WEATHER)

1. The discharge from the SWOO shall not cause the following water quality objectives to be violated in ocean waters upon completion of initial dilution. (These limits are derived from the California Ocean Plan and are incorporated herein based on U.S. EPA's determination that compliance with said provisions provides the basis for U.S. EPA's determination that the discharge will not cause unreasonable degradation as required by Section 403 of the Clean Water Act.):

   a. Physical Characteristics
      1. Floating particulates and grease and oil shall not be visible.
      2. The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.
      3. Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.
      4. The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.

   b. Chemical Characteristics
      1. The dissolved oxygen concentration shall not at any time be depressed more than ten percent from that which occurs naturally as a result of the discharge of oxygen demanding waste materials.
      2. The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
      3. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
      4. The concentration of organic materials in marine sediments shall not be increased to levels which would degrade marine life.
      5. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.

   c. Biological Characteristics
      1. Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.

2. The natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.
3. The concentration of organic materials in fish, shellfish or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

2. Receiving water monitoring shall be conducted in accordance with the attached Self-Monitoring Program, Parts A and B.

E. BIOSOLID MANAGEMENT PRACTICES

1. The Discharger presently re-uses all stabilized, dewatered sewage sludge (biosolids) from the Discharger's wastewater treatment plant by beneficially at permitted sites. If the Discharger desires to dispose of biosolids by a different method, the Discharger shall notify the Board and U.S. EPA in writing before start-up of the alternative disposal practice.

2. Biosolids that are disposed of in a municipal solid waste landfill must meet the requirements of 40 CFR 258. The Discharger's annual self-monitoring report shall include the amount of biosolid disposed of, and the landfill(s) to which it was sent.

3. All biosolids generated by the Discharger must be disposed of in a municipal solid waste landfill, or in accordance with the requirements of 40 CFR 503. All the requirements of 40 CFR Part 503 are enforceable whether or not they are stated in an NPDES permit or other permit issued to the Discharger.

4. Biosolid treatment, storage, and disposal or reuse shall not create a nuisance or result in groundwater contamination.

5. The treatment and temporary storage of biosolids at the Discharger's wastewater treatment facility shall not cause waste material to be in a position where it will be carried from the biosolids treatment and storage site and deposited in the waters of the State.

6. This permit does not authorize permanent on-site storage or disposal of biosolids at the Discharger's wastewater treatment facility. A report of Waste Discharge shall be filed and the site brought into compliance with all applicable regulations prior to commencement of any such activity by the Discharger.

F. PROVISIONS

1. ***Permit Compliance and Rescission of Previous Waste Discharge Requirements***
The Discharger shall comply with all sections of this Order beginning on October 1, 2003. Requirements prescribed by this Order supersede the requirements prescribed by Order No. 97-044. Order No. 97-044 is hereby rescinded upon the effective date of this Order (see Provision 17 for date).

Special Studies

2. ***Marine Mammal Report***
   NOAA Fisheries (letter dated 5/26/03) and the U.S. Fish and Wildlife Service (letter dated 6/24/03) have expressed concern regarding the potential for stormwater and undisinfected wastewater from the SWOO to transmit pathogens to marine mammals. To begin to address this concern, the Discharger shall submit a report identifying monitoring methodologies to determine the presence in wastewater of pathogens with the potential to affect marine mammals. As appropriate, the Discharger will work with NOAA and other agencies working in this field, to gather appropriate information. This report shall be submitted to EPA and the Board no later than 2 years after the adoption date of this permit.

3. ***Pollution Prevention Program and Pollutant Minimization Program***
   a. The Discharger shall continue to improve its existing Pollution Prevention Program in order to reduce pollutant loadings to the treatment plant and therefore to the receiving waters.

   b. The Discharger is currently in the process of developing a new comprehensive wastewater master plan. The "Screening of Feasible Technologies" (SOFT), 2000 draft report should be finalized for use in the master plan process. The Discharger is encouraged to continue to work with interested stakeholders in the development of the master plan.

   c. The Discharger shall submit an annual report, acceptable to the Executive Officer, no later than August 30th of each calendar year. Annual reports shall cover July through June of the preceding year.

   Annual report shall include at least the following information:
   (i) *A brief description of its treatment plant, treatment plant processes and service area.*
   (ii) *A discussion of the current pollutants of concern.* Periodically, the Discharger shall analyze its own situation to determine which pollutants are currently a problem and/or which pollutants may be potential future problems. This discussion shall include the reasons why the pollutants were chosen.
   (iii) *Identification of sources for the pollutants of concern.* This discussion shall include how the Discharger intends to estimate and identify sources of the pollutants. The Discharger should also identify sources or potential sources not directly within the ability or authority of the Discharger to control such as pollutants in the potable water supply and air deposition.
   (iv) *Identification of tasks to reduce the sources of the pollutants of concern.* This discussion shall identify and prioritize tasks to address the Discharger's pollutants of concern. Tasks can target its industrial, commercial, or residential sectors. The Discharger may develop tasks themselves or participate in group, regional, or national tasks that will address its pollutants of concern. The Discharger is strongly encouraged to participate in group, regional, or national tasks that will address its pollutants of concern whenever it is efficient and appropriate to do so. A time line shall be included for the implementation of each task.
   (v) *Continuation of outreach tasks for City employees.* The Discharger shall continue outreach tasks for City and/or County employees. The overall goal of this task is to

inform employees about the pollutants of concerns, potential sources, and how they might be able to help reduce the discharge of pollutants of concerns into the treatment plant. The Discharger may provide a forum for employees to provide input to the Program.

(vi) *Continuation of a public outreach program.* The Discharger shall continue to develop a public outreach program to communicate pollution prevention to its service area. Outreach may include participation in existing community events such as county fairs, initiating new community events such as displays and contests during Pollution Prevention Week, implementation of a school outreach program, conducting plant tours, and providing public information in newspaper articles or advertisements, radio, television stories or spots, newsletters, utility bill inserts, and web site. Information shall be specific to the target audiences. The Discharger should coordinate with other agencies as appropriate.

(vii) *Discussion of criteria used to measure the Program's and tasks' effectiveness.* The Discharger shall establish criteria to evaluate the effectiveness of its Pollution Prevention Program. This shall also include a discussion of the specific criteria used to measure the effectiveness of each of the tasks in item b. (iv), b. (v), and b. (vi).

(viii) *Documentation of efforts and progress.* This discussion shall detail all of the Discharger's activities in the Pollution Prevention Program during the reporting year.

(ix) *Evaluation of Program's and tasks' effectiveness.* This Discharger shall utilize the criteria established in b. (vii) to evaluate the Program's and tasks' effectiveness.

(x) *Identification of specific tasks and time schedules for future efforts.* Based on the evaluation, the Discharger shall detail how it intends to continue or change its tasks in order to more effectively reduce the amount of pollutants to the treatment plant, and subsequently in its effluent. .

d. To the extent where the requirements of the Pollution Prevention Program and the Pollutant Minimization Program overlap, the Discharger is allowed to continue/modify/expand its existing Pollution Prevention Program to satisfy the Pollutant Minimization Program requirements.

These Pollution Prevention/Pollutant Minimization Program requirements are not intended to fulfill the requirements in The Clean Water Enforcement and Pollution Prevention Act of 1999 (Senate Bill 709).

CSO Requirements

4. Nine Minimum Controls

The Discharger shall implement and comply with the following technology-based requirements for the Westside Wet Weather Facilities and Diversion Structures:

a. **Conduct Proper Operations and Regular Maintenance Programs**. The Discharger shall implement the Operations and Maintenance Plan for the combined sewer system that will include the elements listed below. The Discharger shall also update the plan to incorporate any changes to the system and shall operate and maintain the system according to the plan. The Discharger shall keep records to document the implementation of the plan.

i. **Designation of a Manager for Combined Sewer Overflows.** The Discharger shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding combined sewer overflows. The Discharger shall notify the U.S. EPA and the Executive Officer of the Board within 90 days of designation of a new contact person.

ii. **Inspection and maintenance of CSS.** The Discharger shall:
   1. Inspect and maintain all overflow structures, regulators, pumping stations, and tide gates to ensure that they are in good working condition and adjusted to minimize overflows and prevent tidal inflow.
   2. Inspect each overflow outfall at least once per year. The inspection shall include, but is not limited to, entering the regulator structure if accessible, determining the extent of debris and grit build-up, and removing any debris that may constrict flow, cause blockage, and result in a dry weather overflow. For overflow outfalls that are inaccessible, the Discharger may perform a visual check of the overflow pipe to determine whether or not the overflow occurred or could potentially occur during dry weather flow conditions.
   3. Record the results of the inspections in a maintenance log.

iii. **Provision for Trained Staff.** The Discharger shall provide an adequate number of full-time equivalents to carry out the operation, maintenance, repair and testing functions required to ensure compliance with the terms and conditions of this permit. Each member of the staff shall receive appropriate training.

iv. **Allocation of Funds for Operation and Maintenance.** The Discharger shall allocate adequate funds specifically for operation and maintenance activities. The Discharger shall submit a certification of assurance that the necessary funds, equipment, and personnel have been or will be committed to carry out the Operations and Management (O&M) Plan.

b. **Maximize Use of the Collection System for Storage.** The Discharger shall continue to maximize the inline storage capacity. (Note: This provision refers to using the sewers for storage to the maximum extent possible. It does not refer to the storage/transports.)

c. **Review and Modify Pretreatment Program.** The Discharger shall continue to implement selected controls to minimize the impact of non-domestic discharges. The Discharger shall re-evaluate every 3 years whether additional modifications to its pretreatment program are feasible or of practical value. The Discharger shall keep records to document this evaluation and to document implementation of the selected controls to minimize non-domestic discharges.

d. **Maximize Flow to Oceanside WPCP.** The Discharger shall operate the Oceanside WPCP at a maximum treatable flow during wet weather flow conditions. The Discharger shall report rainfall and flow data to the U.S. EPA and the Board as part of the Self-Monitoring Report.

The Discharger has prepared a facilities operation plan. This operation plan was developed to achieve the following objectives:

1. Maximize the volume of wastewater treated at the Oceanside WPCP and discharged via the deep water outfall, consistent with the hydraulic capacities of the Discharger's storage, transport, treatment, and disposal facilities, and

2. Assure that all discharges from the diversion structures are first baffled to reduce floatable volume.

e. **Prohibit Combined Sewer Overflows During Dry Weather.** Dry weather overflows from outfalls CSO 001 through-007 are prohibited. All dry weather overflows must be reported to the U.S. EPA and the Board within 24 hours of when the Discharger becomes aware of a dry weather overflow. When the Discharger detects a dry weather overflow, the Discharger shall begin corrective actions immediately.

The Discharger shall inspect the dry weather overflow point each subsequent day of the overflow until the overflow has been eliminated. The Discharger shall record in the inspection log each dry weather overflow event, as well as the cause, corrective measures taken, and the dates of the beginning and cessation of the overflow.

f. **Control Solid and Floatable Materials in CSOs.** The Discharger shall continue to implement measures to control solid and floatable materials in its overflows. These measures shall include:
1. Ensure that all overflows from the diversion structures are baffled or that other means are used to reduce the volume of floatable materials.
2. Remove solid or floatable materials captured in the storage/transport in an acceptable manner prior to discharge to the receiving water.

g. **Develop and Implement Pollution Prevention Program.** The Discharger shall continue to implement a pollution prevention program focused on reducing the impact of combined sewer overflows on receiving waters. This pollution prevention program is authorized by Federal Regulations on CSOs. The Discharger shall keep records to document pollution prevention implementation activities. This program shall be developed and implemented in accordance with Provision 3.

h. **Notify the Public of Overflows.** The Discharger shall continue to implement a public notification plan to inform citizens of when and where overflows occur. The process must include:
i. A mechanism to alert persons using all receiving bodies of water affected by overflows.
ii. A system to determine the nature and duration of conditions that are potentially harmful to users of these receiving water bodies due to overflows.

Specifically, warning signs shall be posted at beach locations where water contact recreation is enjoyed by the public whenever there is a discharge from the diversion structures. Such warning signs shall be posted on the same days as the overflow unless the overflow occurs after 4:00 p.m., in which case the signs shall be posted by 8:00 a.m. the next day. The Discharger shall keep records documenting public notification.

The City's current notification process fulfills these requirements. The process includes permanent information signs at all beach locations around the perimeter of San Francisco. These signs inform the public in English, Spanish and Chinese that international NO SWIMMING signs will be posted when it is unsafe to enter the water, and warns users that bacteria concentrations may be elevated during periods of heavy rainfall. NO SWIMMING signs are posted at beach locations whenever an overflow occurs in the vicinity. These signs remain posted until water sampling indicates the bacteria concentrations have dropped below the level of concern for water contact recreation. Both signs reference the City's toll free water quality hotline (1-877-SF BEACH) which is updated weekly or whenever beach conditions change. The Discharger also provides color coded descriptions of beach water quality conditions (green/open; yellow/caution; red/posted) on the web at http://beaches.sfwater.org.

i. **Monitor to Effectively Characterize Overflow Impacts and the Efficacy of CSO Controls.** The Discharger shall regularly monitor overflow outfalls to effectively characterize overflow impacts and efficacy of CSO controls.

In order to assess the impact of CSO discharges on water quality, additional monitoring that is not at this time contained in the self-monitoring program will be necessary. The self-monitoring program may be revised to implement additions. This includes follow-up monitoring on the Recreational Use Survey conducted during the prior permit cycle. The Discharger shall conduct the monitoring as follows:

	Task	Compliance Date
(A)	Study Plan	December 1, 2003

The Discharger shall develop and submit a study plan acceptable to the Executive Officer. The study shall at minimum propose follow-up monitoring to the Recreational Use Survey that will serve to track changes in uses over time, and include any other monitoring necessary to evaluate CSO controls and to conform with the CSO policy.

(B)	Annual Status Report	August 30th of each year

The Discharger shall submit to U.S. EPA and the Board an annual report including the following information:

1. Summary of existing data in order to show status and trends;
2. Evaluation of results in order to effectively characterize overflow impacts and efficacy of CSO controls (including pollution prevention efforts).
3. Review of CSO impacts and, if necessary, propose revisions to Westside CSO control program (including the nine minimum controls).

(C) Final Report 1 year prior to permit expiration

The Discharger shall submit a final report, acceptable to the Executive Officer, documenting the results of the Overflow Impacts and the CSO Control Efficacy Study.

Toxicity Requirements

5. ***Acute Toxicity Requirements***
Compliance with the acute toxicity requirements of this Order for the dry weather discharge (E-007) shall be achieved in accordance with the following:

Acute toxicity shall be measured in accordance with Section I. of Part B of the attached SMP, as well as with the Ocean Plan and "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" (EPA/600/4-90-027F, 1993). As described in the 2001 Ocean Plan, test organisms shall be West Coast marine organisms.

6. ***Chronic Toxicity Requirements***
Compliance with the chronic toxicity requirements of this Order for the dry weather discharge (E-007) shall be achieved in accordance with the following:

The Discharger shall conduct chronic toxicity monitoring in accordance with Section I. of the Part B of the SMP attached to this Order.

If the toxicity effluent limitation is exceeded, then within 15 days of exceedance, the Discharger shall begin conducting three additional tests, bi-weekly, over a six week period. If the toxicity effluent limitation is exceeded in any of these three additional tests, then the Discharger shall notify the Board and U.S. EPA. If the Executive Officer of the Board and the U.S. EPA determine that the discharge consistently exceeds a toxicity effluent limitation, then the Discharger shall initiate a TRE/TIE. If none of the three tests indicate toxicity, then the Discharger may return to the normal testing frequency.

The TRE shall be conducted in accordance with the following:
(1) The Discharger shall prepare and submit to the U.S. EPA and the Board for approval a TRE work plan. An initial generic work plan shall be submitted within 90 days of the date of adoption of this Order. The work plan shall be reviewed and updated as necessary in order to remain current and applicable to the discharge and discharge facilities.
(2) The TRE shall be initiated within 30 days of the date of completion of the accelerated monitoring test observed to exceed the permit limitation.
(3) The TRE shall be conducted in accordance with an approved work plan.
(4) The TRE needs to be specific to the discharge and Discharger facility, and be in accordance with current technical guidance and reference materials including U.S. EPA guidance materials. TRE shall be conducted as a tiered evaluation process, such as summarized below:
   (a) Tier 1 consists of basic data collection (routine and accelerated monitoring).
   (b) Tier 2 consists of evaluation of optimization of the treatment process including

operation practices, and in-plant process chemicals.

(c) Tier 3 consists of a toxicity identification evaluation (TIE).

(d) Tier 4 consists of evaluation of options for additional effluent treatment processes.

(e) Tier 5 consists of evaluation of options for modifications of in-plant treatment processes.

(f) Tier 6 consists of implementation of selected toxicity control measures, and follow-up monitoring and confirmation of implementation success.

(5) The TRE may be ended at any stage if monitoring finds there is no longer consistent toxicity.

(6) The objective of the TIE shall be to identify the substance or combination of substances causing the observed toxicity. All reasonable efforts using currently available TIE methodologies shall be employed.

(7) As toxic substances are identified or characterized, the Discharger shall continue the TRE by determining the source(s) and evaluating alternative strategies for reducing or eliminating the substances from the discharge. All reasonable steps shall be taken to reduce toxicity to levels consistent with chronic toxicity evaluation parameters.

1. Many recommended TRE elements parallel required or recommended efforts of source control, pollution prevention and storm water control programs. TRE efforts should be coordinated with such efforts. To prevent duplication of efforts, evidence of complying with requirements or recommended efforts of such programs may be acceptable to comply with TRE requirements.

U.S. EPA and the Board recognize that chronic toxicity may be episodic and identification of causes of and reduction of sources of chronic toxicity may not be successful in all cases. Consideration of discretionary enforcement action by the Board will be based in part on the Discharger's actions and efforts to identify and control or reduce sources of consistent toxicity.

a. Chronic Toxicity Monitoring Screening Phase Requirements, Critical Life Stage Toxicity Tests and definitions of terms used in the chronic toxicity monitoring are identified in Part A of the SMP. The Discharger shall comply with the chronic toxicity screening requirements specified in this attachment as applicable to the discharge.
b. Reopener: This permit may be modified in accordance with the requirements set forth at 40 CFR Parts 122 and 124 to include appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information.

Ongoing Programs

7. ***Pretreatment Program***

The Discharger shall implement and enforce its approved pretreatment program in accordance with Federal Pretreatment Regulations (40 CFR 403), pretreatment standards promulgated under Section 307(b), 307(c), and 307(d) of the Clean Water Act, and the requirements in Attachment E, "Pretreatment Requirements." The Discharger's responsibilities include, but are not limited to:

a. Enforcement of National Pretreatment Standards in accordance with 40 CFR 403.5 and 403.6;

b. Implementation of its pretreatment program in accordance with legal authorities, policies, procedures and financial provisions described in the General Pretreatment regulations (40 CFR 403) and the Discharger's approved pretreatment program;

c. Submission of reports to, the State Board and the Board, as described in Attachment E, "Pretreatment Requirements;"

The Discharger shall implement its approved pretreatment program and the program shall be an enforceable condition of this permit. If the Discharger fails to perform the pretreatment functions, the Board, the State Board, or the U.S. EPA may take enforcement actions against the Discharger as authorized by the Clean Water Act.

Facilities Status Reports and Permit Administration

8. ***Wastewater Facilities, Review and Evaluation, and Status Reports***
   a. The Discharger shall operate and maintain its wastewater collection, treatment and disposal facilities in a manner to ensure that all facilities are adequately staffed, supervised, financed, operated, maintained, repaired, and upgraded as necessary, in order to provide adequate and reliable transportation, treatment, and disposal of all wastewater from both existing and planned future wastewater sources under the Discharger's service responsibilities.
   b. The Discharger shall regularly review and evaluate its wastewater facilities and operation practices in accordance with section a. above. Reviews and evaluations shall be conducted as an ongoing component of the Discharger's administration of its wastewater facilities.
   c. Annually, by August 30th of each year, the Discharger shall submit to the Board a report describing the current status of its wastewater facility review and evaluation, including any recommended or planned actions and an estimated time schedule for these actions. This report shall include a description or summary of review and evaluation procedures, applicable wastewater facility programs or capital improvement projects, and an overview of the major maintenance activities performed in the facilities

9. ***Operations and Maintenance Manual, Review and Status Reports***
   The Discharger shall maintain an Operations and Maintenance Manual (O & M Manual) as described in the findings of this Order for the Discharger's wastewater facilities. The O & M Manual shall be maintained in useable condition, and available for reference and use by all applicable personnel.
   a. The Discharger shall regularly review, and revise or update as necessary, the O & M Manual(s) in order for the document(s) to remain useful and relevant to current equipment and operation practices. Reviews shall be conducted annually, and revisions or updates shall be completed as necessary. For any significant changes in treatment facility equipment or operation practices, applicable revisions shall be completed within 90 days of completion of such changes.
   b. Annually, by August 30th of each year, the Discharger shall submit to the Board a report describing the current status of its O & M Manual review and updating. This report shall include an estimated time schedule for completion of any revisions determined necessary, a

description of any completed revisions, or a statement that no revisions are needed.

10. ***Operation Plan Submittal***
The Discharger shall review and update, as necessary, the Operation Plan at least annually. The Discharger shall submit a letter report to the Executive Officer, by July 1st of each year after the effective date of this permit. The report shall indicate that the review was completed, and describe what changes were made to the Operations Plan in the previous 12 months, or what changes are planned to be made.

11. ***Contingency Plan, Review and Status Reports***
    a. The Discharger shall maintain a Contingency Plan as required by Board Resolution 74-10 (Attachment F), and as prudent in accordance with current municipal facility emergency planning. The discharge of pollutants in violation of this Order where the Discharger has failed to develop and/or adequately implement a contingency plan will be the basis for considering such discharge a willful and negligent violation of this Order pursuant to Section 13387 of the California Water Code.
    b. The Discharger shall regularly review, and update as necessary, the Contingency Plan in order for the plan to remain useful and relevant to current equipment and operation practices. Reviews shall be conducted annually, and updates shall be completed as necessary.
    c. Annually, by August 30th of each year, the Discharger shall submit to the Board a report describing the current status of its Contingency Plan review and update. This report shall include a description or copy of any completed revisions, or a statement that no changes are needed.

12. ***Self-Monitoring Program***
The Discharger shall comply with the SMP for this Order as adopted by the Board and U.S. EPA. U.S. EPA or the Board's Executive Director may make minor amendments to the SMP pursuant to U.S. EPA regulations 40 CFR 122.62, 122.63 and 124.5.

13. ***Standard Provisions and Reporting Requirements***
The Discharger shall comply with all applicable items of the *Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August 1993* Attachment G, or any amendments thereafter. Where provisions or reporting requirements specified in this Order are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications of this Order shall apply.

14. ***Change in Control or Ownership***
    a. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Board.
    b. To assume responsibility of and operations under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order (see S*tandard Provisions & Reporting Requirements*, August 1993, Section E.4.). Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code.

15. Permit Reopener

a. U.S. EPA or the Board may modify, or revoke and reissue, this Order and Permit if present or future investigations demonstrate that the discharge(s) governed by this Order will or have the potential to cause or contribute to adverse impacts on water quality and/or beneficial uses of the receiving waters.

b. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board and U.S. EPA will revise and modify this Order in accordance with such more stringent standards.

c. As new or revised water quality objectives come into effect for ocean waters and contiguous water bodies (whether statewide, regional or site-specific), effluent limitations in this Order will be modified as necessary to reflect updated water quality objectives. Adoption of effluent limitations contained in this Order are not intended to restrict in any way future modifications based on legally adopted water quality objectives.

d. This permit may be modified in accordance with the requirements set forth at 40 CFR Parts 122 and 124, to include appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information, or to implement any EPA approved new State or Federal water quality standards applicable to effluent toxicity.

e. The Board and U.S. EPA may establish wet weather performance-based limitations in the future for the Oceanside WPCP after reviewing wet weather discharge data. This Order/Permit may be reopened for the inclusion of such limits.

f. If the U.S. EPA or the Board finds that the operation of the wet weather facilities results in unacceptable adverse impacts on beneficial uses or fails to meet water quality standards, the long-term average overflow frequency may be modified. Such action could require the modification of constructed facilities, the modification of the operation of constructed facilities, or the construction of additional facilities.

g. This Order may be reopened for the imposition of additional requirements should monitoring indicate that the current controls fail to meet water quality standards and/or not protect designated uses.

h. The U.S. EPA or the Board may amend this permit prior to expiration if changes occur in applicable state and federal biosolid regulations.

i. If the U.S. EPA determines that compliance issues may arise prior to the expiration of this permit as a result of the existing dilution allowance, the U.S. EPA shall reopen the permit to apply the dilution factor or factors contained in U.S. EPA's letter of determination dated March 1, 2004. The U.S. EPA will take into consideration any compliance concerns expressed by the City and County of San Francisco in determining if reopening the permit is appropriate.

16. *NPDES Permit*
This Order shall serve as a National Pollutant Discharge Elimination System (NPDES) permit pursuant to Section 402 of the Clean Water Act or amendments thereto, and shall become effective on October 1, 2003, provided the U.S. EPA Regional Administrator has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

17. *Order Expiration and Reapplication*
    a. This Order expires on September 30, 2008.
    b. In accordance with Title 23, Chapter 3, Subchapter 9 of the California Administrative Code, the Discharger must file a report of waste discharge no later than 180 days before the expiration date of this Order as application for reissue of this permit and waste discharge requirements.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on August 20, 2003.

Effective on: October 1, 2003

Alexis Strauss
Director, Water Division
U.S. Environmental Protection Agency, Region 9
for the Regional Administrator

Loretta K. Barsamian
Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region

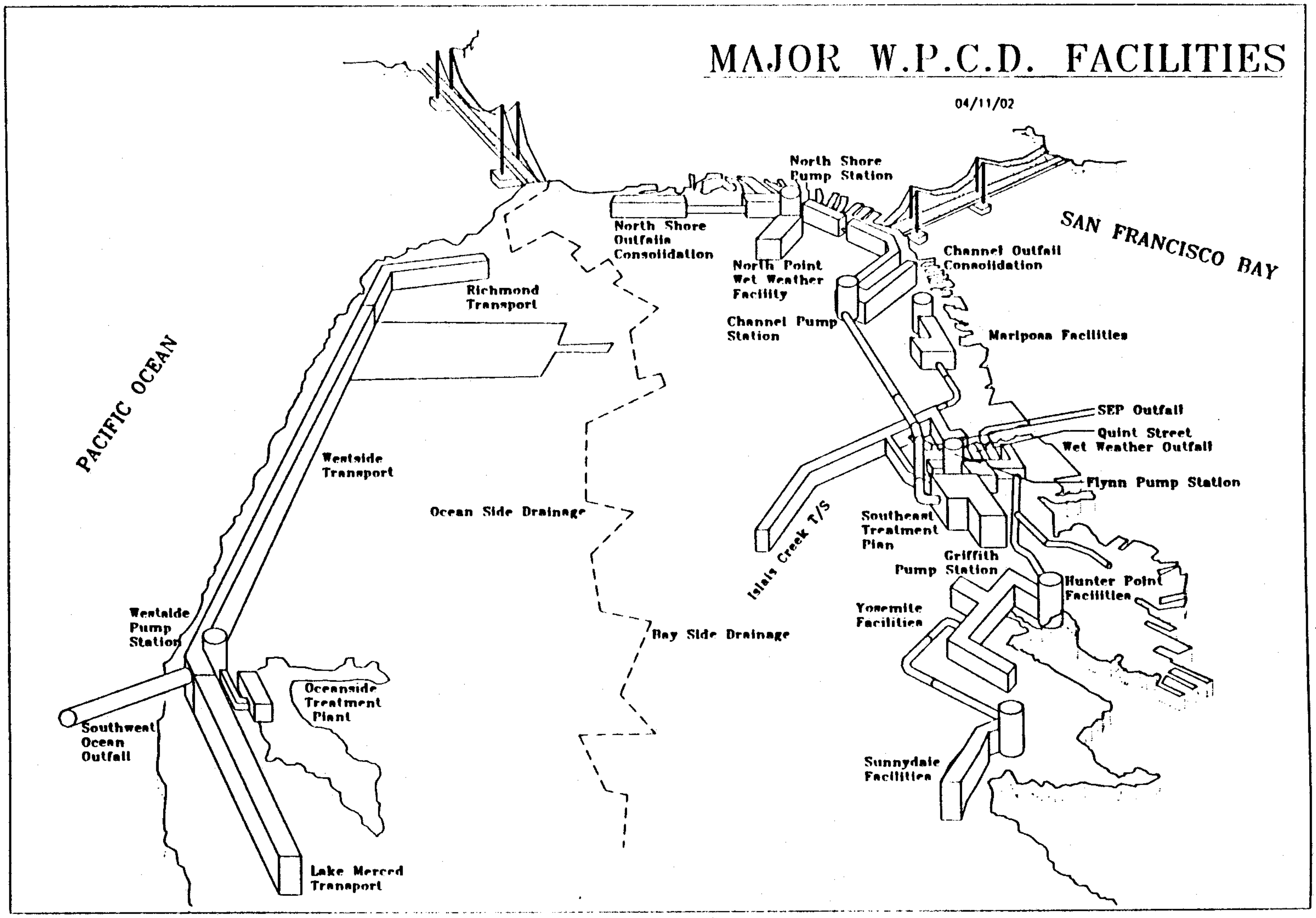
Attachments:
A. Discharge Facility Location Map
B. Combined Sewer Overflow Structure
C. Discharge Facility Treatment Process Diagram
D. Wet Weather Treatment Diagram
E. Pre-treatment
F Board Resolution No. 74-10*
G. Standard Provisions and Reporting Requirements (August 1993) *
H. State Board Order No. 79-16
I. Board Order No. 79-12
J. ESA Consultation Letters from NOAA (May 26, 2003) and USFWS (June 24, 2003)
K. Self-Monitoring Program Part A (August 1993)* and Part B
L. Fact Sheet, dated July 2, 2003

* *Note: Self-Monitoring Program Part A (August 1993), Standard Provisions and Reporting Requirements (August 1993), and Resolution No. 74-10 are not attached but are available for review or download on the Board's website at www.swrcb.ca.gov/rwqcb2."*

Attachment A

Discharge Facility Location Map

Attachment A - Discharge Facility Location Map

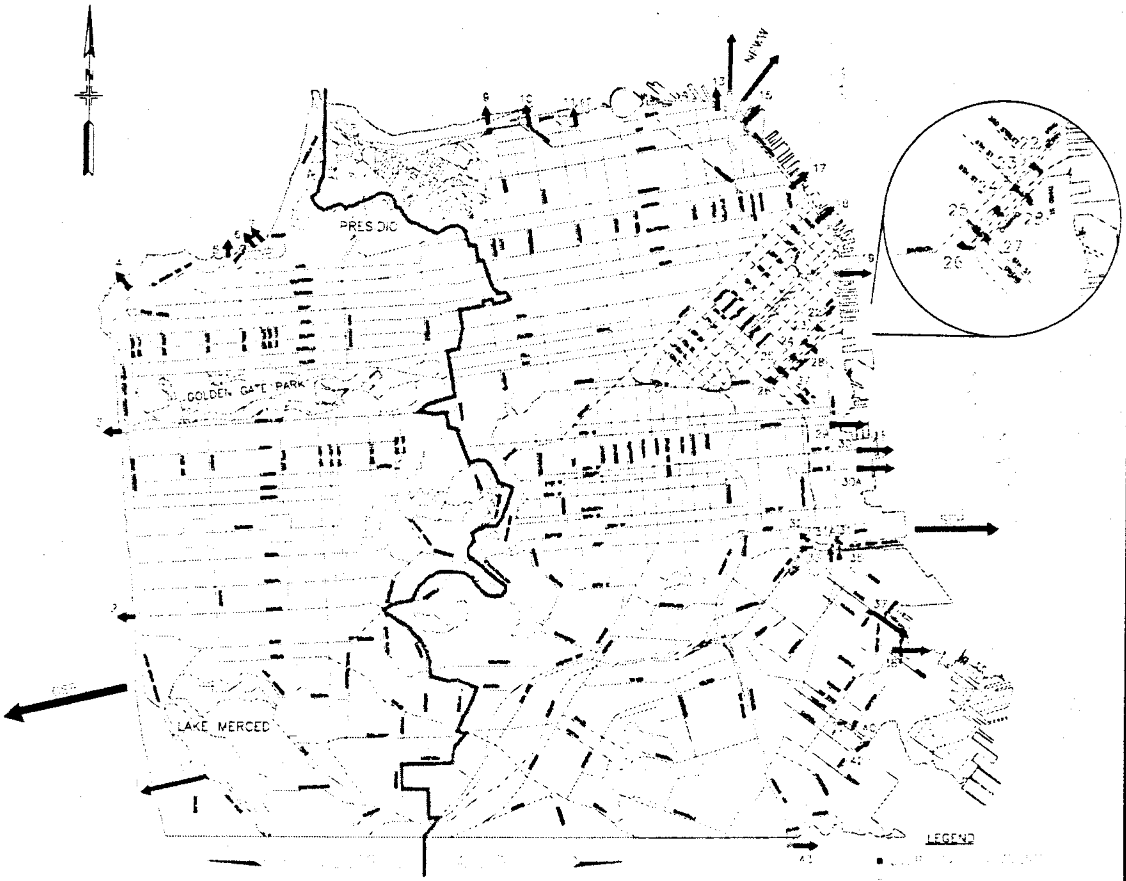


Attachment B

Combined Sewer Overflow Structure

Attachment B – Combined Sewer Overflow Structures

MAJOR DRAINAGE BASINS / OUTFALL LOCATIONS



OUTFALL NO.	OUTFALL NAME	STRUCTURE OR T/S STRUCTURE	T/S OR DRAINAGE BASIN
1	LAKE MERCED	[illegible]	LM
2	VICENTE	T/S Box @ Great Hwy/Vicente St.	WST
3	LINCOLN WAY	T/S Box @ Great Hwy/Lincoln Way	WST
4	MILE ROCK	Tunnel Junction Structure	[illegible]
		Tunnel Overflow Chamber	[illegible]
5	SEACLIFF #1	Pump Station	SEACLIFF
6	SEACLIFF	Outfall Structure Betw. 26th/27th Ave	SEACLIFF
7	SEACLIFF #2	Pump Station	SEACLIFF
8			
9	BAKER STREET	Outfall Structure @ [illegible]	NSOC
10	PIERCE STREET	Outfall Structure	NSOC
11	LAGUNA STREET	T/S Box @ [illegible]	NSOC
12	BEACH STREET	Outfall Structure	NSOC
13	[illegible]	T/S @ Embarcadero & [illegible]	NSOC
		T/S @ Embarcadero & Bay	NSOC
		Outfall Structure	NSOC
17	JACKSON STREET	Outfall Structure	NSOC
18	HOWARD STREET	Overflow Structure	COC
19	BRANNAN STREET	T/S @ Embarcadero & Brannan	COC
20	3RD STREET	T/S structure @ 3rd/King	COC
		Overflow Structure	COC
23	4TH STREET	T/S structure @ 4th/King	COC
		Overflow Structure	COC
24	5TH STREET	T/S @ 5th/Townsend	COC
		Overflow Structure	COC

OUTFALL	LONG TERM AVERAGE OVERFLOWS	AREA NAME
1 – 8	6	WESTSIDE
9 – 17	4	NORTHSHORE
18 – 35	10	CENTRAL BASIN
37 – 43	1	SOUTH BASIN

SAMPLING LOCATIONS

STATION NO.	OUTFALL NO.
0–1	29
0–2	33
0–3	43
0–4	10
0–5	42
0–6	25
LAKE MERCED	1
VICENTE	2
LINCOLN	3
MILE ROCK	4

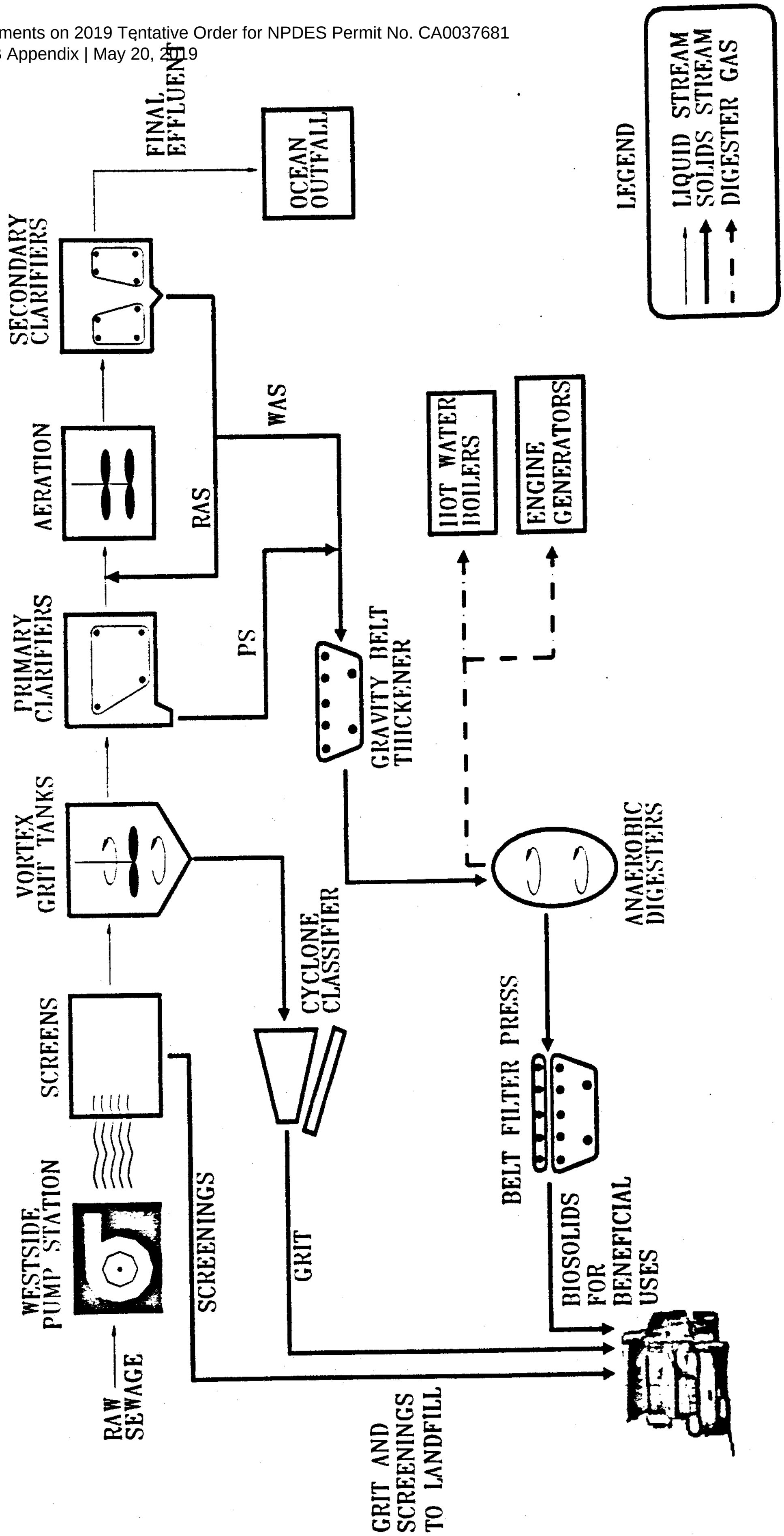
OUTFALL NO.	OUTFALL NAME	STRUCTURE OR T/S STRUCTURE	T/S OR DRAINAGE BASIN
25	N. 6TH STREET	T/S @ 6th/[illegible]	COC
		Overflow Structure	COC
26	DIVISION STREET	Overflow Structure	COC
27	S. 6TH STREET	T/S @ 6th/[illegible]	COC
		Overflow Structure	COC
28	S. 4TH STREET	Overflow Structure	COC
29	MARIPOSA STREET	Overflow Structure	[illegible]
30	20TH STREET	Overflow Structure	[illegible]
30A	22ND STREET	Overflow Structure	[illegible]
31	N. 3RD STREET	Overflow Structure @ 3rd/[illegible]	[illegible]
31A	[illegible] NORTH	Overflow Structure	[illegible]
32	[illegible] STREET	Overflow Structure	[illegible]
33	[illegible] STREET	Overflow Structure	[illegible]
35	S. 3RD STREET	Overflow Structure @ 3rd/[illegible]	[illegible]
37	[illegible] STREET	Overflow Structure @ [illegible]	HP
38	HUDSON STREET	Overflow Structure @ [illegible]	HP
40	S. [illegible]	T/S Structure @ [illegible]	T/F
		Overflow Structure @ [illegible]	T/F
41	[illegible] STREET	T/S Structure @ [illegible]	T/F
42	[illegible] STREET	T/S & Overflow Structure	T/F
43	SUNNYDALE	T/S Structure @ [illegible]	SUNNYDALE

LM	[illegible]	[illegible]	[illegible]
WST	[illegible]	HP	[illegible]
NSOC	[illegible]	T/F	[illegible]
COC	[illegible]	SUNNYDALE	[illegible]
RT	[illegible]		

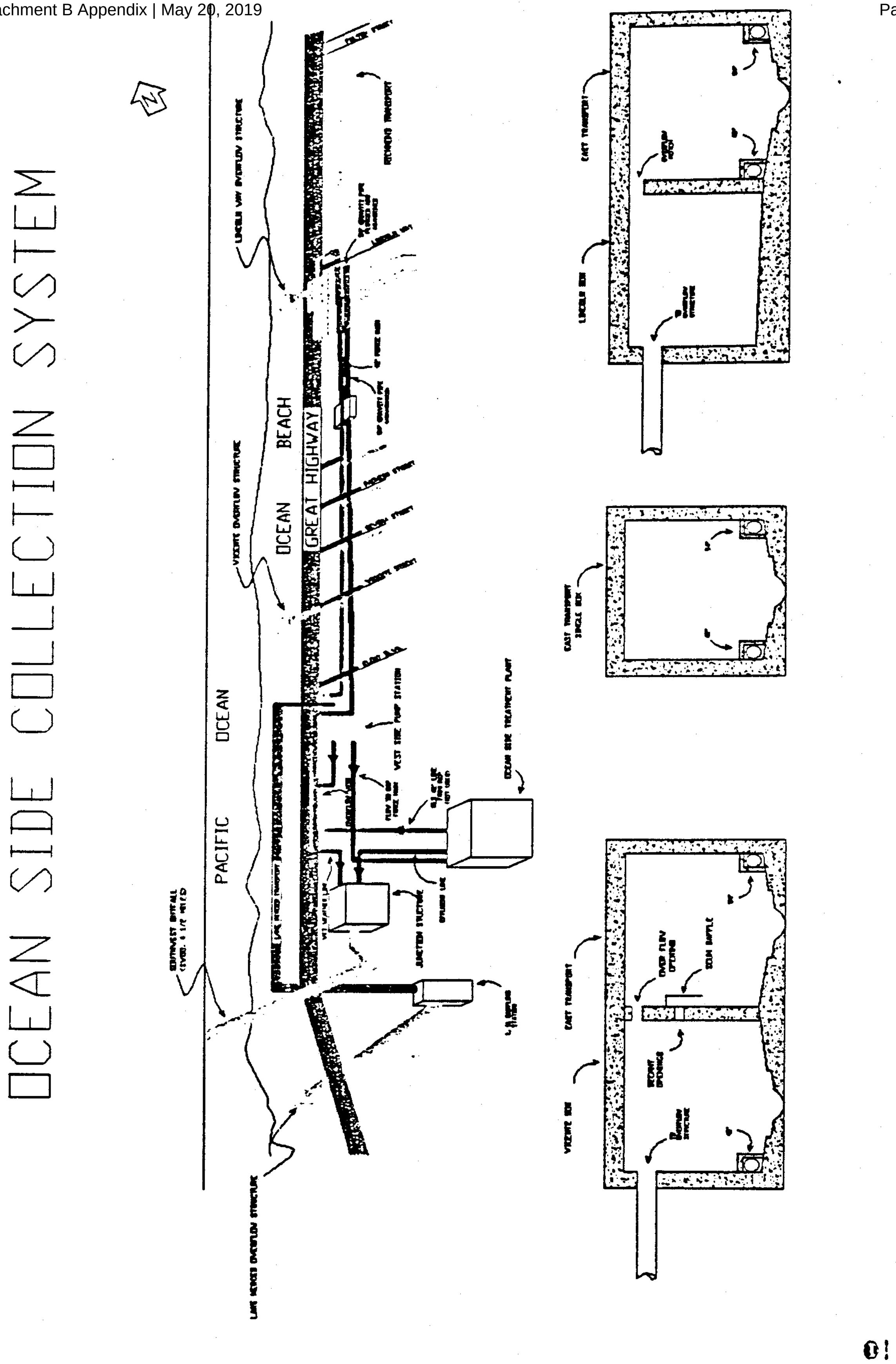
Attachment C

Discharge Facility Treatment Process Diagram

ATTACHMENT C – OCEANSIDE PLANT TREATMENT PROCESS DIAGRAM



Attachment D
Wet Weather Treatment Diagram


OCEAN SIDE COLLECTION SYSTEM
PACIFIC OCEAN
OCEAN BEACH
GREAT HIGHWAY

Attachment E

Pre-treatment

Attachment E to the NPDES permit: Individual permit pretreatment language

Pretreatment Program Provisions

1. The Discharger shall implement all pretreatment requirements contained in 40 CFR 403, as amended. The Discharger shall be subject to enforcement actions, penalties, and fines as provided in the Clean Water Act (33 USC 1351 et seq.), as amended. The Discharger shall implement and enforce their respective Approved Pretreatment Programs or modified Pretreatment Programs as directed by the Board's Executive Officer or the EPA. The EPA and/or the State may initiate enforcement action against an industrial user for noncompliance with applicable standards and requirements as provided in the Clean Water Act.

2. The Discharger shall enforce the requirements promulgated under Sections 307(b), 307(c), 307(d) and 402(b) of the Clean Water Act. The Discharger shall cause industrial users subject to Federal Categorical Standards to achieve compliance no later than the date specified in those requirements or, in the case of a new industrial user, upon commencement of the discharge.

3. The Discharger shall perform the pretreatment functions as required in 40 CFR Part 403 and amendments or modifications thereto including, but not limited to:

   i) Implement the necessary legal authorities to fully implement the pretreatment regulations as provided in 40 CFR 403.8(f)(1);

   ii) Implement the programmatic functions as provided in 40 CFR 403.8(f)(2);

   iii) Publish an annual list of industrial users in significant noncompliance as provided per 40 CFR 403.8(f)(2)(vii);

   iv) Provide for the requisite funding and personnel to implement the pretreatment program as provided in 40 CFR 403.8(f)(3); and

   v) Enforce the national pretreatment standards for prohibited discharges and categorical standards as provided in 40 CFR 403.5 and 403.6, respectively.

4. The Discharger shall submit annually a report to the EPA Region 9, the State Board and the Regional Board describing the Discharger's respective pretreatment program activities over the previous twelve months. In the event that the Discharger is not in compliance with any conditions or requirements of this permit, the Discharger shall also include the reasons for noncompliance and a plan and schedule for achieving compliance. The report shall contain, but is not limited to, the information specified in **Appendix A** entitled, "Requirements for Pretreatment Annual Reports," which is made a part of this Order. The annual report is due on the last day of February each year.

5. The Discharger shall submit semiannual pretreatment reports to the EPA Region 9, the State Board and the Board describing the status of their respective significant industrial users (SIUs). The report shall contain, but not is limited to, the information specified in **Appendix B** entitled, "Requirements for Semiannual Pretreatment Reports," which is made part of this Order. The semiannual reports are due July 31st (for the period January through June) and January 31st (for the period July through December) of each year. The Executive Officer may exempt a Discharger from the semiannual reporting requirements on a case by case basis subject to State Board and EPA's comment and approval.

APPENDIX A

REQUIREMENTS FOR PRETREATMENT ANNUAL REPORTS

The Pretreatment Annual Report is due each year on the last day of February. [If the annual report is combined with the semiannual report (for the July through December period) the submittal deadline is January 31st of each year.] The purpose of the Annual Report is 1) to describe the status of the Publicly Owned Treatment Works (POTW) pretreatment program and 2) to report on the effectiveness of the program, as determined by comparing the results of the preceding year's program implementation. The report shall contain at a minimum, but is not limited to, the following information:

1) Cover Sheet

The cover sheet must contain the name(s) and National Pollutant Discharge Elimination Discharge System (NPDES) permit number(s) of those POTWs that are part of the Pretreatment Program. Additionally, the cover sheet must include: the name, address and telephone number of a pretreatment contact person; the period covered in the report; a statement of truthfulness; and the dated signature of a principal executive officer, ranking elected official, or other duly authorized employee who is responsible for overall operation of the POTW (40 CFR 403.12(j)).

2) Introduction

The Introduction shall include any pertinent background information related to the City/ District/Agency, the POTW and/or the Industrial base of the area. Also, this section shall include an update on the status of any Pretreatment Compliance Inspection (PCI) tasks, Pretreatment Performance Evaluation tasks, Pretreatment Compliance Audit (PCA) tasks, Cleanup and Abatement Order (CAO) tasks, or other pretreatment-related enforcement actions required by the Regional Board or the EPA. A more specific discussion shall be included in the section entitled, "Program Changes."

3) Definitions

This section shall contain a list of key terms and their definitions that the POTW uses to describe or characterize elements of its pretreatment program.

4) Discussion of Upset, Interference and Pass Through

This section shall include a discussion of Upset, Interference or Pass Through incidents, if any, at the POTW(s) that the Discharger knows of or suspects were caused by industrial discharges. Each incident shall be described, at a minimum, consisting of the following information:

- a) a description of what occurred;
- b) a description of what was done to identify the source;
- c) the name and address of the IU responsible
- d) the reason(s) why the incident occurred;
- e) a description of the corrective actions taken; and
- f) an examination of the local and federal discharge limits and requirements for the purposes of determining whether any additional limits or changes to existing requirements may be necessary to prevent other Upset, Interference or Pass Through incidents.

5) **Influent, Effluent and Sludge Monitoring Results**

This section shall provide a summary of the analytical results from the "Influent, Effluent and Sludge Monitoring" as specified in Appendix C. The results should be reported in a summary matrix that lists monthly influent and effluent metal results for the reporting year.

A graphical representation of the influent and effluent metal monitoring data for the past five years shall also be provided with a discussion of any trends.

6) **Inspection and Sampling Program**

This section shall contain at a minimum, but is not limited to, the following information:

a) Inspections: the number of inspections performed for each type of IU; the criteria for determining the frequency of inspections; the inspection format procedures;
b) Sampling Events: the number of sampling events performed for each type of IU; the criteria for determining the frequency of sampling; the chain of custody procedures.

7) **Enforcement Procedures**

This section shall provide information as to when the approved Enforcement Response Plan (ERP) had been formally adopted or last revised. In addition, the date the finalized ERP was submitted to the Regional Board shall also be given.

8) **Federal Categories**

This section shall contain a list of all of the federal categories that apply to the POTW. The specific category shall be listed including the subpart and 40 CFR section that applies. The maximum and average limits for the each category shall be provided. This list shall indicate the number of Categorical Industrial Users (CIUs) per category and the CIUs that are being regulated pursuant to the category. The information and data used to determine the limits for those CIUs for which a combined waste stream formula is applied shall also be provided.

9) **Local Standards**

This section shall include a table presenting the local limits.

10) **Updated List of Regulated SIUs**

This section shall contain a complete and updated list of the Discharger's Significant Industrial Users (SIUs), including their names, addresses, and the reason why the SIU is classified as "significant." The list shall include all deletions and additions keyed to the list as submitted in the previous annual report. All deletions shall be briefly explained.

11) **Compliance Activities**

a) **Inspection and Sampling Summary:** This section shall contain a summary of all the inspections and sampling activities conducted by the Discharger over the past year to gather information and data regarding the SIUs. The summary shall include:

(1) the number of inspections and sampling events conducted for each SIU;

(2) the quarters in which these activities were conducted; and

(3) the compliance status of each SIU, delineated by quarter, and characterized using all applicable descriptions as given below:

(a) in consistent compliance;

(b) in inconsistent compliance;

(c) in significant noncompliance;

(d) on a compliance schedule to achieve compliance, (include the date final compliance is required);

(e) not in compliance and not on a compliance schedule;

(f) compliance status unknown, and why not.

b) **Enforcement Summary:** This section shall contain a summary of the compliance and enforcement activities during the past year. The summary shall include the names of all the SIUs affected by the following actions:

(1) Warning letters or notices of violations regarding SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(2) Administrative Orders regarding the SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(3) Civil actions regarding the SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(4) Criminal actions regarding the SIUs' apparent noncompliance with or violation of any federal pretreatment categorical standards and/or requirements, or local limits and/or requirements. For each notice, indicate whether it was for an infraction of a federal or local standard/limit or requirement.

(5) Assessment of monetary penalties. Identify the amount of penalty in each case and reason for assessing the penalty.

(6) Order to restrict/suspend discharge to the POTW.

(7) Order to disconnect the discharge from entering the POTW.

12) **Baseline Monitoring Report Update**

This section shall provide a list of CIUs that have been added to the pretreatment program since the last annual report. This list of new CIUs shall summarize the status of the respective Baseline Monitoring Reports (BMR). The BMR must contain all of the information specified in 40 CFR 403.12(b). For each of the new CIUs, the summary shall indicate when the BMR was due; when the CIU was notified by the POTW of this requirement; when the CIU submitted the report; and/or when the report is due.

13) **Pretreatment Program Changes**

This section shall contain a description of any significant changes in the Pretreatment Program during the past year including, but not limited to: legal authority, local limits, monitoring/ inspection program and frequency, enforcement protocol, program's administrative structure, staffing level, resource requirements and funding mechanism. If the manager of the pretreatment program changes, a revised organizational chart shall be included. If any element(s) of the program is in the process of being modified, this intention shall also be indicated.

14) **Pretreatment Program Budget**

This section shall present the budget spent on the Pretreatment Program. The budget, either by the calendar or fiscal year, shall show the amounts spent on personnel, equipment, chemical analyses and any other appropriate categories. A brief discussion of the source(s) of funding shall be provided.

15) **Public Participation Summary**

This section shall include a copy of the public notice as required in 40 CFR 403.8(f)(2)(vii). If a notice was not published, the reason shall be stated.

16) **Sludge Storage and Disposal Practice**

This section shall have a description of how the treated sludge is stored and ultimately disposed. The sludge storage area, if one is used, shall be described in detail. Its location, a description of the containment features and the sludge handling procedures shall be included.

17) **PCS Data Entry Form**

The annual report shall include the PCS Data Entry Form. This form shall summarize the enforcement actions taken against SIUs in the past year. This form shall include the following information: the POTW name, NPDES Permit number, period covered by the report, the number of SIUs in significant noncompliance (SNC) that are on a pretreatment compliance schedule, the number of notices of violation and administrative orders issued against SIUs, the number of civil and criminal judicial actions against SIUs, the number of SIUs that have been published as a result of being in SNC, and the number of SIUs from which penalties have been collected.

18) **Other Subjects**

Other information related to the Pretreatment Program that does not fit into one of the above categories should be included in this section.

Signed copies of the reports shall be submitted to the Regional Administrator at USEPA, the State Water Resources Control Board and the Regional Board at the following addresses:

Regional Administrator
United States Environmental Protection Agency
Region 9, Mail Code: WTR-7
Clean Water Act Compliance Office
Water Division
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Regulatory Unit
State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento, CA 95814

Pretreatment Coordinator
NPDES Permits Division
SF Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

APPENDIX B:

REQUIREMENTS FOR SEMIANNUAL PRETREATMENT REPORTS

The semiannual pretreatment reports are due on July 31st (for pretreatment program activities conducted from January through June) and January 31st (for pretreatment activities conducted from July through December) of each year, unless an exception has been granted by the Board's Executive Officer. The semiannual reports shall contain, at a minimum, but is not limited to, the following information:

1) **Influent, Effluent and Sludge Monitoring**

The influent, effluent and sludge monitoring results shall be included in the report. The analytical laboratory report shall also be included, with the QA/QC data validation provided upon request. A description of the sampling procedures and a discussion of the results shall be given. (Please see Appendix C for specific detailed requirements.) The contributing source(s) of the parameters that exceed NPDES limits shall be investigated and discussed. In addition, a brief discussion of the contributing source(s) of all organic compounds identified shall be provided.

The Discharger has the option to submit all monitoring results via an electronic reporting format approved by the Executive Officer. The procedures for submitting the data will be similar to the electronic submittal of the NPDES self-monitoring reports as outlined in the December 17, 1999 Regional Board letter, Official Implementation of Electronic Reporting System (ERS). The Discharger shall contact the Regional Board's ERS Project Manager for specific details in submitting the monitoring data.

If the monitoring results are submitted electronically, the analytical laboratory reports (along with the QA/QC data validation) should be kept at the discharger's facility.

2) **Industrial User Compliance Status**

This section shall contain a list of all Significant Industrial Users (SIUs) that were not in consistent compliance with all pretreatment standards/limits or requirements for the reporting period. The compliance status for the previous reporting period shall also be included. Once the SIU has determined to be out of compliance, the SIU shall be included in the report until consistent compliance has been achieved. A brief description detailing the actions that the SIU undertook to come back into compliance shall be provided.

For each SIU on the list, the following information shall be provided:

a. Indicate if the SIU is subject to Federal categorical standards; if so, specify the category including the subpart that applies.

b. For SIUs subject to Federal Categorical Standards, indicate if the violation is of a categorical or local standard.

c. Indicate the compliance status of the SIU for the two quarters of the reporting period.

d. For violations/noncompliance occurring in the reporting period, provide (1) the date(s) of violation(s); (2) the parameters and corresponding concentrations exceeding the limits and the discharge limits for these parameters and (3) a brief summary of the noncompliant event(s) and the steps that are being taken to achieve compliance.

3) POTW's Compliance with Pretreatment Program Requirements

This section shall contain a discussion of the Discharger's compliance status with the Pretreatment Program Requirements as indicated in the latest Pretreatment Compliance Audit (PCA) Report, Pretreatment Compliance Inspection (PCI) Report or Pretreatment Performance Evaluation (PPE) Report. It shall contain a summary of the following information:

a. Date of latest PCA, PCI or PPE and report.
b. Date of the Discharger's response.
c. List of unresolved issues.
d. Plan and schedule for resolving the remaining issues.

The reports shall be signed by a principal executive officer, ranking elected official, or other duly authorized employee who is responsible for the overall operation of the Publicly Owned Treatment Works (POTW) (40 CFR 403.12(j)). Signed copies of the reports shall be submitted to the Regional Administrator at USEPA, the State Water Resources Control Board and the Regional Board at the following addresses:

Regional Administrator
United States Environmental Protection Agency
Region 9, Mail Code: WTR-7
Clean Water Act Compliance Office
Water Division
75 Hawthorne Street
San Francisco, CA 94105

Pretreatment Program Manager
Regulatory Unit
State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento, CA 95814

Pretreatment Coordinator
NPDES Permits Division
SF Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

APPENDIX C

REQUIREMENTS FOR INFLUENT, EFFLUENT AND SLUDGE MONITORING

The Discharger shall conduct sampling of their respective treatment plant's influent, effluent and sludge at the frequency as shown in **Table 3** on **Page 9 of the Self Monitoring Program.**

The monitoring and reporting requirements of the POTW's Pretreatment Program are in addition to those specified in the individual POTW's NPDES permit. Any subsequent modifications of the NPDES requirements shall be adhered to and shall not affect the requirements described in this Appendix unless written notice from the Regional Board is received. When sampling periods coincide, one set of test results, reported separately, may be used for those parameters that are required to be monitored in both the Discharger's NPDES permit and Pretreatment Program. Monitoring reports required by this Order shall be sent to the Pretreatment Coordinator.

1. **Influent and Effluent Monitoring**

The Discharger shall monitor for the parameters using the required test methods listed in Table 3 (page 9). Any test method substitutions must have received prior written Regional Board approval. In addition, unless instructed otherwise in writing, the Discharger shall continue to monitor for those parameters at the frequency stated in Table 1. Influent and Effluent sampling locations shall be the same as those sites specified in the POTW's Self-Monitoring Program as set forth in its NPDES permit.

The influent and effluent sampled should be taken during the same 24-hour period. All samples must be representative of daily operations. A grab sample shall be used for volatile organic compounds, cyanide and phenol. In addition, any samples for oil and grease, polychlorinated biphenyls, dioxins/furans, and polynuclear aromatic hydrocarbons shall be grab samples. For all other pollutants, 24-hour composite samples must be obtained through flow-proportioned composite sampling. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto. For effluent monitoring, the reporting limits for the individual parameters shall be at or below the minimum levels (MLs) as stated in the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2000) [also known as the State Implementation Policy (SIP)]; any revisions to the MLs shall be adhered to. If a parameter does not have a stated minimum level, then the Discharger shall conduct the analysis using the lowest commercially available and reasonably achievable detection levels.

The following standardized report format should be used for submittal of the influent and effluent monitoring report. A similar structured format may be used but will be subject to Regional Board approval. The monitoring reports shall be submitted with the Semiannual Reports.

A. Sampling Procedures – This section shall include a brief discussion of the sample locations, collection times, how the sample was collected (i.e., direct collection using vials or bottles, or other types of collection using devices such as automatic samplers, buckets, or beakers), types of containers used, storage procedures and holding times. Include description of prechlorination and chlorination/dechlorination practices during the sampling periods.

B. Method of Sampling Dechlorination – A brief description of the sample dechlorination method prior to analysis shall be provided.

C. Sample Compositing – The manner in which samples are composited shall be described. If the compositing procedure is different from the test method specifications, a reason for the variation shall be provided.

D. Data Validation – All quality assurance/quality control (QA/QC) methods to be used shall be discussed and summarized. These methods include, but are not limited to, spike samples, split samples, blanks and standards. Ways in which the QA/QC data will be used to qualify the analytical test results shall be identified. A certification statement shall be submitted with this discussion stating that the laboratory QA/QC validation data has been reviewed and has met the laboratory acceptance criteria. The QA/QC validation data shall be submitted to the Regional Board upon request.

E. A tabulation of the test results shall be provided.

F. Discussion of Results – The report shall include a complete discussion of the test results. If any pollutants are detected in sufficient concentration to upset, interfere or pass through plant operations, the type of pollutant(s) and potential source(s) shall be noted, along with a plan of action to control, eliminate, and/or monitor the pollutant(s). Any apparent generation and/or destruction of pollutants attributable to chlorination/dechlorination sampling and analysis practices shall be noted.

2. **Sludge Monitoring**

Sludge should be sampled in the same 24-hour period during which the influent and effluent are sampled except as noted in (C) below. The same parameters required for influent and effluent analysis shall be included in the sludge analysis. The sludge analyzed shall be a composite sample of the sludge for final disposal consisting of:

A. Sludge lagoons – 20 grab samples collected at representative equidistant intervals (grid pattern) and composited as a single grab, or

B. Dried stockpile – 20 grab samples collected at various representative locations and depths and composited as a single grab, or

C. Dewatered sludge- daily composite of 4 representative grab samples each day for 5 days taken at equal intervals during the daily operating shift taken from a) the dewatering units or b) from each truckload, and shall be combined into a single 5-day composite.

The U.S. EPA manual, <u>POTW Sludge Sampling and Analysis Guidance Document</u>, August 1989, containing detailed sampling protocols specific to sludge is recommended as a guidance for sampling procedures. The U.S. EPA manual <u>Analytical Methods of the National Sewage Sludge Survey</u>, September 1990, containing detailed analytical protocols specific to sludge, is recommended as a guidance for analytical methods.

In determining if the sludge is a hazardous waste, the Dischargers shall adhere to Article 2, "Criteria for Identifying the Characteristics of Hazardous Waste," and Article 3, "Characteristics of Hazardous Waste," of Title 22, California Code of Regulations, Sections 66261.10 to 66261.24 and all amendments thereto.

Sludge monitoring reports shall be submitted with the appropriate Semiannual Report. The following standardized report format should be used for submittal of the report. A similarly structured form may be used but will be subject to Regional Board approval.

A. Sampling procedures – Include sample locations, collection procedures, types of containers used, storage/refrigeration methods, compositing techniques and holding times. Enclose a map of sample locations if sludge lagoons or stockpiled sludge is sampled.

B. Data Validation – All quality assurance/quality control (QA/QC) methods to be used shall be discussed and summarized. These methods include, but are not limited to, spike samples, split samples, blanks and standards. Ways in which the QA/QC data will be used to qualify the analytical test results shall be identified. A certification statement shall be submitted with this discussion stating that the laboratory QA/QC validation data has been reviewed and has met the laboratory acceptance criteria. The QA/QC validation data shall be submitted to the Regional Board upon request.

C. Test Results – Tabulate the test results and include the percent solids.

D. Discussion of Results – The report shall include a complete discussion of test results. If the detected pollutant(s) is reasonably deemed to have an adverse effect on sludge disposal, a plan of action to control, eliminate, and/or monitor the pollutant(s) and the known or potential source(s) shall be included. Any apparent generation and/or destruction of pollutants attributable to chlorination/ dechlorination sampling and analysis practices shall be noted.

The Discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants that the permittee believes may be causing or contributing to Interference, Pass Through or adversely impacting sludge quality.

Attachment F

Board Resolution No. 74-10

Attachment G

Standard Provisions and Reporting Requirements
(August 1993)

Attachment H

State Board Order No. 79-16

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of the Request for An Exception to the 1978 Water Quality Control Plan for Ocean Waters of California by the City and County of San Francisco for the Richmond Sunset Sewerage Zone Wet Weather Diversion Structures.	Order No. WQ 79-16

BY THE BOARD:

The City and County of San Francisco (discharger) have a combined storm and wastewater collection system. When rainfall exceeds 0.02 inches per hour, untreated domestic wastewater mixed with stormwater runoff is discharged into the Pacific Ocean through any of eight wet weather diversion structures in the Richmond Sunset Sewerage Zone. These facilities are located on the West or Ocean side of the penninsula.

On March 16, 1976, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board) adopted Order No. 76-23, Waste Discharge Requirements for the wet weather diversion structures. Order No. 76-23 required the discharger to reduce the frequency of discharge from diversion structures from an average of 114 overflow events per year to an average of one overflow event per year and to undertake a study to better define the cost and water quality benefits of facilities designed to achieve various overflow frequencies. Upon completion and submittal of the study on

December 15, 1978, the discharger requested the Regional Board to consider an increase in the allowable frequency of the discharge for the wet weather diversion structures from an average of one overflow per year to an average of eight overflows per year.

Broadly speaking, the <u>1978 Water Quality Control Plan for Ocean Waters of California</u> (Ocean Plan) prohibits the discharge or by-pass of wastewater to the ocean not conforming to the standards in the Ocean Plan. Exceptions to the standards contained in the Ocean Plan may be granted on a case by case basis. Untreated wet weather diversions require an exception to the Ocean Plan.[1/]

On January 16, 1979, the Regional Board adopted Order No. 79-12, amending Order No. 76-23 to allow an average of eight overflows per year. Based on the evidence presented at public hearing, the Regional Board determined that an exception to the Ocean Plan is warranted. By letter dated February 5, 1979, the Regional Board requested the State Water Resources Control Board (State Board) to review and approve exceptions to the Ocean Plan as recommended by Regional Board Order No. 79-12.

On March 16, 1979, the State Board held a public hearing to receive evidence pertaining to the request for an exception to the Ocean Plan.

1/ See discussion under II. Ocean Plan, page 7.

I. EXISTING WASTE COLLECTION AND DISPOSAL SYSTEM COMPARED TO THE PROPOSED SYSTEM.

San Francisco is the only city in California with a completely combined sanitary and stormwater system.[2] The City and County of San Francisco is comprised of three hydrographic sub-units and the plans for the collection and treatment of wastewater and stormwater runoff correspond to the sub-units. The Richmond Sunset Sewerage Zone corresponds to the most western sub-unit and may be defined, generally, as that portion of the County north of the San Francisco-San Mateo county line and draining the western slope of the coastal hills dividing the County. Currently, all sewered wastes are routed to the waste treatment plant situated in the western end of the Golden Gate Park. The plant provides primary treatment and chlorination to wastewater prior to ocean discharge. As indicated previously, when rainfall exceeds 0.02 inches per hour, untreated domestic wastewater mixed with stormwater runoff is by-passed from the sewer lines carrying wastewater and runoff to the treatment plant into the ocean through any of eight wet weather diversion structures. From south to north, the diversion structures are situated near Lake Merced, Vicente Street, Lincoln Way, Mile Rock and four are grouped on Bakers Beach.

2/ Water Quality Control Plan Report, San Francisco Bay Region, Chapter 16, page 73.

The outfalls range widely in size and discharge onto the Beach at or near the waters edge. For instance, the outfall at Lake Merced is about ten feet by eleven feet, the outfall at Vicente Street is two barrels about five feet in diameter and the smallest outfall, near Bakers Beach, is eighteen inches in diameter.

The discharger is proposing to construct storage, pumping, treatment and outfall facilities in the Richmond Sunset Zone to comply with waste discharge requirements including the requirement that (with the exception of an average of eight allowable overflows per year) the discharge of untreated waste is prohibited.3/

"The concept which underlies all overflow alternatives in the Great Highway is an "intercepting system" whereby the sewer functions as a storage facility and as a transport conduit. By maximizing the continuous movement of sewage in a storage facility, excessive deposition of solids is prevented. The major storage facility (Westside Transport) is located under the Upper Great Highway between Fulton Street and the Westside Pump Station just south of Sloat Boulevard. The Richmond and Lake Merced area flows will be collected and directed to storage in the Westside Transport via tunnels.4/

3/ As amended by Order 79-12, Regional Board Order No. 76-23, Discharge Prohibition A.1 provides in part:

> Discharge of untreated waste to waters of the State is prohibited with the exception of allowable overflows as defined below. The City shall design and construct facilities for diversion structures No. 1-8 to achieve a long term average of 8 overflows per year from these facilities.

4/ Abstract Report Westside Wet Weather Facility Revised Overflow Control Study, December 1978, Section IV, page 4

"Storm flows would be by gravity to the Westside Transport for storage and transport to the Westside Pump Station, then pumped to the proposed Southwest Water Pollution Control Plant (SWWPCP) south of the Zoo for treatment. Effluent would be discharged into the ocean two miles offshore via a deep-water outfall. When storage and withdrawal rates are exceeded, by-passing would occur with some control through the Vicente and Lincoln Way Outfalls, Lake Merced and Bakers Beach (Richmond) Outfalls with possible selectivity into the Mile Rock Outfall... The existing Richmond Sunset Water Pollution Control Plant located in Golden Gate Park will be abandoned, thereby returning four acres of park land to recreational uses.

* * *

"The Mile Rock Outfall (shoreline discharge) now functions as both the effluent outfall for the Richmond Sunset plant and as a wet weather overflow discharge for flows originating in the westerly portion of the Richmond Sunset district. Upon relocation of the dry-weather treatment to the Southwest side, dry-weather discharges to Mile Rock would cease and wet weather discharges would be reduced to the specified frequency."5/

The proposed Southwest Water Pollution Control Plant referred to in the foregoing quotations would be located immediately south of the grounds of the Fleishhacker Playground and Zoo and Sloat Boulevard. As envisioned, currently, a storage facility designed for a rate of eight overflows/year would consist of a channel seventeen and one-half wide and twelve to forty-five feet deep, running along the Great Highway between Fulton to Lincoln Way. The discharger does not propose to make any physical alterations to the existing wet weather outfalls.

5/ Section IV, page 5 of report cited previously. (Note 4).

The following table abstracted from Finding 4 of Regional Board Order No. 79-12 provides a comparison between the performance of the existing facilities and the performance anticipated in a system designed for an average of eight overflow incidents annually.

Average Number of Overflows Per Year	Existing 114	Proposed 8
Minimum/maximum number of overflows per year	26/193	1/18
Percent of annual combined wastewater treated (avg.)	74.1	95.9
Percent of annual combined wastewater which overflows (avg.)	25.9	4.1
Volume of overflow (Million gallons/ year, avg.)	2870	449
Total hours of overflow per year (avg.)	372	32
Minimum/maximum hours of overflow per year	163/617	2/78
Average duration of overflow (hours)	3.3	4
Composition of overflows (avg.)		
Percent sewage	12	6.5
Percent storm water	88	93.5
Percent reduction in BOD_5 and Suspended Solids discharged from existing overflows (avg.)	base	84
Average number of days nearshore water adjacent to discharge points exceed coliform standards for body contact recreation		
days greater than 1000 MPN/100 ml	119	25
days greater than 10,000 MPN/100 ml	70	10

II. THE OCEAN PLAN

The Ocean Plan was adopted to protect a wide range of beneficial uses[6/], Order No. 76-23 indicates that to some degree the following beneficial uses are made of the ocean waters in the vicinity of the diversion structures: (1) Water Contact Recreation; (2) Non-contact Water Recreation; (3) Marine Habitat; (4) Commercial and Sport Fishing; (5) Fish Migration; and (6) Wildlife Habitat.[7/]

To protect beneficial uses, the Ocean Plan provides for the concurrent application of certain regulatory mechanisms (standards) to discharges into ocean waters. These mechanisms can be broadly identified as including:

1) Water Quality Objectives (Chapter II).
2) General Management Requirements (Chapter III).
3) Effluent Quality Requirements (Chapter IV).
4) Discharge Prohibitions (Chapter V).

6/ Chapter I, Ocean Plan.

7/ For definitions of these uses, see Chapter 4, pages 1-5, Water Quality Control Plan Report, San Francisco Bay Region.

Exception to the standards contained in Chapters II through V, is provided for in Section G, Chapter VI., which provides:

> "The State Board may, subsequent to a public hearing, and with the concurrence of the Environmental Protection Agency, grant exceptions to any provision of this Plan where the Board determines:
>
> 1) The existence of unusual circumstances not anticipated at the time of the Plan's adoption;
>
> 2) The exception will not compromise protection of ocean waters for beneficial uses; and
>
> 3) The public interest will be served.

To some degree, authorization of the continued use of the wet weather diversion structures will require an exception to each of these regulatory mechanisms.

A. CIRCUMSTANCES NOT ANTICIPATED

Examination of the record in this matter clearly indicates "[t]he existence of unusual circumstances not anticipated at the time of the Plan's adoption." One such circumstance arises out of the Ocean Plan's failure to address, directly, how it would regulate the by-passing of combined waste flows.

Referring to the record pertaining to the State Board's adoption of the 1978 amendments to the Ocean Plan, it is patently clear that it was realized it was inappropriate to apply Ocean Plan standards strictly to combined waste and stormwater discharges. The record indicates, further, that rather than address this problem in the 1978 Ocean Plan amendments, directly, it was decided to deal with such problems on a case-by-case basis via the exception mechanism. Plainly it was not considered possible to anticipate in what manner the Ocean Plan should be modified to deal with the circumstances that would be presented by particular combined wet weather discharges. Additionally, it was realized that the discharges in question here would, in all probability be the subject of an exception proceeding under the Ocean Plan.[8]

Finally, it should be recognized that, with the exception of the planned eight overflow events, the City will be providing waste treatment to all stormwater runoff contained in the proposed system (about 86 percent). This contrasts, markedly, with the vast majority of communities that collect and discharge stormwater runoff without any treatment because runoff is not comingled with domestic waste flows. We conclude, therefore, that present in this request for an exception are unusual circumstances not anticipated at the time of the Ocean Plan's adoption.

8/ Position Paper 7, Proposed Amendment of Ocean Plan, December 29, 1977

B. PROTECTION OF WATERS FOR BENEFICIAL USES

No exception to the Ocean Plan may be granted if protection of ocean waters for beneficial uses will be compromised. Considering the testimony presented at the March 16, 1979, hearing and reviewing the Regional Board's record on this matter, it appears that those beneficial uses of concern are: contact and non-contact water recreation; marine habitat and sport fishing. The proposed wet weather diversions have three characteristics which may adversely affect these beneficial uses, that is, toxicity, coliform and floatables.

A wet weather diversion may contain toxic components which pose a threat to marine habitat and sport fishing. Table B of the Ocean Plan provides specific limitations for certain toxic materials.9/ Relying upon the discharger's Abstract Report Westside Wet Weather Facility Revised Overflow Control Study, December 1978 (Abstract Report) the Department of Fish and Game 10/ testified that the discharger's investigation indicated that lead, copper and zinc would be present in the wastewaters by-passed in excess of permissible Table B concentrations.11/

9/ Chapter IV, Ocean Plan.

10/ Testimony by Mike Martin, Ph.D.

11/ Table V-3.

Although stormwater is initially high in concentrations of toxic materials, the concentrations are rapidly diluted by additional stormwater runoff. Averaging four hours in duration, the discharges are intermittent. Bioassays involving placement of three spine stickleback in undiluted combined effluent for 96 hours resulted in one hundred percent survival of the fish more than fifty percent of the time. Although this fish is more pollutant tolerant, no organisms in the marine environment would ever be exposed to undiluted overflow for more than a few hours.[12/] It should be noted, additionally, that the Department indicated it had no specific information showing that marine habitat had been impaired from the many years of by-passing of these metals at high frequencies and concentrations. It is anticipated that the proposed system will provide waste treatment to about eighty-six percent of stormwater runoff. In the long run, therefore, the amount of toxic substances entering the ocean from the proposed system will be substantially less than from other communities that do not have a combined system. Under these circumstances, we do not conclude that the marine habitat and sport fishing beneficial uses will be compromised because of toxic concentrations of lead, copper and zinc. However, special provisions to reduce the concentration of toxic materials will be made a condition of the exception granted by this Order.

12/ Section V, page 4, Abstract Report.

Coliform are a group of bacteria predominantly inhabiting the intestines of man or animals. Coliform organisms are used as indicators of the possible presence of disease organisms. Of concern, to health officials are the diseases of Shigellosis, Salmonellosis and Hepatitis A. Provision A "Bacteriological Characteristics", Chapter II, of the Ocean Plan contains coliform standards intended to prevent the transmission of disease.

Wet weather discharges may contain coliform in concentrations that would make contact and non-contact recreation uses unsafe. Disease organisms may also contaminate shellfish, making harvesting unsafe for short periods of time. Coliform will be present in the wet weather discharges for which exception is sought due to the comingling of untreated domestic wastewater and stormwater runoff in the combined sewer system. Untreated wastewater will make up about 6.5 percent of the total volume of overflows if San Francisco implements the eight by-pass proposal.

Under current wet weather discharge conditions, the beach areas are posted as being unsafe for contact recreation from about October to April of each year due to high coliform concentrations. Twenty-five years of epidemiological data, however, shows no clinically confirmed cases of enteric disease from either recreational contact with ocean waters or the consumption of shellfish harvested from those waters.13/ It is estimated that the proposed facilities will result in coliform concentrations requiring posting of the beaches for an average of about twenty-five days per year.14/ In addition, based on

13/ Section V, page 13, Abstract Report.

14/ Plate 7, Reference Plates, Abstract Report.

data contained in the Abstract Report it is reasonable to conclude that recreational uses of the beach areas and waters will be minimal and that shell fishing will be unlikely to occur during and immediately following the winter storms that will result in an overflow.15/ Given these circumstances, we do not believe that the elevated coliform concentrations for the time in question constitute a compromise of contact and non-contact recreational uses.

Floatables include fecal matter and other organic and inorganic substances. Such materials may shelter coliform and prolong coliform concentrations in the receiving water. Also, for aesthetic reasons, floatables may interfere with contact and non-contact recreation uses. Chapter III, B, requires that "[w]aste discharged to the ocean must be essentially free of: 1. material that is floatable...".

Current wet weather discharges contain substantial quantities of floatables. By installing a baffling system, it is anticipated that the proposed facilities will reduce the discharge of floatables as much as seventy to ninty-five percent from existing levels.16/ In addition, the storage capacity being built into the proposed facility will result in substantial reduction of the amount of settleable solids discharged. As noted under our previous discussion regarding coliform, epidemiological data does not indicate the existence of adverse public health problems associated with the current wet weather discharges. Considering the foregoing discussion, we do not conclude that the beneficial uses under consideration will be compromised by the proposed discharges.

15/ Plate 6, Reference Plates, Abstract Report.

16/ Section VII, page 2, Abstract Report.

C. PUBLIC INTEREST CONSIDERATIONS

Exemptions to the Ocean Plan cannot be granted unless the public interest will be served by granting such exemptions. Analysis of whether the public interest will be served in this matter necessarily involves protection of beneficial uses of ocean waters, the uniqueness of the discharger's sewer system, and economic impacts in terms of capital costs, operation and maintenance costs and user charges.

The discharger's sewer system is a combined system which collects and routes to the treatment plants both sanitary sewage and stormwater. Whenever rainfall exceeds 0.02 inches per hour, this combined wastewater by-passes the treatment plants and discharges to waters of the United States. This occurs on the average of 114 times per year from various overflow structures located throughout the treatment area. This totally combined system is unique and the only major system of its kind in the state of California. Consequently, when the discharger completes the projects and facilities discussed previously in this Order, presuming eight overflows, they will not only be treating ninty-nine percent of sanitary wastewater but will also be treating eighty-six percent of stormwater runoff. This combined treatment will substantially reduce pollutant loadings to the ocean from urban runoff, an accomplishment unique to the discharger's system. Unquestionably this serves the public interest.

We have previously discussed protection of beneficial uses. This is an integral part of serving the public interest. Further, the Central Coast Regional Coastal Commission (Regional Commission) has denied the discharger a required development permit based on one overflow in part based on the size and location of the transport necessary for a one overflow system. The Regional Commission's concerns related to future beach erosion, sewer exposure and seismic and groundwater problems. An allowance of eight overflows will allow a smaller transport system to be built. The State Commission has now assumed jurisdiction in this matter.

The cost impacts and savings of allowing eight overflows on the westside are enormous. Considerable evidence was introduced in the Regional Board record and at the hearing regarding these costs and savings. Capital costs of the Westside project assuming one overflow are $299,000,000 and $189,000,000 assuming eight overflows. Thus, an increase in the number of overflows from one to eight would result in a $110,000,000 capital cost saving. The annual operation and maintenance cost savings would be $10,000,000. Table IV-1 of the Abstract Report shows detailed cost comparisons for the various parts of the Westside project. Plate 5 of the Abstract Report tabulates the cost of suspended solid, BOD, and coliform benefits for different overflow levels. The testimony presented indicates substantially diminishing benefit returns per dollar spent as the number of overflows diminishes below eight. This is clearly demonstrated by the Regional Board graph dated January 15, 1979.

Considerable written and oral testimony was presented to the State Board and the Regional Board regarding citizen concern for user charges. This testimony included comments from The West of Twin Peaks Central Council, The Citizens Advisory Committee for Wastewater Management, The Hotel Employers Association, The Sunset Coalition, The Sunset-Parkside Education and Action Committee, Paul D. Berrigan, Brig. Gen. Retd., Descon Corporation, The San Francisco Bay Chapter Sierra Club, and The Parkside District Improvement Club, Inc.. The user charge based on eight overflows is more reasonable than for one or zero.

Based upon the factors above, we find the public interest will be served by granting the discharger an exemption to the Ocean Plan to allow an average of eight overflows per year.

III. EXCEPTION SUBJECT TO CONDITIONS

Subject to the following conditions, this Order excepts the proposed by-passes from the terms of the Ocean Plan.

1. The discharger shall perform a self-monitoring program in accordance with the specifications prescribed by the Regional Board as indicated in Provision 12 of Regional Board Order No. 79-12. All beaches affected by the wet weather overflows shall be posted with warning signs for the period of time beginning when the overflow commences and continuing until analysis indicates the water quality of the affected areas is meeting bacteriological standards for recreation.

   At all areas where shellfish may be harvested for human consumption warning signs shall be posted for the period of time beginning when the overflow commences and continuing until the City and County Health Department indicates that no further posting is required.

2. Excepting provision Chapter II. A., to the greatest extent practical, the discharger shall design, construct and operate facilities which will conform to the remaining standards set forth in Chapter II of the Ocean Plan.

3. To the greatest extent practical, the discharger shall design, construct and operate facilities that will comply with the conditions controlled by the requirements provided by Chapter III, Sections A and B of the Ocean Plan.

4. The discharger shall develop the conceptual proposals for the design to be used and the technologies to be installed in the facilities intended to assure compliance with conditions 2 and 3. The proposals shall be submitted to the State Board and the EPA for approval within sixty days following adoption of this Order.

5. Excepting an average of eight overflows per year, the discharger shall design and construct facilities that will contain all other stormwater runoff.17/ The discharge of all other untreated waste to waters of the state is prohibited.

6. The State Board Division of Water Quality shall critically review the discharger's grant application and subsequent design and construction and the Regional Board shall review operating performance to assure compliance with conditions 1, 2, 3 and 5.

7. The discharger shall fully comply with any federal and state source control program in order to minimize the entry of toxic substances into the waste collection system from in-

17/ For the purpose of this Order, allowable overflows are those overflows permitted by Discharge Prohibitions A.1., Order No. 76-23 as amended by Order No. 79-12. In addition, any two overflows within one storm or a series of storms, separated by six or more hours shall be considered two separate overflow events. This requirement for an average of eight overflows is based upon the 62 year period of rainfall record used by the City in developing its facility design.

dustrial dischargers. To the extent that Section 208 studies being conducted by ABAG conclude there are feasible measures for reducing the entry of toxic substances into the collection system from stormwater runoff, the discharger shall implement such measures in accordance with a plan approved by the Regional Board.

8. Notwithstanding this Order, if the Regional Board finds that changes in location, intensity or importance of affected beneficial uses or demonstrated unacceptable adverse impacts as a result of operation of the constructed facilities have occurred, it may require the construction of additional facilities or modification of the operation of existing facilities.

As noted earlier, the exception granted by this Order is subject to the concurrence of the EPA. The EPA may attach, independently, other conditions upon the discharger as a condition of granting an exception.

IV. ADDITIONAL CONSIDERATIONS

The discharger completed a final EIR/EIS for the Wastewater Master Plan in May 1974. The discharger completed a final EIR for the Westside Transport facility in July 1977, which addressed overflows from diversion structures Nos. 2 and 3. This EIR identified potential adverse water quality impacts from this project related to seismic activity and the project has been modified to mitigate this potential impact. This EIR will be amended by the discharger following adoption of this Order. The discharger has commenced preparation of a draft EIR for the Richmond Tunnel facility which will address overflows from diversion structures Nos. 4 through 8, and has indicated they will prepare an EIR for the Lake Merced Transport facility which will address overflows from diversion structure No. 1. Upon completion of the amendment to the Westside Transport facility EIR, the final EIR for the Richmond Tunnel facility, and the final EIR for the Lake Merced Transport facility, the State Board will review any adverse impacts identified, and if necessary, make appropriate revisions of this Order.

V. CONCLUSIONS

After review of the record and for the reasons heretofore expressed, we have reached the following conclusions:

1. Subject to the conditions set forth in "III. EXCEPTION SUBJECT TO CONDITIONS," the proposed wet weather discharges by the City and County of San Francisco from the eight diversion structures in the Richmond Sunset Sewerage Zone are excepted from the requirements of the Ocean Plan.
2. Revisions may be made to this Order upon completion of the amendment to the Westside Transport facility EIR, the final EIR for the Richmond Tunnel and the final EIR for the Lake Merced Transport facility.

VI. ORDER

IT IS HEREBY ORDERED that the discharger's request for an exemption is granted subject to the conditions contained in "III. EXCEPTION SUBJECT TO CONDITIONS". Revisions may be made to this Order upon completion of additional environmental documents.

Dated: March 23, 1979

W. Don Maughan
W. Don Maughan, Chairman

William J. Miller
William J. Miller, Member

L. L. Mitchell
L. L. Mitchell, Member

Attachment I

Regional Board Order No. 79-12

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 79-12

NPDES PERMIT NO. CA0038415

AMENDING ORDER NO. 76-23 REGARDING
CITY AND COUNTY OF SAN FRANCISCO
RICHMOND SUNSET SEWERAGE ZONE
WET WEATHER DIVERSION STRUCTURES

The California Regional Water Quality Control Board, San Francisco Bay Region, hereinafter called the Board, finds that:

1. The City and County of San Francisco, hereinafter called the discharger, presently discharges untreated domestic and industrial wastewater mixed with storm water runoff, all containing pollutants, into the Pacific Ocean, a water of the United States, through any of eight (8) wet weather diversion structures in the Richmond Sunset Sewerage Zone. These discharges occur only when rainfall exceeds 0.02 inches per hour.

2. Order No. 76-23 required the discharger to reduce the frequency of discharge for diversion structures No. 1 through 8 to an average of one overflow event per year and to undertake a citywide overflow control study to better define the cost and water quality benefits of facilities designed to achieve various overflow frequencies.

3. The discharger has undertaken an overflow control study and has requested the Regional Board to consider an increase in the allowable frequency of discharge for diversion structures No. 1 through 8 from an average of 1 overflow per year to an average of 8 overflows per year.

4. The following table provides a comparison of improvement obtainable by reducing the average overflows from diversion structures No. 1 through 8 to eight (8), four (4) and one (1) overflow per year compared to the existing average of 114 per year. Data was derived from the discharger's predictive computer model and are therefore approximations.

Average Number of Overflows Per Year	Existing 114	8	4	Order No. 76-23 1
Minimum/maximum number of overflows per year	26/193	1/18	0/11	0/4
% of annual combined wastewater treated (avg.)	74.1	95.9	98.1	99.53
% of annual combined wastewater which overflows (avg.)	25.9	4.1	1.9	0.47
Volume of overflow (Million gallons/ year, avg.)	2870	449	213	52
Total hours of overflow per year (avg)	372	32	15.4	3.5
Minimum/maximum hours of overflow per year	163/617	2/78	0/42	0/18
Average duration of overflow (hours)	3.3	4	3.9	3.5
Composition of overflows (avg)				
% sewage	12	6.5	6.5	6.2
% storm water	88	93.5	93.5	93.8
% reduction in BOD_5 and Suspended Solids discharged from existing overflows (avg)	base	84	92.5	98
Average number of days nearshore water adjacent to discharge points exceed coliform standards for body contact recreation				
days greater than 1000 MPN/100 ml	119	25	13	4
days greater than 10,000 MPN/100 ml	70	10	6	1
Cost of facilities (millions of dollars)				
Capital cost (total)	base	189	242	299
Storage		150	161	182
Pumping		13.5	21.5	25.5
Treatment /outfall		25.5	59.1	91.6
Annual cost	base	14	19	24

5. Overflows will occur from storage structures which will be designed to provide for additional removal of settleable and floatable solids. Removal of these solids will provide further mitigation of the aesthetic and public health impacts over and above the mitigation provided by reduction in the frequency of overflows.

6. The discharger completed a final EIR/EIS for the Wastewater Master Plan in May 1974. The discharger completed a final EIR for the Westside Transport facility in July, 1977, which addressed overflows from diversion structures Nos. 2 and 3. This EIR identified potential adverse water quality impacts from this project related to seismic activity and the project has been modified to mitigate this potential impact. This EIR will be amended by the City following adoption of this order. The discharger has commenced preparation of a draft EIR for the Richmond Tunnel facility which will address overflows from diversion structures Nos. 4 through 8 and has indicated they will prepare an EIR for the Lake Merced Transport facility which will address overflows from diversion structure No. 1. Upon completion of the amendment to the Westside Transport facility EIR, the final EIR for the Richmond Tunnel facility, and the final EIR for the Lake Merced Transport facility, the Board will review any adverse water quality impacts identified, and if necessary, make appropriate revisions of this Order. The issuance of waste discharge requirements for this project is exempt from the provisions of Chapter 3 (commencing with Section 21000) of Division 13 of the California Public Resources Code (CEQA) in accordance with Water Code Section 13389.

7. The Board has notified the discharger and interested agencies and persons of its intent to amend Order No. 76-23 and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

8. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

9. The combined sewer collection system of San Francisco, designed to transport both sanitary and storm flows, presents a unique problem regarding total compliance with the Basin Plan prohibition against the discharge of untreated waste. The Basin Plan recommends that exceptions to compliance be allowed for wet weather discharges, provided that beneficial uses are not adversely affected; however, a specific exception clause was not included. It is clear that the intent of the Basin Plan is to allow exceptions and this Board will consider inclusion of a specific exception clause during the next Basin Plan updating.

10. Based upon the presently available planning information contained in these findings and evidence presented at the public meeting concerning the cost differences of facilities necessary to achieve specific overflow frequencies and the water quality benefits derived from construction of those facilities and considering the location and intensity of existing beneficial uses; a long term average of eight (8) overflows per year for diversion structures No. 1 through 8, will provide adequate overall protection of beneficial uses; provided however that further study to comply with the discharge prohibitions No. A.2 and A.3 is required by the discharger especially where existing discharge points are located in areas which do not have adequate exchange with ocean water and may not provide adequate protection of adjacent nearshore beneficial uses. Further mitigation may be required in the future, after facilities are placed in operation, if it is determined that beneficial uses are not adequately protected.

11. The Federal Water Pollution Control Act and amendments thereto require that point source discharges comply with appropriate standards by July 1, 1977. The discharger has not started construction of facilities to comply with the prohibitions and provisions of Order No. 76-23 as amended by this Order. The Board will consider an appropriate enforcement order which will include a time schedule for compliance with Order No. 76-23 as amended by this order within 90 days of the date of this order.

IT IS HEREBY ORDERED, that Order No. 76-23 is amended as follows:

A. Finding No. 1, page 1, is amended to read:

1. The City and County of San Francisco, hereinafter called the discharger, presently discharges untreated domestic and industrial wastewater mixed with storm water runoff, all containing pollutants, into the Pacific Ocean, a water of the United States.

B. Finding No. 8, page 2, is deleted.

C. Finding No. 9, page 2, is amended to read:

9. The beneficial uses of the Pacific Ocean in the vicinity of these diversion structures are:

Water contact recreation
Non-contact water recreation
Marine habitat
Commercial and sport fishing
Fish migration
Wildlife habitats

D. Discharge prohibition A.1, page 3, is amended to read:

1. Discharge of untreated waste to waters of the State is prohibited with the exception of allowable overflows as defined below. The City shall design and construct facilities for diversion structures No. 1-8 to achieve a long term average of eight (8) overflows per year from these facilities. These long term overflow frequencies shall not be used to determine compliance or noncompliance with the exception. Allowable overflows from these facilities are defined as those discharges which occur when all of the following criteria are met:

a. All storage capacity within a storage facility is fully utilized; and

b. Maximum installed pumping capacity or some lower rate based on limits of downstream transport or treatment capabilities is being utilized to withdraw flows from the storage facility; and

c. All citywide treatment facilities, excluding the Golden Gate Park reclamation facility, are being operated at capacity or at some lower rate consistent with the maximum withdrawal and transport rates; and

d. Overflow occurs from a facility employing baffles or other equivalent means to reduce the discharge of floatables.

Overflows which occur when criteria a, b, c, and d are not being met shall be considered violations of this discharge prohibitions.

E. Provision B.3.a., page 3, is amended to delete the following:

"(1)[1/] Reduce frequency of discharge for diversion structures No. 1 through 8 to an average [2/] of one overflow event per year.

[1/] This Board will consider amendment of this order to further reduce frequency of discharge after review of the information requested in Provision B.4. below.

[2/] Method of computing average to be developed in self-monitoring program."

F. Provision B.3.a is amended to add the following on page 5:

Task	Completion Date
"(d) Full compliance with Discharge Prohibition A.1.	by July 1, 1977"

G. Provision B.3.b. is amended to add the following on page 5:

Task	Completion Date
"(3) Full compliance with Discharge Prohibition A.2. and A.3.	by July 1, 1977"

H. Provision B.3.c. is amended to add the following on page 6:

Task	Completion Date
"(2) Full compliance with Provision B.1.	by July 1, 1977"

I. Provisions No. B. 10., 11., and 12. are added on page 7 as follows:

"10. The City and County of San Francisco is required to submit to the Regional Board by the first day of every month a report, under penalty of perjury, on progress towards compliance with this Order. Said report shall include the status of progress made toward compliance with all tasks of this Order. If noncompliance or threatened noncompliance is reported the reasons for noncompliance and an estimated completion date shall be provided.

11. The long term average overflow frequency prescribed in this Order is based on information available at the time of adoption of this Order. If the Board finds that changes in the location, intensity or importance of affected beneficial uses or demonstrated unacceptable adverse impacts as a result of operation of the constructed facilities have occurred they may require the construction of additional facilities or modifications of the operation of existing facilities.

12. The City and County of San Francisco shall perform a self-monitoring program in accordance with the specifications prescribed by the Executive Officer of the Regional Board. The City and County's Health Department is requested to post warning signs on all beaches affected by the wet weather overflows for a period of time commencing with the day of overflow and continuing until the water analyses indicate the water quality of the affected areas have recovered and are meeting bacteriological standards for water contact sport recreations in the beach areas."

I, Fred H. Dierker, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on January 16, 1979.

FRED H. DIERKER
Executive Officer

Attachments:
Reporting Requirements 8/8/73
Standard Provisions 8/8/73

Attachment J

ESA Consultation Letters

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In reply please refer to:
May 26, 2003 151422SWR02SR8258:MEM;JJD

MAY 30 2003

Nancy Yoshikawa
CWA Standards and Permits Office
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA, 94105

Dear Ms. Yoshikawa:

Thank you for your request of February 12, 2003, to initiate section 7 consultation with the National Marine Fisheries Service (NOAA Fisheries) regarding the joint U.S. Environmental Protection Agency's (EPA) and Regional Water Quality Control Board's proposed issuance of the National Pollutant Discharge Elimination System (NPDES) permit for the City and County of San Francisco's Oceanside Treatment Plant, Southwest Ocean Outfall (SWOO), and Westside Wet Weather facilities. The permit would regulate the discharge of treated wastewater through the SWOO, which is located beyond the three mile limit of the territorial sea into federal waters. The permit would also regulate the discharge of seven Combined Sewer Overflow (CSO) points along the western edge of San Francisco. NOAA Fisheries provided a list of Federally listed (or proposed for listing) threatened or endangered species or critical habitat under our jurisdiction that may be affected by the proposed permit by letter dated September 19, 2002.

The City and County of San Francisco (CCSF) operates a combined sewer collection system into which both sewage and storm water runoff flow. Effluent is discharged 3.75 miles offshore of Ocean Beach through the SWOO. Effluent may be treated to a primary or secondary level, depending on volume, but is not disinfected. Primary treatment entails separation of solids from liquid fractions. Secondary treatment entails microbial "digestion" of solid fractions. Discharges in dry weather average 18 million gallons per day (MGD). In wet weather, effluent discharges from the Oceanside Plant may increase up to 65 MGD, 43 MGD of which is treated to secondary standards, and then blended with 22 MGD treated to primary standards. Flows above 65 MGD (up to 175 MGD) receive primary treatment in the CSO structures before being discharged through the SWOO. Flows in excess of 175 MGD are discharged directly to the shoreline via seven overflow structures.

The effluent may contribute significant levels of bacteria, heavy metals, and organic pollutants (e.g. pesticides and pesticide residues, pharmaceutical compounds) to the receiving ocean waters. To monitor these effects during the past five years, the CCSF has conducted extensive beach and offshore monitoring from Point San Pedro to Point Bonita, and offshore approximately eight miles.

<u>Endangered Species Act</u>

Available information indicates that the following listed species (Evolutionarily Significant Units) may occur in the project areas:

<u>Anadromous Salmonids</u>

Sacramento River winter-run chinook salmon (*Oncorhynchus tshawytscha*)
endangered (January 4, 1994, 59 FR 440)
Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*)
threatened (September 16, 1999, 64 FR 50394)
Central California Coast coho (*Oncorhynchus* kisutch)
threatened (October 31, 1996, 64 FR 56138)
Central California Coast steelhead (*Oncorhynchus mykiss*)
threatened (August 18, 1997, 62 FR 43937)
Central Valley steelhead (*Oncorhynchus mykiss*)
threatened (March 19, 1998, 63 FR 13347)

All the above anadromous salmonids enter the ocean as juveniles following 6-months to 2 years of freshwater residence. Upon entering the ocean as smolts, our understanding of ocean migratory behavior and distribution patterns is limited. Movement and distribution fluctuates with ocean temperatures, food availability, salmonid race (i.e. area of origin), and ocean environmental conditions. After one to four years in the ocean, salmon and steelhead return as adults to their natal streams to spawn

<u>Cetaceans</u>

Fin Whale (*Balaenoptera physalus*)
endangered (Dec 28, 1973, Public Law 93-205)
Blue Whale (*Balaenoptera musculus*)
endangered (Dec 28, 1973, Public Law 93-205)
Humpback Whale (*Megaptera novaengiae*)
endangered (Dec 28, 1973, Public Law 93-205)
Sperm Whale (*Physeter macrocephalus*)
endangered (Dec 28, 1973, Public Law 93-205)

Pinnipeds

Steller Sea Lion (*Eumetopias jubatus*)
threatened (November 26, 990, 50 FR 227)

Sea Turtles

Leatherback sea turtle (*Dermochelys coriacea*)
endangered (June 2, 1970)
Loggerhead Sea Turtle (*Caretta caretta*)
threatened (July 28, 1978, 43 FR 82808)
Green Sea Turtle (*Chelonia mydas*)
threatened (July 28, 1978, 43 FR 82808)
Olive Ridley sea turtle (*Lepidochelys olivacea*)
threatened (July 28, 1978, 43 FR 82808)

Tissues of English sole (*Pleuronectes vetulus*), and Dungeness crab (*Cancer magister*) collected from the SWOO study area and from reference sites were examined for organic and inorganic pollutants (CCSF 2001). Elevated levels of polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), DDT and arsenic were detected in fish and crab tissues. Screening values for PAHs were exceeded in fish muscle and liver tissues. While PAH contaminants probably degrade rapidly in sunlight, they have been implicated in hyperplasia (excessive cell growth) and neoplasia (tumors), in aquatic invertebrates and fish (Eisler 2000).

Screening values for PCBs and DDT were exceeded in crab hepatpancreas tissues. Marine mammals are the most vulnerable to PCB contamination, because these compounds are widely distributed, found in marine mammal prey species, and accumulate in body fatty tissues. These compounds adversely affect patterns of survival, reproduction, growth, metabolism, and accumulation in all tested organisms. Chinook salmon, for example, had decreased hatch success when their eggs contained as little at 1 microgram PCB per kilogram of weight. Deleterious effects to mammals were significant on growth survival, reproduction, or metabolisms from chronic daily exposures of as little as 0.008 milligrams/kilogram (Eisler 2000).

Sediment monitoring for both organic compounds and metals reveal no increasing or decreasing trend in sediment contamination. Concentrations around the outfall were not significantly higher than other sampling sites in the study area (CCSF 2001). The CCSF also conducted voluntary "whole sediment toxicity testing" during the 2000 survey. Along with sediment chemistry and benthic community analysis, these tests assess possible contaminant effects that could be missed in other analyses. Results indicated no detectable toxicity at any of the sample sites.

NOAA Fisheries has examined the results of these monitoring efforts which include levels of bacterial coliforms and concentrations of inorganic and organic pollutants in tissues and in sediment. Comparison of data from the extensive monitoring program with reference sites indicates that discharge of effluent under the existing NPDES permit has not adversely affected conditions to the extent that loading or trends can be distinguished from background levels. In regards to pathogenic organisms, there are no known incidents of marine mammals listed under the ESA which were affected by pathogens likely associated with this project. However the data set is also extremely limited (Gulland pers. com. 2003).

Based on the best available information, I concur with your determination that this project is not likely to adversely affect threatened and endangered species of anadromous salmonids, cetaceans, pinnipeds, or sea turtles. This concludes section 7 consultation for listed species under the jurisdiction of NOAA Fisheries in accordance with 50 CFR §402.14(b)(1) for the proposed issuance of the NPDES permit for the CCSF's Oceanside and Westside facilities. However, further consultation may be required if (1) new information becomes available indicating that listed species or critical habitat may be adversely affected by the project in a manner not previously considered, (2) current project plans change in a manner that affects listed species or critical habitat, or (3) a new species is listed or critical habitat designated that may be affected by the action.

Magnuson-Stevens Fishery Conservation and Management Act - Essential Fish Habitat

The project site is located within an area identified as Essential Fish Habitat (EFH) for various life stages of fish species managed with the following Fishery Management Plans (FMP) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA):

Pacific Groundfish FMP - (starry flounder, English sole, sand sole, leopard shark, spiny dogfish, brown rockfish, etc.)
Coastal Pelagics FMP - (northern anchovy, Pacific sardine)
Pacific Coast Salmon FMP - (chinook and coho salmon)

NOAA Fisheries has evaluated the proposed project for potential adverse effects to EFH pursuant to Section 305(b)(2) of the MSA. Based on the best available information, EFH Conservation Recommendations are not necessary. However, if the proposed action is modified in a manner that may adversely affect EFH, or if continued monitoring shows contaminants beginning to accumulate in EFH above current conditions, the EPA may need to reinitiate EFH consultation with NOAA Fisheries.

Marine Mammal Protection Act

The purpose of the MMPA is to prevent the taking of marine mammals and to provide for their conservation and management. Operation of the project has the greatest potential to affect harbor seals *(Phoca vitulina richardsi)* by introducing pathogens into the water column via the SWOO or the seven shoreline overflow sites. Usage of the shoreline overflow sites is rare while effluent is constantly discharged through the SWOO. Other marine mammals such as California sea lion *(Zalophus californianus)* are known to utilize the area and may be affected. Documented cases have not been noted at this time, but the available data set is very small.

Pacific harbor seals have been found in areas near San Francisco infected with pathogens that may be introduced through the SWOO. The two most prominent pathogens are both protozoans and are also known to infect other mammal species. The first is *Sarcocystis neurona*, which has been implicated in harbor seal infections and mortality in several instances (Lapointe, et. al. 1998, Miller, et. al. 2001). It is considered a well established pathogen in harbor seals affecting mostly older animals (Miller, pers. comm. 2003). The second is *Toxoplasma gondii* which has been found in a harbor seal in the Monterey Bay (Miller, et. al. 2001), but is a more prominent pathogen in southern sea otters (Miller, et. al. 2002). These pathogens are known to enter coastal waters in freshwater runoff (Miller, et. al. 2002).

During discussions with EPA and the CCSF, NOAA Fisheries expressed concern about the possible introduction of morbilliviruses to the water column as a result of the project. The morbillivirus family includes measles in humans, canine distemper, phocine distemper, dolphin distemper and a few other varieties. Morbilliviruses are responsible for episodes of mortality in Caspian seals *(Phoca caspica)* in the Caspian sea (Kennedy, S., et. al. 2000) and harbor seals *(Phoca vitulina)* in northwestern Europe (Taubenberger, et. al. 1996). They have been isolated from harbor porpoises *(Phocoena phocoena)* that died along the Irish coast, striped dolphins *(Stenella coeruleoalba)* in the Mediterranean Sea and bottlenose dolphins along the U.S. Atlantic and Gulf of Mexico coasts (Taubenberger et. al. 1996). NOAA Fisheries consulted with experts at The Marine Mammal Center in Sausalito, California to see if there are any episodes of morbillivirus infection in the San Francisco area. To date, they have recorded no episodes of infection, however antibodies to morbillivirus have been found in common dolphins *(Delphinus delphis)* off the Southern California coast. This indicates that the animals have been exposed to some form of morbillivirus, but which form is not known. West coast populations are not be expected to have resistance to infectious strains though because they are not known to have been exposed (Gulland, pers. comm. 2003).

Due to the design of the CCSF's West Side combined sewer system these pathogens can be introduced to the water column through the SWOO as well as to the shoreline from runoff or CSO overflows. NOAA Fisheries requests that the CCSF conduct testing of the effluent for *Sarcocystis neurona*, *Toxoplasma gondii* and morbilliviruses at least twice a year during the upcoming permit cycle. Sampling should occur once during dry weather conditions and once during wet weather conditions when primary treated effluent is being discharged. This testing would be in addition to the *E. coli* and *enterocoocus* monitoring proposed as part of the draft discharge permit currently out for public comment. NOAA Fisheries recognizes that proper methodologies for this examination will have to be determined and, if requested, we will aid the CCSF in organizing a technical advisory committee to determine the scope of the work.

If you have questions concerning this consultation, please contact Maura Eagan Moody at (707) 575-6092 or Joe Dillon at (707) 575-6093. Thank you for your cooperation on this complex matter. We look forward to working with you in the future.

Sincerely,

For

Rodney R. McInnis
Acting Regional Administrator

cc: James H. Lecky, NOAA Fisheries, Long Beach, California
Dan Buford, USFWS, Sacramento, California
Abigail Smith, SF RWQCB, Oakland, California
Dan Russell, USFWS, Sacramento, California
Joe Cordaro, NOAA Fisheries, Long Beach, California
Tina Fahy, NOAA Fisheries, Long Beach, California
Arleen Navarret, San Francisco Public Utilities Commission

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

AHS
JUN 26 2003

IN REPLY REFER TO
1-1-03-I-2235

JUN 24 2003

Mr. Terry Oda
Manager, Clean Water Act Standards and Permits Office
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Subject: Informal Consultation for NPDES Permit (#CA0037681) for San Francisco's Westside (Correspondence Reference - WTR-5)

Dear Mr. Oda:

This letter is in response to your February 12, 2003, request to initiate informal consultation on a draft National Pollutant Discharge Elimination System (NPDES) permit for the City and County of San Francisco's Oceanside Treatment Plant, Southwest Ocean Outfall, and Westside Wet Weather Facilities pursuant to the Endangered Species Act of 1973, as amended (Act). This draft NPDES permit, a renewal of an existing permit, is jointly issued by the U.S. Environmental Protection Agency (EPA) and the State of California's San Francisco Bay Regional Water Quality Control Board. This permit is issued pursuant to Section 402 of the Clean Water Act for the discharge of treated wastewaters to waters of the State and United States from the Oceanside Water Pollution Control Plant (WPCP) and the Westside Wet Weather Combined Sewer System (WWWCSS). In addition to your informal consultation letter, you provided a draft Biological Evaluation (BE) of the joint NPDES permit. Based on this BE, the EPA has determined that issuance of the proposed permit may affect, but is not likely to adversely affect, the southern sea otter (*Enhydra lutris nereis*) (sea otter). The EPA is requesting the Service's concurrence with this determination.

The Oceanside WPCP and the WWWCSS provide treatment for sewage and storm water from the west side of the City of San Francisco. During dry weather and smaller wet weather events, all flows receive secondary treatment at the Oceanside WPCP and are discharged through the Southwest Ocean Outfall (SWOO) into Federal waters of the Pacific Ocean [6 kilometers (km) offshore, 80 feet deep from Mean Lower Low Water (MLLW)]. In larger wet weather events, the SWOO discharge increases and includes primary treated effluent from the Oceanside WPCP and the WWWCSS. During very large storms, the SWOO pumping capacity is exceeded and combined sewer overflows (CSOs) occur at seven discharge points along the City's shoreline.

Dry weather discharges average 18 million gallons per day (MGD). Effluent discharges from the Oceanside WPCP may increase to 65 MGD during wet weather events; 43 MGD which receives secondary treatment from the WPCP and 22 MGD which receives the equivalent of primary treatment from the WWWCSS. Flows above 65 MGD (up to 175 MGD) receive primary treatment in the CSO structures before being discharged through the SWOO. Flows in excess of 175 MGD are discharged directly to the shoreline via seven outflow structures. None of the effluent, whether in primary or secondary treatment, receives disinfection treatment. The effluent may contain numerous organic and inorganic pollutants as it enters ocean waters. The City and County of San Francisco's (CCSF) Public Utilities Commission, Water Quality Bureau, has conducted beach and offshore monitoring for several years to assess the impact of these discharges (CCSF, 2001).

Based on the Southwest Ocean Outfall Regional Monitoring Program's Five-Year Summary Report (CCSF, 2001), sediment monitoring for metal and organic pollutants revealed no increasing or decreasing trend in contamination. In 2000, sediment samples were collected at 24 sites and used in 'whole sediment' toxicity testing, using an amphipod (*Eohaustorius* spp.) as the test organism. Detectable toxicity was not observed at any of the sample sites. Although screening values for a number of pollutants (*e.g.*, polyaromatic hydrocarbons, polychlorinated biphenyls, DDT, arsenic) were exceeded in fish and crab tissues sampled from the SWOO study area, no clear trends were observed between study sites. This monitoring effort indicates that effluent discharged under the existing NPDES permit has not adversely affected environmental conditions to the extent that loading or trends can be distinguished from background levels.

As noted above, none of the effluent resulting from this NPDES permit undergoes disinfection before discharge. The EPA's draft BE discusses recent speculation that undisinfected wastewater might be a source of disease for marine mammals, including the sea otter. The BE cites a study (Miller *et al.*, 2002) in which serological data from 223 live and dead sea otters from the Morro Bay region were examined between 1997 and 2001. Otters sampled near areas with freshwater runoff were approximately three times more likely to be seropositive for *Toxoplasma gondii*, a virus found in cat feces, than otters sampled in other areas. In addition to *T. gondii*, another pathogen (*Sarcocystis neurona*) which may potentially be introduced through undisinfected wastewater has been implicated in harbor seal infections and mortality (Dillon, pers. comm., 2003). Miller et al. (2002) found no evidence of a relationship between seropositivity to *T. gondii* and exposure to municipal sewage and believe the reason is that the major municipal sewage outfalls are located far offshore (greater than 0.5 km) and nearly all otters were sampled at locations greater than 5 km from the nearest major municipal sewage outfall. The authors concluded that exposure of sea otters to sewage plumes derived from major municipal sources was low in their study. The Oceanside outfall is located 6 km from shore and is 24 km from the northern most range of the sea otter.

Questions about pathogens in undisinfected wastewater and their potential impact on marine mammals is proposed to be addressed in the NPDES permit through a full literature review to be completed by the discharger. However, as little is yet known about the magnitude of potential marine mammal pathogens in undisinfected wastewater or about the environmental fate and transport of these organisms once introduced into the marine ecosystem, the Service recommends additional monitoring requirements be included in the permit. Effluent should be tested for both *Sarcocystis neurona* and *Toxoplasma gondii* at least twice a year during the upcoming permit cycle. Sampling should occur once a year during dry weather conditions and once a year during wet weather conditions when primary-treated effluent is discharged. This testing would be in addition to the bacteriological monitoring requirements already in the draft permit.

The known northernmost range of the sea otter (Half Moon Bay) is approximately 24 km (15 miles) from both the SWOO and the WWWCSS discharges (Sander, pers. comm., 2003). Based on this information, and the results of the ongoing Southwest Ocean Outfall Regional Monitoring Program, the Service concurs with the EPA's determination that issuance of the existing NPDES permit is not likely to adversely affect the sea otter.

These comments are provided in accordance with the Act and conclude informal consultation. However, further consultation may be required if: (1) new information becomes available indicating that listed species or critical habitat may be adversely affected by the project in a manner not previously considered, (2) current project plans change in a manner that affects listed species or critical habitat, or (3) a new species is listed or critical habitat designated that may be affected by the action. Should you have any questions about these comments, please contact Tom Maurer of the Environmental Contaminants Division at (916) 414-6590 or Dan Buford of the Endangered Species Division at (916) 414-6625.

Sincerely,

Doug Weinrich

Doug Weinrich
Acting Chief, Endangered Species Program

cc:
EPA, Region IX, San Francisco, CA (Attn.: Nancy Yoshikawa)
NOAA Fisheries, Santa Rosa, CA, (Attn.: Joe Dillon)
SFRWQCB, Oakland, CA, (Attn.: Abigail Smith)
VFWO, Ventura, CA, (Attn.: Greg Sanders)

REFERENCES

City and County of San Francisco (CCSF). 2001. Southwest Ocean Outfall Regional Monitoring Program. 2000 Annual Report. CCSF Public Utilities Commission, Water Quality Bureau. Prepared by the Environmental Services Section. 109 pp and Appendices.

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Attachment K

Self-Monitoring Program

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
AND
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 9

SELF-MONITORING PROGRAM

FOR

CITY AND COUNTY OF SAN FRANCISCO
OCEANSIDE TREATMENT PLANT,
SOUTHWEST OCEAN OUTFALL,
AND
WESTSIDE WET WEATHER FACILITIES

NPDES PERMIT NO. CA 0037681

CONSISTS OF
PART A, dated August 1993

AND

PART B (attached), effective October 1, 2003

** Note: Self-Monitoring Program Part A (August 1993), Standard Provisions and Reporting Requirements (August 1993), and Resolution No. 74-10 are not attached but are available for review or download on the Board's website at www.swrcb.ca.gov/rwqcb2."*

SELF-MONITORING PLAN

CONTENTS

I. Oceanside Wastewater Treatment Plant, Dry Weather Discharge Monitoring

A. Influent and Effluent Monitoring Stations

Discussion

Effluent monitoring is conducted to determine compliance with effluent limitations in the permit. Influent monitoring is necessary to determine compliance with percent-removal requirements for BOD and suspended solids and to assess overall plant performance.

Requirements:

Description of Sampling Stations

1. Influent

Station	Description
A-003	At any point in the treatment facilities headworks at which all waste tributary to the system is present and preceding any phase of treatment, and exclusive of any return flows or process side streams

2. Effluent

Station	Description
E-007	At any point in the sewerage system between the point of discharge and the point at which all wastes have gone through the treatment processes, and before mixing with any effluent from the Westside Transport.

Sampling Schedule

The schedule of sample, analysis, and observations shall be that given in Table 2 and its footnotes, and as stated below.

B. Whole Effluent Toxicity (WET) Testing

Discussion:

Sections 308(a) and 402 of the Clean Water Act provide authority to EPA or the State to require that NPDES permittees/applicants use biological monitoring methods and provide chemical toxicity and instream biological data when necessary for the establishment of effluent limits, the detection of violations, or the assurance of compliance with water quality standards. Further rationale regarding test protocols is provided in the document *Regions 9 &10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*, May 31, 1996.

Requirement:

The permittee shall perform (Whole Effluent Toxicity) WET testing as described in the 2001 California Ocean Plan (Ocean Plan), in accordance with the following:

1. Acute Toxicity

a. Definition:

i) TUa = 100 / 96-hour LC 50.

ii) LC50 (percent waste resulting in a 50% decrease in survival of test organisms) shall be determined by static renewal bioassay techniques using standard marine test species as specified in 40 CFR Part 136. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC50 may be determined after the test samples are adjusted to remove the influence of those substances.

When it is not possible to measure the 96-hour LC 50 due to greater than 50 percent survival of the test species in 100 percent waste, the toxicity concentration shall be calculated by the following expression:

$$TUa = \log(100-S)/1.7$$

Where:
S= percentage survival of 100% waste. If S>99, TUa shall be reported as zero.

b. Test Species and Methods:
Compliance monitoring for the acute toxicity objective TUa shall be determined using a U.S. EPA approved protocol as provided in 40 CFR PART 136. Acute toxicity testing shall be conducted using marine test species. Acute toxicity testing using the most sensitive species shall be conducted monthly for the first year. If the first 12 months of data do not detect acute toxicity, annual testing may be conducted thereafter during this permit cycle. After the first annual test, subsequent annual tests shall be conducted in a different month than that of the previous year. One year prior to the expiration of this permit, a screening for the most sensitive species shall be conducted.

2. Chronic Toxicity

a. Definition:
Chronic toxicity measures a sublethal effect (e.g,. reduced growth, reproduction) to test organisms exposed to an effluent or ambient water compared to that of the control organisms. Results shall be reported in TUc, where TUc = 100/NOEC (in percent effluent). The no observed effect concentration (NOEC) is the highest concentration of toxicant to which organisms are exposed in a chronic test, that causes no observable adverse effect on the test organisms (e.g. the highest concentration of toxicant to which the values for the observed responses are not statistically significant different from the controls).

b. Test Species and Methods:

i) In the 1997 NPDES permit, the Discharger conducted chronic toxicity screening using Giant Kelp, *Macrocystis* pyrifera (alga), Topsmelt, *Atherinops* affinis (fish), and Abalone, *Haliotis* rufescens (invertebrate). Each screening event during the permit cycle indicated the invertebrate was most sensitive to the OWPCP final effluent. In preparation for NPDES permit re-issuance, the discharger conducted an expanded chronic screening of the OWPCP final effluent in June, July and December of 2001 and February of 2002 including three species of invertebrates (*Haliotus rufescens*, *Strongylocentrotus* purpuratus and *Mytilus* spp.) and the previously tested fish and algal species. Results of that screening indicated that all invertebrate species were more sensitive to the Oceanside final effluent, with the echinoderm development test showing the most sensitivity. Based on those results, the Discharger shall conduct tests on a monthly basis using *Strongylocentrotus* purpuratus in the Echinoderm Development test (*Dendraster excentricus* may be substituted if there is seasonal unavailability). ii) Every 2 years, the Discharger shall re-screen for the most sensitive species, for one month at different times from the prior year and continue to monitor with the most sensitive species.

iii) The presence of chronic toxicity shall be estimated as specified using U.S. EPA's *Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms*, EPA/600/R-95-136, August, 1995, Chapman, Denton and Lazorchak. (Hereafter referred to as "test methods manual.")

iv) If chronic toxicity as defined [i.e., the permit limit] is detected and the Discharger demonstrates to the satisfaction of the Executive Officer that the cause of the observed toxicity is due only to ammonia, the test event will not be considered in violation of the permit limit provided the Discharger also demonstrates that the discharge has not caused an exceedance of either of the California Ocean Plan objectives for ammonia in the receiving water outside of the 76:1 mixing zone. The Discharger must initiate accelerated testing and submit a report documenting the test results and toxic ammonia contribution.

c. Whole Effluent Toxicity QA, TRE, TIE and Reporting

i. Quality Assurance

a. The in-stream waste concentration (IWC), four concentrations bracketing the IWC and a control will be tested for each species. The IWC is the concentration of effluent at the edge of the mixing zone.

b. Concurrent testing with reference toxicants shall be conducted.

c. If either of the reference toxicant tests or the effluent tests do not meet all test acceptability criteria as specified in the test methods manual, then the Discharger must re-sample and re-test as soon as possible.

d. If the effluent sample is significantly different from the control sample, and the minimum significant difference (%MSD) is less than 5%, the City at its option may exclude this result and repeat the test. If control sample variability in the effluent test exceeds the upper limit of 20 % MSD which is the same as the reference toxicant, the City must re-sample and re-test as soon as possible.

ii. Preparation of TRE Workplan

The Discharger shall submit to U.S. EPA and the Board a copy of the Discharger's TRE workplan (1-2 pages) within 90 days of the effective date of this permit. This plan shall describe the steps the Discharger intends to follow if toxicity is detected, and should include provisions for, at minimum:

a. Information gathering phase to investigate and evaluate information for potential causes/sources of toxicity, effluent variability, treatment system efficiency;

b. Steps for maximizing in-house treatment efficiency and good housekeeping; and

c. If a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e., is there in-house expertise, or will the study be sent out to contractor?).

iii. Toxicity Reduction Evaluation (TRE):

a. If chronic toxicity as defined [i.e., the permit limit] is detected then, in accordance with the Discharger's TRE workplan and U.S. EPA manuals EPA/600/4-89/001A (municipal), the Discharger shall initiate a TRE within fifteen (15) days of the exceedance to reduce the cause(s) of toxicity.

b. If chronic toxicity as defined [i.e., the permit limit] is detected, then the Discharger shall conduct three more tests, bi-weekly (every two weeks).

iv. Toxicity Identification Evaluation (TIE)

a. If chronic toxicity is detected in any of the three bi-weekly tests, then the discharger shall in accordance with EPA acute and chronic manuals EPA/600/6-91/005F(Phase I), EPA/600/R-96/054 (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III), initiate a TIE to identify the causes of toxicity.

b. If none of the three tests indicates toxicity, then the Discharger may return to the normal testing frequency.

v. Reporting

a. The Discharger shall submit the results of the toxicity tests, including any accelerated testing conducted during the month, in TUs with the discharge monitoring reports (DMR) for the month in which the tests are conducted.

b. The full report shall be submitted by the end of the month in which the DMR is submitted.

c. The full report shall consist of: (1) the toxicity test results; (2) the dates of sample collection and initiation of each toxicity test; (3) the source water; (4) the effluent discharge flow rate from the day of sample collection; and (5) the results of the effluent analyses for chemical/physical parameters required for the outfall as defined in Part B of the Self-Monitoring Program.

d. Test results for chronic tests shall be reported according to the chronic manual chapter on Report Preparation, and shall be attached to the DMR.

e. The Discharger shall notify U.S. EPA and the Board in writing within thirty (30) days of exceedance of the limit trigger of

(1) Any findings of the TRE/TIE or other investigation to identify the cause(s) of toxicity;

(2) Actions the Discharger has taken or will take to mitigate the impact of the discharge, to correct the noncompliance and to prevent the recurrence of toxicity;

(3) An expeditious schedule under which corrective actions will be implemented where corrective actions including a TRE/TIE have not been completed; and

(4) The reason for not taking action, if no actions have been taken.

II. Shoreline Monitoring (Surf Zone Sampling)

Discussion

Shoreline monitoring is conducted to assess bacteriological conditions in areas used for water contact recreation (e.g. swimming, surfing). The permit issued in 1997 required monitoring for total coliform only. However, based on scientific evidence that *E. coli* and enterococcus are better indicators of gastrointestinal illness than total coliform (see U.S. EPA's draft "Implementation Guidance for Ambient Water Quality Criteria for Bacteria,") monitoring under this permit will include all three indicators—total coliform, E-coli (as a surrogate for fecal coliform), and enterococcus.

Requirements

A. Routine Monitoring

The Discharger shall conduct shoreline monitoring at six stations located from Baker Beach along the shoreline perimeter to Sloat Blvd on Ocean Beach one day per week (Monday through Friday, excluding holidays). Samples shall be collected in the surf and sampled for total coliform bacteria, *E-coli* (as a surrogate for fecal coliform), and enterrococcus. All indicator organisms may be measured using the Quanti-Tray method of analysis, with total coliform and *E coli.* bacteria measured using the Colilert 18™ medium and enteroccocus measured using theEnterolert™ medium. Also, water temperature shall be taken at each beach.

B. Monitoring in Response to a CSO

Whenever a CSO occurs, the Discharger shall post the beach as a preventative measure in the vicinity of the CSO discharge, and shall conduct shoreline monitoring for total coliform bacteria, *E-coli* (as a surrogate or fecal coliform), and enterococcus at a minimum of ten stations located from Baker Beach along the shoreline perimeter to Fort Funston on Ocean Beach as soon as practicable with regard to safety. (Tidal conditions and storm related wave activity may prevent samples from safely being collected immediately following a CSO event. Sampling should be conducted as soon as safely possible following a CSO discharge.) Shoreline monitoring shall be conducted at those locations in closest proximity to the CSO discharge (see Station Descriptions below). Samples shall be collected in the surf and sampled for total coliform bacteria, *E. coli* (as a surrogate for fecal coliform), and enterrococcus. All indicator organisms may be measured using the Quanti-Tray method of analysis, with total coliform and *E coli.* bacteria measured using the Colilert 18™ medium and enteroccocus measured using theEnterolert™ medium. Monitoring shall be conducted daily, and the beach shall remain posted until levels of all of the three indicators drop below the following:

Total Coliform: 10,000 per 100 ml[1]
E-coli (surrogate for fecal coliform): 400 per 100 ml[2]
Enteroccocus: 104 per 100 ml[3]

The above criteria for the 3 indicators are the single sample minimum protective bacteriological standards contained in the California Department of Health Services regulations for public beaches and ocean water contact sports (AB 411). Although San Francisco's beaches are not regulated under AB 411, use of these standards will maintain consistency with other California beaches. Additionally, although the Ocean Plan does not contain a single sample number for enteroccocus, the total coliform and fecal coliform standards are consistent with the Ocean Plan, and thus also with State Board Order No. 79-16 that requires posting until standards are met.

E-coli is commonly used as a surrogate for fecal coliform for beach monitoring in California. *E. coli* is a subset of fecal coliforms.

Location of Shoreline Stations

Weekly Monitoring

Station	Description
15(east)	In the surf at a point east of station 15
15	In the surf at the terminus of Lobos Creek along Baker Beach

1 These are all single sample levels requirements because they apply to each CSO event.
2 These are all single sample levels requirements because they apply to each CSO event.
3 These are all single sample levels requirements because they apply to each CSO event.

17	In the surf along China Beach
18	In the surf along Ocean Beach at the foot of Balboa St.
19	In the surf along Ocean Beach at the foot of Lincoln Ave., opposite the Lincoln overflow structure
21.1	In the surf along Ocean Beach at the foot of Sloat Blvd.

CSO Monitoring Discharge Location	Station	Description
Sea Cliff 2 Pump Station	15(east)	In the surf at a point east of station 15
Sea Cliff 2 Pump Station	15	In the surf at the terminus of Lobos Creek along Baker Beach
Sea Cliff 2 Pump Station	16	In the surf opposite the Sea Cliff 2 Pump Station
Sea Cliff 1 Pump Station	17	In the surf along China Beach
Lincoln CSO Structure	18	In the surf along Ocean Beach at the foot of Balboa St.
Lincoln CSO Structure	19	In the surf along Ocean Beach at the foot of Lincoln Ave., opposite the Lincoln overflow structure
Lincoln/Vicente CSO Structure	20	In the surf along Ocean Beach at the foot of Pacheco St.
Vicente CSO Structure	21	In the surf along Ocean Beach at the foot of Vicente St., opposite the Vicente overflow structure
Vicente CSO Structure	21.1	In the surf along Ocean Beach at the foot of Sloat Blvd.
Lake Merced CSO Structure	22	In the surf along Ocean Beach at Fort Funston, opposite the Lake Merced overflow structure

III. Westside Treated Combined Sewer Overflow (CSO) monitoring

Discussion

The purpose of this program is to effectively characterize overflow events and impacts.

Requirements

The discharger shall provide the following non-sampling information during CSOs:

a. Date and time that CSO discharge started;
b. Frequency, duration, and (if possible) volume of discharge;
c. Rainfall intensity and amount (hourly data, aggregated);
d. Summary data to support estimate of discharge volume; and
e. Summary data to document conformance with operation plan for wet weather facilities.

The representative station for the Westside CSO Control System is the Vicente Box. This station is located at a point prior to discharge where all waste tributary to the diversion structure is present and all treatment (i.e. baffling) is complete. Effluent sampling will be required only during discharge events, which may last from less than an hour to over a day. Composite sampling shall commence within 1 hour after a discharge begins and continue until the discharge ceases, but not to exceed 24 hours. Samples shall be taken according to the following schedule:

Parameter	Sample Type	Sample Frequency
Flow (mgd)[5]	Continuous	Continuous during discharge
BOD (mg/l)	C-X[1] (X<24)	1/occurrence
Suspended Solids(mg/l)	C-X[1] (X<24)	1/occurrence

Ammonia as N (mg/l)	C-X[1] (X<24)	1/ occurrence
Oil and Grease (mg/l)	C-X[1] (X<24)	1/ occurrence
pH	C-X[1] (X<24)	1/ occurrence
Pesticides and PCBs[2]	C-X[1] (X<24)	1/ occurrence
Trace Metals[3]	C-X[1] (X<24)	1/ occurrence
PAHs[4]	C-X[1] (X<24)	1/ occurrence

Notes:

1. Composite sample (1/hour) over X hours (the duration of the discharge), not to exceed 24 hours.
2. Pesticides and PCBs as identified in EPA Method 608
3. Measure concentrations of ten metals: arsenic cadmium, chromium (total), copper, lead, mercury, nickel, silver, zinc, and selenium. Ultra Clean methods shall be employed for mercury to the maximum extent practicable. Hydride generation methods shall be used for selenium and arsenic. These precautions are necessary to minimize positive interferences.
4. Polynuclear aromatic hydrocarbons, as identified in the California Ocean Plan.
5. Models may be used to estimate flow.

IV. Offshore Monitoring

Discussion

The Ocean Outfall Monitoring Program is designed to determine environmental effects from the discharged secondary treated effluent (18 MGD, average dry weather flow) from the City and County of San Francisco's, Oceanside Water Pollution Control Plant.

The study plan characterizes the area outside San Francisco Bay between Rocky Point in Marin County and Point San Pedro in San Mateo County. Randomized sampling locations were determined using the EPA's EMAP grid system within specified depth strata (Figure I). The purpose of this effort is to: 1) evaluate gradient effects near the discharge pipe and gradient effects from San Francisco Bay; 2) characterize non-affected areas that can be combined to define reference conditions; and 3) provide information on sediment and infaunal characteristics in the area between the discharge pipe and the Monterey Bay National Marine Sanctuary boundary.

Sampling is conducted annually in the fall during the period when sediments are least disturbed and may show the highest concentrations of contaminants. Focusing the sampling effort on a single index period (fall), eliminates the need to account for seasonal variability in the analysis of the data. This savings in effort is used to increase the number of sample locations to better evaluate any spatial patterns in the data that might be attributed to the outfall and to provide information on reference conditions which can then be used to evaluate any outfall-related effects.

This program will be implemented dynamically to maximize the amount of relevant and useful data that can be gathered within the five-year permit life by allowing the EPA, the Regional Board, and the City and County of San Francisco to agree to program corrections in response to ongoing analyses of monitoring data. The level of effort defined in the original program will not be exceeded in subsequent years. All data will be reported to EPA and the Board by July of the following year to allow time to make modifications in the program for the following sampling effort. Summary data analysis will be provided for each year's data set. A comprehensive cumulative summary report will be generated in 2005 and 2009 comprising long term data analysis from 1997 through 2004 and 1997 through 2007 respectively.

A. Benthic Monitoring (Sediment and Infauna)

Discussion

Benthic sampling includes collection from 7 fixed historical stations to maintain time series data comparison (Fixed stations 1, 2, 4, 6, 25, 28, 31). Forty randomized sampling locations using the EPA's EMAP grid system were generated in 1997 (EMAP Station #s R1-R40) to monitor the expanded sampling area. During the previous permit cycle, data from those randomized sampling stations located within the sand bar (R-10, R-11, R-13, R-15, R-18) characterized an area not comparable to the rest of the study area, and those stations have been removed from the program. Seven additional fixed sites located south of the SWOO discharge pipe (SWOO Pipe Stations 73-79) have been added to better characterize an outfall effect. Depending on the results of each year's data analysis, the number of samples in subsequent years may increase or decrease as approved by the Executive Officer and the U.S. EPA.

Requirements

Collect 44 benthic samples in the first year of the permit cycle. These include 7 fixed historical stations to maintain time series data comparison. Depending upon the results of each year's data analysis, the number of samples in subsequent years may increase or decrease as approved by the Executive Officer and the U.S. EPA.

All benthic samples shall be collected using a 0.1 m^2 Smith McIntyre grab sampler. An adequate number of grab samples, dependent upon volume needs, shall be collected from each location and composited for sediment analysis. The top 2-5 centimeters of sediment shall be removed from the surface of each grab, uniformly mixed, and analyzed for:

1. total volatile solids;
2. total organic carbon;
3. Kjeldahl nitrogen;
4. grain size including fractions of silt and clay;
5. Inorganic priority pollutant analysis (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn).
6. DDT, PCB congeners and PAHs

Based on data analysis, U.S. EPA, the Executive Officer, and the City may increase or decrease the number of stations as appropriate for the analysis of the identified constituents.

One benthic grab sample shall be collected from each location for infaunal analysis. Each sample shall be passed through 1.0 mm and 0.5 mm sieves. The organisms retained on each sieve shall be relaxed and preserved for later taxonomic determination to the lowest taxon possible and enumerated.

Stations:

Fixed Sampling Locations

Historical Station	Latitude	Longitude	SWOO Pipe Stations Station	Latitude	Longitude
1	37 42 12.00	-122 34 31.20	73	37 42 45.00	-122 33 53.28

2	37 42 37.80	-122 34 30.00	74	37 42 16.56	-122 32 59.64
4	37 42 42.00	-122 35 42.00	75	37 42 41.40	-122 31 56.64
6	37 40 00.00	-122 32 15.00	76	37 41 40.20	-122 33 20.88
25	37 42 13.80	-122 34 30.00	77	37 42 05.04	-122 32 17.88
28	37 41 54.00	-122 34 28.80	78	37 41 03.12	-122 33 03.96
31	37 43 28.80	-122 34 01.80	79	37 41 55.68	-122 30 54.72

Randomized Sampling Locations

EMAP Station #	SWOO Station #	Longitude	Latitude
R1	32	37 52 04.77	-122 38 28.60
R2	33	37 51 06.14	-122 36 00.87
R3	34	37 51 04.65	-122 38 50.77
R4	35	37 50 53.96	-122 40 45.11
R5	36	37 50 15.84	-122 37 12.27
R6	37	37 50 11.61	-122 35 41.45
R7	38	37 49 40.86	-122 39 18.05
R8	39	37 49 19.20	-122 41 25.50
R9	40	37 48 31.68	-122 37 29.76
R10		37 47 48.31	-122 29 57.44
R11		37 47 10.02	-122 30 46.18
R12	43	37 47 07.88	-122 36 57.88
R13		37 46 39.77	-122 34 22.04
R14	45	37 46 29.37	-122 38 38.38
R15		37 46 23.73	-122 32 08.26
R16	47	37 45 39.83	-122 37 04.52
R17	48	37 45 33.87	-122 38 55.98
R18		37 45 24.69	-122 33 44.13
R19	50	37 45 00.01	-122 39 56.01
R20	51	etc.	etc.
R21	52		
R22	53		
R23	54		
R24	55		
R25	56		
R26	57		
R27	58		
R28	59		
R29	60		
R30	61		
R31	62		
R32	63		
R33	64		
R34	65		
R35	66		
R36	67		
R37	68		
R38	69		
R39	70		
R40	71	37 36 16.73	-122 33 03.03
	72	37 48 13.20	-122 39 19.80

B. Trawls

Discussion

Trawls shall be conducted to assess the presence or absence of a balanced indigenous population of demersal fish and epibenthic invertebrates, and to determine the bioaccumulation of priority pollutants in targeted organisms.

Requirements

To assess bioaccumulation effects, one fish and one macroinvertebrate species shall be collected near the SWOO and at one or more reference locations. This will occur once per year, during the fall season. The preferred species for use in the bioaccumulation studies are English sole (*Pleuronectes vetulus*) and the dungeness crab (*Cancer magister*). Three composites of 10 or more organisms of similar size from each station will be collected for priority pollutant analysis. Muscle and liver/hepatopancreas tissues will be analyzed for metals (As, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn), DDT, PCB congeners and PAHs.

A fish community analysis shall also be conducted once per year during the fall season—a minimum of one trawl at an outfall location and one trawl at a reference location will be sampled. Fish and invertebrates collected in each trawl will be identified to the lowest identifiable taxon and enumerated. Abnormalities and disease symptoms (e.g. fin erosion, lesions, tumors) shall be recorded and itemized. Standard length of all fish specimens will be measured, disk width will be measured for skates and rays, and the carapace length of shrimp and carapace width of crabs will be measured. Shrimp will be separated as gravid females and unsexed individuals, and crabs will be sexed.

V. Pretreatment Monitoring Requirements

Table 1 Oceanside Pretreatment Monitoring Requirements

Constituents / EPA Method	Influent A-001	Effluent E-001	Sludge
VOC / 624	2/Y	2/Y	
BNA / 625	2/Y	2/Y	
Metals [1]	M	M	
O-Pest / 614	N/A	N/A	
C-Pest / 632	N/A	N/A	
Sludge [2]			2/Y

Definition of terms in Table 1:

M = once each month

2/Y = twice each calendar year (at about 6 month intervals, once in the dry season, once in the wet season)

VOC = volatile organic compounds

BNA = base/neutrals and acids extractable organic compounds

O-Pest = organophosphorus pesticides, no monitoring required for this constituent

C-Pest = carbamate and urea pesticides, no monitoring required for this constituent

Key to notes used in Table 1:

[1] Same EPA method used to determine compliance with the respective NPDES permit. The parameters are copper, lead, mercury, nickel, silver, zinc, and cyanide.

[2] EPA approved methods.

VI. Reporting Requirements

A. Self-Monitoring Reports for each calendar month shall be submitted monthly, to be received no later than the 30th day of the following month. The required contents of these reports are specified in section G.4. of Part A of the Self Monitoring Program and include effluent monitoring data, CSO monitoring data, and shoreline monitoring data.

B. An annual report covering effluent sampling from the previous calendar year shall be submitted to the Board by January 30 of the following year. The annual summary of wet weather activities and receiving water results will be submitted by August 30. The required contents of the annual report are specified in section G.5 of Part A of the Self Monitoring Programs.

C. Any overflow, bypass or other significant non-compliance incident that may endanger health or the environment shall be reported according to sections G.1 and G.2 of Part A of the Self Monitoring Program.

D. An annual report of the offshore monitoring data shall be submitted by August 30 of each calendar year. The report shall include raw data tables and summary data analyses for each monitoring component. A comprehensive cumulative summary report will be generated in 2005 and 2009 comprising long term data analysis from 1997 through 2004 and 1997 through 2007 respectively.

Attachments: Part A, dated August 1993
Table 2

Table 2
INFLUENT AND EFFLUENT MONITORING SCHEDULES FOR OCEANSIDE WATER POLLUTION CONTROL PLANT

Parameter	**Influent A- 007**			**Effluent E-007**		
(In ug/l unless otherwise noted)	**C-24**	**Grab**	**Cont.**	**C-24**	**Grab**	**Cont.**
Flow Rate (MGD)[1]			D			D
BOD (5-day) (mg/l)	1/W (8)			1/W (8)		
Total Suspended Solids (mg/l)	5/W			5/W		
Grease & Oil (mg/l) [2]	M			M		
Turbidity (NTU)				W		
pH (units)		5/W			5/W	
Acute Toxicity (TUa)[3]				M(9)		
Chronic Toxicity (TUC)[4]				M		
Arsenic (ug/l)[5]				M		
Hexavalent Cadmium (ug/l)				M		
Chromium (ug/l) [6]				M		
Copper (ug/l)				M		
Lead (ug/l)				M		
Mercury (ug/l)[5]				M		
Nickel (ug/l)				M		
Selenium (ug/l)[5]				M		
Silver (ug/l)				M		
Zinc (ug/l)				M		
Cyanide (ug/l) [7]				M		
Ammonia as Nitrogen				Q		
Endosufan (ng/l)				Q		

Parameter	Influent A- 007			Effluent E-007		
(In ug/l unless otherwise noted)	C-24	Grab	Cont.	C-24	Grab	Cont.
Endrin (ng/l)				Q		
HCH (ng/l)				Q		
Radioactivity (pci/l)				A		
Acrolein				Q		
Antimony				Q		
Bis(2-chloroethoxy) methane				Q		
Bis(2-chloroisopropyl) ether				Q		
Chlorobenzene				Q		
Chromium III				Q		
Di-n-butyl phthalate				Q		
Dichlorobenzene				Q		
1,1 dichloroethylene				Q		
Diethyl phthalate				Q		
Dimethyl phthalate				Q		
4,6, dinitro-2 methylphenol				Q		
2,4 dinitrophenol				Q		
Ethylbenzene				Q		
Flouranthene				Q		
Hexachlorocyclopentadiene				Q		
Isophorone				Q		
Nitrobenzene				Q		
Thallium				Q		
Toluene (Methylbenzene)				Q		

Parameter	**Influent A- 007**			**Effluent E-007**		
(In ug/l unless otherwise noted)	**C-24**	**Grab**	**Cont.**	**C-24**	**Grab**	**Cont.**
1,1,2,2 tetrachloroethane				Q		
Tributyltin	Q			Q		
1,1,1 trichloroethene				Q		
1,1,2 trichlorethane				Q		
Acrylonitrile				Q		
Aldrin				Q		
Benzene				Q		
Benzidine				Q		
Beryllium				Q		
Bis(2-chloroethyl) ether				Q		
Bis(2-ethylhexyl) phathalate				Q		
Carbon tetrachloride				Q		
Chlordane				Q		
Chloroform				Q		
DDT				Q		
1,4, dichlorobenzene				Q		
3,3 dichlorbenzidine				Q		
1,2 dichloroethane				Q		
dichloromethane				Q		
1,3 dichlorpropene				Q		
Dieldrin				Q		
2, 4, dinitrotoluene				Q		
1,2 diphenyhydrazine				Q		
Halomethanes				Q		
Halomethanes (All)				Q		
Heptachlor				Q		
Hexachlorobenzene				Q		
Hexachlorobutadiene				Q		
Hexachloroethane				Q		

Parameter	Influent A- 007			Effluent E-007		
(In ug/l unless otherwise noted)	C-24	Grab	Cont.	C-24	Grab	Cont.
N-nitrosodimethylamine				Q		
N-nitrosodiphenylamine				Q		
PAHs				Q		
PCBs				Q		
TCDD equivalents (Dioxin)	Q			Q		
Tetrachloroethylene (PERC)				Q		
Toxaphene				Q		
Trichloroethylene				Q		
2,4,6 trichlorophenol				Q		
Vinyl chloride				Q		
1,1, dichloroethylene				Q		
Isophorone				Q		
1,1,2,2 tetrachloroethane				Q		
1,1,2 trichloroethane				Q		

LEGEND FOR TABLE

Types of Samples

C-24	Flow-weighted composite sample (24 hours)
Grab	Grab Sample
Cont.	Continuous sample

Sampling Frequency

D	Once per day
W	Once per calendar week
M	Once per calendar month
2/W	Two days per calendar week
5/W	Five days per calendar week
2/M	Two days per
A	Annual
Q	Quarterly

TABLE NOTES:

1. Effluent flows from the Westside Transport (decant) shall also be measured and reported.

2. Grease and oil sampling shall consist of 3 grab sample taken at 8 hour intervals during the sampling day, with each grab being collected in glass container and analyzed separately. Results shall be expressed as a weighted average of the three results, based on the instantaneous flow rates at the time each grab sample was collected.

3. Bioassay samples shall be collected on days coincident with effluent composite sampling. The Discharger may use the static renewal method for the 96-hour bioassay (renewal with 24-hour composite sample at 24-hour intervals during the test). Un-ionized ammonia concentrations shall be determined whenever bioassay results violate effluent limits. Refer to Section II for Testing Procedures.

4. Bioassay sample shall be collected on days coincident with effluent composite sampling. Refer to Section II for testing procedures.

5. Ultra Clean methods shall be employed for mercury to the maximum extent practicable. Quantifications shall be at 2 ug/l or lower. Hydride generation methods shall be used for selenium and arsenic. These precautions are necessary to minimize positive interferences

6. The discharger may, at its option, analyze for total chromium. The discharger shall specify in the monitoring reports whether the value is total or hexavalent chromium.

7. The discharger may, at its option, analyze for cyanide as Weak Acid Dissociable Cyanide using protocols specified in Standard Method Part 4500-CN-1, U.S. EPA Method 01 1677, or equivalent alternatives in the latest edition. Alternative methods of analysis must be approved by the Executive Officer.

8. BOD shall be monitored weekly and COD shall be 5/W.

9. Acute toxicity shall be measured monthly for the first year (12 months). If acute toxicity is not present, annual testing may be conducted thereafter. Subsequent annual testing shall be conducted during a different month than that of the previous year.

Attachment L

Fact Sheet

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
AND
U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 9

FACT SHEET

FOR MAILING TO INTERESTED PERSONS AND GOVERNMENT AGENCIES

FOR

CITY AND COUNTY OF SAN FRANCISCO
OCEANSIDE TREATMENT PLANT,
SOUTHWEST OCEAN OUTFALL,
AND
WESTSIDE WET WEATHER FACILITIES

NPDES PERMIT NO. CA 0037681

July 2, 2003

FACT SHEET

CONTENTS

LIST OF TABLES

I. PUBLIC NOTICE

Written Comments

- Interested persons are invited to submit written comments concerning this draft permit.
- Comments should be submitted to the Regional Board no later than 5:00 p.m. on June 13, 2003.
- Send comments to: The San Francisco Regional Water Quality Control Board, 1515 Clay St. Suite 1400, Oakland, CA. 94612. ATTN: Abigail Smith

Public Hearing

- The draft permit will be considered for adoption by the Regional Board and the U.S. EPA at a public hearing during the Regional Board's regular monthly meeting at: Elihu Harris State Office Building, 1515 Clay Street, Oakland, CA; 1st floor Auditorium.
- This meeting will be held on July 16, 2003, starting at 9:00 am.

Additional Information

- For additional information about this matter, interested persons should contact Regional Board staff member: Ms. Abigail Smith, Phone: (510) 622-2413; email: ahs@rb2.swrcb.ca.gov

This Fact Sheet contains information regarding an application for waste discharge requirements and National Pollutant Discharge Elimination System (NPDES) permit for the City and County of San Francisco for discharges from the City's Oceanside Water Pollution Control Plant, and Westside Wet Weather Facilities. The Fact Sheet describes the factual, legal, and methodological basis for the proposed permit and provides supporting documentation to explain the rationale and assumptions used in deriving the limits.

II. INTRODUCTION

The City and County of San Francisco (hereinafter Discharger) has applied to the Environmental Protection Agency, Region IX (EPA), and to the California Regional Water Quality Control Board (the Board) for re-issuance of its NPDES permit (CA0037681) for discharge of pollutants to Federal and State waters.

The discharger is also the owner and operator of a wastewater collection, treatment, and disposal system which serves the east side of San Francisco. The Discharger's collection system meets the regulatory definition of a Combined Sewer System (CSS)*. During wet-weather, most of the combined sewage and stormwater in excess of the Oceanside Water Pollution Control Plant (Oceanside WPCP) capacity is accumulated in three storage/transports on the Westside. When treatment and storage capacity is exceeded, San Francisco discharges storm water runoff including a component of domestic and industrial wastewater runoff from these transports into the Pacific Ocean first through the Ocean Outfall (into Federal waters) and, in major storms, through any of seven wet weather discharge points along the Oceanside shoreline (into State waters). These discharges meet the regulatory definition of Combined Sewer Overflows (CSOs). Prior to completing the Westside wet weather control facilities, treated CSOs occurred when rainfall intensity exceeded 0.02 inches/hour, and occurred as many as 53 times per year. Beginning in 1997 with the completion of all control structures, the average long-term shoreline treated overflow design rate is eight per year for the entire Westside. To be considered a discrete "overflow event," the overflow must be separated by six hours in time from any other overflow. (This criterion was established by State Water Resources Control Board Order 79-16).

Wastewater from the east side of the City is discharged to San Francisco Bay and is covered by NPDES Permit No. CA0037664 issued to the City and County of San Francisco.

*Note:
CSO is defined under Section I.A. of EPA's 1994 CSO Control Policy as "the discharge from a combined sewer system (CSS) at a point prior to the Publicly Owned Treatment Works (POTW) treatment plant." A CSS is defined as "A wastewater collection system owned by a State or municipality which conveys sanitary wastewater (domestic, commercial, and industrial wastewater) and storm water through a single pipe system to a POTW treatment plant."

III. DISCHARGE DESCRIPTION

The Oceanside Water Pollution Control Plant
The Oceanside WPCP came on-line in September 1993 and replaced the Richmond-Sunset WPCP. The Oceanside WPCP provides secondary level treatment for an average dry weather flow of about 18 MGD with a peak secondary treatment capacity of 43 MGD. The maximum design flow is up to 65 MGD; flow above 43 MGD receives primary treatment. This extra treatment capacity is intended for use only during wet weather to treat the greatly increased storm flows. The City collects the wastewater in a combined sewer system. That is, the domestic sewage, industrial wastewater, and storm water runoff are all collected in the same pipes (combined sewer). Most other communities in California have a separated sewer system: one set of pipes for domestic sewage and industrial wastes and another set for storm water. Under wet weather conditions, the Oceanside WPCP operates as a CSO treatment facility (primary only), and is regulated under the Federal Combined Sewer Overflow Control Policy, (59FR 18688). Combined sewer system wet weather facilities must provide storage capacity for wet weather flows, maximize flow to treatment facilities, and minimize combined sewer overflows. Flows receiving less than secondary treatment during wet weather periods and discharged directly to the SWOO are considered CSOs, but are not considered in the evaluation of the long term average designated for shoreline discharges.

Southwest Ocean Outfall (SWOO)
The SWOO is 4 miles long. It carries the treated wastewater out to a diffuser system beginning approximately 3.75 miles from shore and at a depth of 78 feet. The end of the outfall consists of a diffuser section approximately 900 meters in length and 3.5 meters in diameter, with risers located every 11 meters. Twenty- one out of 85 risers are currently in operation to maintain port velocity because the present dry-weather flow through the outfall is only 20% of capacity. Every other riser located along the outer 439 meters of the diffuser section is active. Each riser is constructed with eight discharge points.

The Discharger completed construction of the SWOO in 1986 and began discharging Richmond-Sunset plant effluent to federal waters via the new outfall in September 1986. After completion of the Oceanside WPCP in 1993, the Richmond-Sunset plant was abandoned and eventually razed. The flow through the SWOO varies from the dry weather average of 18 MGD to a maximum wet weather rate of approximately 175 MGD[1]. The potential maximum flow varies with both the tides and volume of combined storm flows accumulated in the Westside Transport. Dye studies of the effluent conducted in 1988 indicated that the minimum dilution is at least 100:1 and generally exceeds 200:1.

Westside Storage/Transport Treatment
The discharges to the receiving water from the storage/transports through the wet weather control facilities have received flow-through treatment to remove settleable solids and floatable materials. This treatment is equivalent to the minimum treatment specified by the *Combined Sewer Overflow Control Policy* (59 FR 18688) for the "Presumption" Approach (See Section VII of this Fact Sheet).

1 The maximum design capacity of the SWOO is approximately 400-450 MG. It was designed with this overall capacity to accept flows from the entire County of San Francisco.

Westside Treatment Design Goal for Wet Weather

During dry weather all wastewater receives secondary level treatment. During wet weather the combined sewer flows receive approximately the following level of treatment (discharge location in parenthesis). Percentages are based on the Westside System Model's estimate of the annual volume of wastewater (3,500 MG) from the Westside Wet Weather System.

	Percentage of Predicted Annual Wastewater Volume (3,500 MG)
Treatment at Oceanside WPCP (Ocean Outfall discharge)	Approximately 50% of the combined flow receives a combination of secondary and/or primary treatment which generally meets secondary standards.
Flow-through (Ocean Outfall discharge)	Approximately 37% of the combined flow receives "flow-through" treatment (equivalent to primary treatment) in the decant process of the Westside storage/transport and is discharged to the SWOO. A weir and baffle system retains settleable solids and floatable materials in the storage/transport structure, which are then flushed to the treatment plant after the rainstorm subsides
Flow-through (Shoreline discharge)	Approximately 13% of the combined flow receives "flow-through" treatment (equivalent to primary treatment) in the storage/transport structures and is discharged to the shoreline via any of seven CSO structures.

All flow to the Oceanside WPCP is pumped from the Westside Pump Station after coarse screening. The plant treatment process consists of a headworks with fine bar screens and grit removal, primary sedimentation tanks, pure oxygen aeration basins, and secondary clarifiers. During dry weather, all wastewater receives secondary level treatment via a pure oxygen activated biosolids process (an average dry weather flow of 18 MGD, peak secondary treatment capacity of 43 MGD). During wet weather, additional primary treatment capacity is available for flows to 65 MGD at the Oceanside WPCP. These excess wet weather flows receive primary treatment using clarifiers prior to discharge to the ocean outfall.

Combined Sewer Flows Discharged Directly to the SWOO

During larger storms, the Oceanside WPCP reaches maximum treatment capacity. If it appears that the combined sewer flows will continue to increase and exceed the capacity of the treatment plant and the storage capacity of the Storage/Transports, the excess effluent is "decanted" directly from the Westside Transport to the SWOO. This decanted effluent has received flow-through treatment within the Westside Transport as discussed above and is also screened at the pump station with mechanically cleaned 3/4 inch bar screens. Such discharges are considered CSOs, but are not included in the determination of the long-term average design goals for shoreline discharges.

Treated Combined Sewer Overflow Shoreline Discharges
Table 1. Shows the number of controlled overflows and untreated overflows that have taken place since 1992.

Table 1. Historical Data for Overflows at Controlled and Uncontrolled Portions of the Westside CSS

Wet Weather Year	Untreated overflows (uncontrolled areas)	Controlled overflows (facilities in place)	Annual Rainfall (West-side) in inches	Comments
1992-1993	59	5	22.45	Westside Transport completed September 1986
1993-1994	38	2	12.73	Lake Merced Transport completed July 1993 Oceanside WPCPP completed September 1993
1994-1995	67	5	27.26	
1995-1996	46	9	22.35	
1996-1997	0	8	20.75	Richmond Transport completed January 1997
1997-1998	0	14	41.14	All facilities on line
1998-1999	0	7	18.86	
1999-2000	0	7	23.19	
2000-2001	0	3	13.76	
2001-2002	0	7	22.25	
2002-2003	*0*	*8*	-	*Expected performance based on design*

Note: The Westside Transport was operational in 1987 and therefore Ocean Beach has been in the controlled overflow category for the years listed above. The shoreline discharges occur only when the storm flow exceeds the combined storage capacity of the storage/transports and the capacity of the pumping facilities to transfer flows to the Oceanside WPCP (for eventual discharge through the SWOO) or directly to the SWOO where flows bypass secondary treatment at the Oceanside WPCP but receive primary treatment in the storage structures. The Westside combined sewage control facilities have been designed so that on average these shoreline discharges will occur up to eight times per year (as a long-term average). By definition, a new overflow event occurs if the discharge is interrupted for six or more hours. The combined sewer flows discharged during these 8 occurrences will have received flow-through treatment for the removal of settleable solids and floatable material. When these shoreline overflows occur, the beach is posted with warning signs to avoid water contact recreation and daily shoreline water samples are collected and analyzed for bacteria until concentrations drop below the criteria listed in Section 12B of the Self-Monitoring Program. Although these criteria do not apply for compliance purposes, they provide a useful basis for determining when public health warnings should be posted. Previous sampling indicates that elevated bacteria levels tend to be located only in the vicinity of the outfalls and tend to decrease rapidly, typically within 24 hours.

The previous permit listed a total of eight CSO discharge locations. There are currently only seven CSO discharge locations because one CSO site was eliminated during the construction of the Richmond Transport System. The current list of CSO discharge locations is included in the permit.

Storage/Transports

During wet weather, the City collects storm water runoff mixed with domestic and industrial wastewater in Storage/Transports. The Westside system includes three large Storage/Transports: Westside Transport, Richmond Transport, and the Lake Merced Transport. Their combined storage capacity (including 2.2 MG in sewers) is 73.5 million gallons. They are designed to hold combined sewage during wet weather for later treatment at the Oceanside WPCP. They also provide flow-through treatment for any excess flows which are discharged either directly to the SWOO or to the shoreline. Flow-through treatment includes the removal of settleable solids and floatable pollutants. This treatment is equivalent to the minimum treatment specified by the *Combined Sewer Overflow Control Policy* (59 FR 18688) for the "Presumption" Approach (the "Presumption" Approach is discussed in Section III of the fact sheet).

The Westside wastewater system has been built with significant standby capacity to be used during wet weather. Table 2. Summarizes these capacities.

Table 2. Westside Wastewater System Treatment and Storage Capacity

	Dry Weather	Wet Weather
Oceanside Water Pollution Control Plant Treatment Capacity	(MGD)	(MGD)
Secondary level	18 (avg.)	43 (max.)
Primary (only)	-	22
Storage Capacity		(million gallons, MG)
Westside Transport (1)	-	49.3
Lake Merced Transport (2)		10.0
Richmond Transport(3)	-	12
Sewer Lines (4)	-	2.2
System Capacity		(MGD)
Oceanside WPCP	-	65 (max.)
Southwest Ocean Outfall	-	175 (max)

(1) Construction completed in 1986.
(2) Construction completed in 1993.
(3) Construction completed in 1997
(4) The storage/transports allows the sewer lines to store an additional 2.2 million gallons of wet weather

combined wastewater.

Bypass
The Ocean Plan prohibits by-passing of untreated wastes.

Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:
(A) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, [40 CFR 122.41(m)(4)]

"Bypass" is defined in the Federal regulations as:

Bypass means the intentional diversion of waste streams from any portion of a treatment facility. [40 CFR 122.41(m)(1)(I)]

The Combined Sewer Overflow Control Policy provides an interpretation of these requirements for publicly owned treatment works such as the Oceanside WPCP, that treat significant quantities of combined sewage in addition to dry weather flow. Such facilities normally have secondary treatment capacity sufficient to handle dry weather flows plus additional treatment capacity for combined flows. However, such facilities often need the operational flexibility to divert some excess combined sewage flows around certain treatment processes (such as biological treatment units) to avoid damage to those treatment processes. Without such flexibility, these treatment works would need to limit flow to the treatment plants to the capacity that could be treated through all the treatment processes at the plant. This would be counterproductive in that it would result in these diverted flows being discharged to the environment untreated. The CSO Policy recognizes the value of maximizing treatment at the publicly owned treatment plant, and therefore explicitly authorizes bypasses as necessary to assure that flows are not needlessly diverted from the treatment plant. This is consistent with the City's policy of operating the Oceanside WPCP at maximum capacity during storm events.

The City's Westside system has been designed and constructed to maximize flows to the Oceanside WPCP. The Oceanside WPCP provides up to 43 MGD of secondary treatment capacity (average dry-weather flow is about 18 MGD), and another 22 MGD of primary treatment capacity during wet-weather periods, for a total treatment capacity of 65 MGD during wet weather. Treated effluent is combined prior to discharge to the Pacific Ocean via the SWOO. Flows to the Oceanside WPCP or SWOO are maximized prior to any discharge to the near-shore waters of the Pacific Ocean.

While the City can treat 65 MGD of flow to primary levels at the Oceanside WPCP, the plant can provide secondary treatment for only 43 MGD. Thus, when wet weather flows exceed 43 MGD, Oceanside WPCP is designed to allow excess flows (between 43 MGD and 65 MGD) to bypass the secondary treatment processes and discharge to the SWOO after receiving only primary treatment. The CSO Policy describes the circumstances where such bypassing may be explicitly authorized in a CSO permit. 59 FR 18693.

For such bypassing to be permitted, the permittee must justify the cut-off point at which the flow will be diverted from the secondary treatment portions of the treatment plant, and provide a benefit-cost analysis demonstrating that the conveyance of wet weather flow to the POTW for primary treatment is more beneficial than other CSO abatement alternatives such as storage and pump back for secondary treatment, sewer separation, or satellite treatment.

The City performed a benefit-cost on CSO abatement alternatives as part of its 1971 Master Plan. The system currently being implemented was determined to be significantly more beneficial than any of the other options analyzed. In particular; the Master Plan determined that sewer separation was extremely costly, highly disruptive, and undesirable in that it would not address storm water pollution. In addition, the BPJ analysis performed by EPA Region 9, for the 1997 permit, demonstrated that providing either additional storage (to increase secondary treatment of stored wastewater) or additional secondary treatment capacity is both extraordinarily expensive and highly disruptive to the local community. (See attachment 2)

In addition, the permittee must demonstrate compliance with the requirements of 40 CFR 122.41(m)(4) for the bypass to be permitted. The bypass must be unavoidable to prevent loss of life, personal injury or severe property damage. For purposes of CSO permits, severe property damage includes situations where flows above a certain level wash out the POTW's secondary treatment system. See 59 FR 18694. There must be no feasible alternatives to the bypass. For purposes of CSO permits, this provision is met if the secondary treatment system is properly operated and maintained, the secondary system has been designed to meet secondary limits for flows greater than peak dry weather flow, plus an appropriate quantity of wet weather flow, and it is either technically or financially infeasible to provide secondary treatment at the existing facilities for a greater amount of wet weather flow. Finally, the permittee must provide notice of the need for the bypass. This last provision is satisfied by the City's NPDES permit application describing the Oceanside WPCP facilities and its wet-weather operation plans.

The Oceanside WPCP can provide 43 MGD of secondary treatment; more than double the average dry weather flow of 18 MGD. If the City attempts to provide secondary treatment to more than 43 MGD of flow during wet weather, the City risks washing out its biological treatment processes. This would result in serious property damage at the Oceanside WPCP. In addition, it would degrade treatment performance significantly until the biological treatment process could be reestablished. The Master Plan for the City's Westside facilities documents the financial infeasibility of providing more secondary treatment capacity for wet weather flows at the Oceanside WPCP. In addition, the location of the Oceanside WPCP near (and under) the San Francisco Zoo is very physically limited. Expansion of the treatment works on site is essentially impossible without severe disruption to zoo facilities.

The proposed permit requires the City to provide secondary treatment for all flows reaching the Oceanside WPCP up to 43 MGD. The City must provide primary treatment at the Oceanside WPCP for the flows in excess of 43 MGD up to 65 MGD. In addition, the City is required to use the storage capacity in the Westside Transport to maximize, to the extent feasible, storage of wet-weather flows for later treatment during dry weather periods.

The second potential issue concerns the wet weather discharge from the storage transports directly to the shoreline diversions structures. These discharges receive flow-through treatment but will not meet all the requirements of the Ocean Plan Tables A and B. In January 1979, the State Board adopted Order 79-16 which identified 8 overflows per year as the Oceanside Wet Weather Control Facilities design goal. In Order WQ79-16, the State Board found that:

1. The exception will not compromise protection of ocean waters for beneficial uses, and

2. The public interest will be served.

Beginning in 1997, all shoreline overflow discharges from the storage/transports have received flow-through treatment. The bypass provision applies only to discharges from publicly owned treatment works (POTWs) and does not apply to discharges from collection systems (such as the shoreline discharges). These shoreline discharges are not covered by the bypass provision but rather covered by other permit provisions as supported by the *Combined Sewer Overflow Control Policy*.

IV. PLANNING

Master Plan
The 1971 Master Plan for Wastewater Management and the 1974 Master Plan Environmental Impact Statement and Report (EIR/S) set the groundwork for the City's wastewater control program. The Master Plan and the EIR/S identified the need for a new and upgraded wastewater treatment plant on the Westside and a new ocean outfall. These documents also established the principal of storing accumulated combined sewage flows during wet weather for later treatment at the treatment plant.

In order to determine the size of the storage transports it was first necessary to identify an acceptable overflow frequency for the treated overflows. (This design goal was also necessary in order to set the wet weather design capacity of the Oceanside WPCP.) To provide a basis for this decision, the City completed engineering and cost-effectiveness studies and in December 1978 submitted the *Westside Wet Weather Control Facilities Overflow Control Study*. In January, 1979, the State Water Quality Control Board adopted Order 79-16 which designated a long term average of 8 overflows per year as the Westside design goal. A permit finding noted that this frequency would "provide adequate overall protection of beneficial uses." The agency deliberations were accompanied by an extensive public participation process.

In response to objectives set forth by the City's 1974 Master Plan Environmental Impact Statement and Report, the City has spent over 1.6 billion dollars City-wide on construction projects to reduce the water quality impact of the combined sewer system. The majority of these expenditures have been directed toward controlling the wet weather storm flows. Table 3 summarizes the costs of the Master Plan projects.

Table 3. Master Plan Projects Cost Estimates and Expenditures

Projects Completed by 2002	Costs
Bayside Core	$ 408,700,000
Westside Core	$ 410,700,000
Oceanside Plant	$ 261,700,000
Southeast Facilities	$ 515,200,000
Subsequent Bayside Improvements	$42,000,000
TOTAL PROJECTS	$1,638,300,000

Source: City and County of San Francisco
Public Utilities Commission

Reassessment of Treated Overflows
All facilities became operational in early 1997. Since that time, the City has investigated several alternatives for providing additional wastewater controls and further reductions in overflows. The "Westside System Evaluation," 2002, summarized a preliminary engineering assessment of various combinations of additional storage capacity and additional pumping capacity. The goal was to reduce the frequency of the shoreline discharges. Additional treatment or storage is prohibitive for several reasons. Increasing treatment capacity at the Oceanside WPCP would require the development of additional land of which there is none available at the facility; increasing storage capacity requires land acquisition or installation under existing roadways, for which the costs of construction are very high. Additional pumping would transfer more of the stored wet weather flows from the storage/transports directly to the Ocean Outfall. Providing additional pumping capacity appears more viable than providing additional storage. However, because the City is meeting the Westside CSO design criteria (long term average of 8 overflows per year), no additional measures are required at this time. Under the post construction monitoring required by this draft permit pursuant to Phase II of the CSO Policy, the City will monitor to determine if additional controls are

necessary for compliance, or if changes in beneficial uses or changes in objectives (e.g. wet weather standards) are necessary so that the fully implemented CSO control program complies with water quality standards. If controls are determined to be necessary, the feasibility of additional pumping capacity and other measures will be further evaluated at that time.

In addition to the Westside System Evaluation, the City supported the preparation of the report: "Screening of Feasible Technologies" (SOFT), 2000 (Draft), which examined various wastewater control options such as reducing runoff volume and providing decentralized treatment. The report notes that as CSO volume is reduced, each marginal reduction becomes increasingly difficult and more expensive. The City is currently initiating the development of a comprehensive wastewater master plan, and within that process will continue to evaluate the feasibility of implementing such options as those described in the SOFT report.

Wet Weather Day Definition
Definition of a wet weather day:
"Wet weather day" is defined in this permit as any day which any of the following conditions exist as result of rainfall:

a. The instantaneous influent flow to the Oceanside Water Pollution Control Plant is exceeding 43 MGD; or

b. The average daily influent concentration of TSS or BOD is less than 100 mg/L on the day the discharge occurs; or

c. The Westside storage/transport flow elevation exceeds 0 feet from the bottom of the west box and then 18 feet in the east box..

Condition (a) reflects the maximum flow that the designers of the treatment plant believe could be processed by the biological secondary units. Condition (b) allows the discharger to treat and discharge storm water stored in the transport following significant storm events (in order to prepare for the next storm event). Because the influent is so dilute following significant storm events (as evidenced by the fact that TSS is less than 100 mg/l) percent removal requirements are often impossible to meet. (See Section I.2. above). Condition (c) allows the discharger to effectively reduce the volume of combined storm water and wastewater flows in the storage/transport structures in preparation for the next storm event.

*Note
Storm events can result in significant increases in flows to the Oceanside WPCP. In fact, any flows greater than 20 MGD are likely the result of storm events. However, "wet weather day" is defined as the above specific conditions which may result in an allowable treated CSO or in a "bypass" of portions of Oceanside WPCP facilities. In other words, "wet-weather" discharges are those which may not receive secondary treatment and therefore, may not be able to meet the technology-based requirements for POTWs.

Pollution Prevention and Pollution Minimization
Pollution prevention measures include source reduction and other practices that reduce or eliminate pollutants through the increased efficiency in the use of resources or the protection of resources by conservation. Two major source reduction efforts, implemented by the City's Bureau of Environmental Regulation and Management (BERM) focus on reducing the pollutants released to the environment through the sewer system: (1) the development of an overall pollution prevention program and (2) the implementation of a wastewater waste minimization program as part of the pretreatment requirements. The City's water pollution prevention and pretreatment programs minimize the introduction of toxic pollutants into the CSS. (The pretreatment program is discussed in greater detail in Attachment E.)

The City undertook a study of Best Management Practices (BMPs) to determine which would provide the most cost-effective reduction in pollutant loadings into the CSS during both dry- and wet-weather periods[2]. The most important pollutants of concern at that time during wet-weather periods include PAHs, copper, lead, and cyanide. The main sources of these pollutants are automobiles and automotive-related businesses; other sources include tar shingles, wood preservatives, paints, algicides, and manufacturing. The Water Pollution Prevention Program therefore tailored campaigns to reduce pollutants from these sources, and has since created programs for additional pollutants of concern such as mercury.

A key BMP is the City's street sweeping program, which directly reduces pollutants originating from street surfaces; all City streets are swept at least once per week with vacuum sweepers. Catch basins are also cleaned, as necessary, which helps to reduce pollutant loading during storm events. Other BMPs selected for implementation include a pollution prevention education program, provision of alternative disposal methods for residential hazardous waste, regulatory measures to reduce the risk of toxic spills, and public agency measures to prevent contact of rainfall runoff with potential contaminants.

The NPDES permit requires the implementation and continual development of a Pollution Prevention Plan. This plan is subject to the review and approval of the Board. This requirement represents a BAT control because it primarily results in the removal of toxic pollutants. Table 4 is a list of pollution prevention activity highlights prepared by the City.

TABLE 4
SAN FRANCISCO WATER POLLUTION PREVENTION HIGHLIGHTS SINCE 1990

Years	Action/Activities
1990	• Water Pollution Prevention Program initiated • Local limits in Pretreatment Program reviewed • Large dischargers (and some small dischargers) required to prepare pollution prevention plans
1991	• Consumer products heavy metals inventory study completed • *Combined Sewerage System* – Educational brochure for residents describing the combined sewer system
1992	• Plumbing corrosion identified as a significant copper source in wastewater • Pollution prevention workshops conducted for painting contractors, vehicle repair shops, hospitals, and photofinishers • Consumers receive *Less Toxic Shopping*, a guide for selecting less toxic household products • Public survey reveals lack of awareness among residents about proper handling and disposal of household hazardous waste such as used motor oil • San Francisco hosts the first annual West Coast Wastewater Pollution Prevention Symposium
1993	• Copper-based root killers utility bill insert • Medical and research facilities receive BMPs • *Bugged?* – Integrated Pest Management (IPM) guide developed and distributed at IPM workshops, public events, street fairs, direct mailings • *Water Pollution Begins in Your Home* – guide for residents on how to protect the San Francisco Bay and Pacific Ocean with tips on proper handling and

2 James M. Montgomery, Consulting Engineers, Inc. *City and County of San Francisco, Department of Public Works, Best Management Practices Study*, August 1992

	disposal of household hazardous waste
1994	• Dentists identified as major mercury source in San Francisco wastewater (>100 samples collected) • Auto Repair Facility program initiated – 3-year audit/inspection pilot program • Regional outreach on copper-based root control products • *Mass Loadings of Used Motor Oil and Latex Paints to the Sewerage System* study completed • Public Survey conducted
1995	• Latex Paint Recycling Initiative – 7 drop-off locations established throughout San Francisco to accept unwanted latex paint from residents; all paint is recycled • *Grow It!* – the guide for less toxic gardening methods for residents was created (available in English, Spanish, and Chinese) • Storm Water Pollution Prevention Program initiated • Cooling tower study completed • Cooling tower and commercial building managers receive BMPs • Dental Mercury Steering Committee - stakeholders convene to review and evaluate dental mercury pollution prevention • Plumbing corrosion inhibitors study initiated • Co-sponsored 3rd annual West Coast Wastewater Pollution Prevention Symposium • Significant Industrial Users required to submit Hazardous Waste Reduction Assessment Checklist and Storm Water Pollution Prevention Assessment Checklist
1996	• Completed Auto Repair Facility pollution prevention audits – 3-year effort with 372 audits conducted • Pollution source identification investigations of screen printers, jewelers, and machine shops (*1995/96 Scoping Study Report)* • *Toxic Organic Pollutant (TOP) Management Study* (Phase I began in 1995, Phase II in 1996) – multi-year study with a broad scope running from TOP source identification to control measure implementation including public education. Related work included surveying residents regarding pesticide use and disposal. • San Francisco began funding the "Green Gardener" training program which has resulted in development and maintenance of scores of organically-grown gardens throughout San Francisco's communities and schools, and engaged thousands of local community members and school children in organic gardening projects • Public survey reveals 40% of households received impressions from the Water Pollution Prevention Program
1997	• Integrated Pest Management Ordinance adopted • Chinese *Clean It!* and *Fix It!* and Spanish *Grow It!* and *Fix It!* distributed • *Clean It!* survey results indicate that methods in the guide were useful for guide recipients in using less toxic methods for cleaning • Auto Repair Facility program results indicate > 75% compliance with BMPs
1998	• Curbside pickup of household hazardous waste for elderly and handicapped residents available • Public survey conducted; results were helpful to determine where to focus new pollution prevention strategies • Local limits reviewed • *Only Rain Down the Drain* - storm water pollution prevention brochure distributed to businesses with potential to contribute to pollution in storm water runoff
1999	• Initiated dioxin detection limit study to attain lower detection limits • Healthy Air and Smog Prevention Ordinance adopted • Environmentally Preferable Purchasing Policy adopted by the Board of Supervisors

	• IPM Partnership launched • *Never Down the Drain* – Dental mercury BMP brochure mailed to all San Francisco dentists • Community outreach on local Chinese and Spanish television stations on pesticide, paint, and motor oil pollution prevention • Stenciled over 1,000 storm drains on the west side of San Francisco with "Don't Dump – Protect the Ocean" message • Latex paint drop-off sites established at local hardware stores throughout San Francisco • Less toxic pest control *Control It!* published (available in English, Spanish, and Chinese) • Pollutant removal study conducted to determine the removal efficiency for five toxic heavy metals (including copper; mercury results were consistently below detection limits) - *Identifying Potential Storm Water Pollution Sources Using a Geographic Information System and Estimating Sediment Catch Basin Efficiencies*
2000	• *Dioxin in San Francisco Wastewater – Identification and Treatment* - completed a study of dioxin in wastewater; probably the most comprehensive study of its kind in the nation • Ban on mercury fever thermometers adopted by City and County of San Francisco • Completed dioxin detection limit study as part of the aforementioned investigation of dioxin in wastewater • • Pest Control Operator IPM workshops conducted • *Keep it On Site* – educational brochure developed for the construction industry pollution prevention • Storm Water Phase II NPDES compliance planning initiated • San Francisco co-sponsored the ninth annual West Coast Wastewater Pollution Prevention Symposium • Restaurant IPM outreach conducted in pilot area • Developed restaurant IPM poster in English and Spanish – *"Don't Set a Table for Pests"*
2001	• *IPM Innovator* award for City and County of San Francisco from the California Department of Pesticide Regulation • San Francisco participated in a national pollution prevention case study to test a model framework of effectiveness measurement tools for pollution prevention programs. *Tools to Measure Source Control Program Effectiveness* (2000) – Prepared by Larry Walker Associates for the Water Environment Research Federation (document D00302) • Conducted dental mercury wastewater sampling to test BMP impacts on POTW influent as part of a national study on BMPs. *Mercury Pollution Prevention Program Evaluation* (March 2002) - Prepared by Larry Walker Associates for Association of Metropolitan Sewerage Agencies. • Janitorial products study of less toxic alternatives initiated • Database and GIS systems launched to track water pollution prevention activities, communications, and outreach materials, and to create links with new and ongoing business licenses • San Francisco voters approve the Solar Energy bond measure • Curbside pickup of used motor oil and latex paint permanent program • Expanded the IPM Partnership program • Heron's Head Park Living Classroom project to assist local youth in environmental

	education receives funding • Strybing Arboretum receives funding for horticultural jobs training; training will focus on less toxic methods for horticulture • MUNI launched low-emission bus pilot program • San Francisco Board of Supervisors adopts rechargeable battery purchasing plan • San Francisco Board of Supervisors and Mayor of San Francisco urge the U.S. Environmental Protection Agency to require full disclosure of all inert ingredients on pesticide labels • Launched one of the region's first biodiesel stations • Purchased over 400 new compressed natural gas vehicles since 1998 • Green Business program planning initiated
2002	• San Francisco was instrumental in securing funding to build the region's first liquefied natural gas (LNG) fueling station and for waste hauling company Norcal to convert from diesel to LNG, offsetting air pollution generated by 2,200 cars • *Best program: Used Oil Collection* from the North America Hazardous Materials Association • *Best program: Electronic Waste* award from California Environmental Proctection Agency • *Best program: Electronic Waste* award from California Resource Recovery Association • Dentist database updated and contacts made for dental mercury BMP education opportunities

V. STATUTORY AND REGULATORY BACKGROUND

Clean Water Act (CWA)
The Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) permit program. All point source discharges to waters of the U.S. must have permits issued under this program. The Clean Water Act also established the criteria which EPA and the states use in issuing permits to these discharges. Essentially, the discharges have to comply with three sets of requirements:

- Technology-based minimum requirements which apply to all dischargers of a specified class (CWA section 301(b)(1)(A) and (B) and 301(b)(2)).
- More stringent effluent limits if needed for the discharge to meet water quality standards (CWA section 301(b)(1)(C)).
- For marine discharges, the Ocean Discharge Criteria (CWA section 403(c)).

Federal Regulations Implementing the CWA - technology-based requirements
The requirements of the Clean Water Act are more specifically defined in the implementing regulations. The technology-based requirements for publicly owned treatment works (POTWs) such as the Oceanside Plant are the secondary treatment standards as defined in the regulations at 40 CFR 133.102.

Federal Regulations Implementing the CWA - water quality-based requirements
In addition to the technology-based standards, the wastewater discharges must comply with water quality standards if these are more stringent than the technology-based standards. As will be discussed in detail in Section B (Effluent Limitations), water quality considerations have compelled the permitting agencies (EPA and the Board) to issue permits in previous years which have required construction of facilities which have a pollutant control performance significantly beyond the technology-based requirements of BCT and BAT.

For discharges to State Waters, the water quality standards which pertain to these discharges are those contained in the 2001 California Ocean Plan (Water Quality Control Plan, Ocean Waters of California). And, as noted above, the *Combined Sewer Overflow Control Policy* establishes a methodology for applying water quality standards to CSOs.

For discharges from the Ocean Outfall, state water quality standards are not directly applicable at the point of discharge (which is into Federal Waters). However, the discharges must comply with Section 403, Ocean Discharge Criteria, of the Clean Water Act. These criteria are established in the regulations at 40 CFR 125.120 et seq. Compliance with water quality objectives borrowed from the Ocean Plan provides the basis for EPA's determination that discharges from the Ocean Outfall comply with Section 403. The following sections provide more detail on the Ocean Plan, the *Combined Sewer Overflow Control Policy* and the Ocean Discharge Criteria.

The California Ocean Plan and Federal Ocean Discharge Criteria
The Ocean Plan designates the following beneficial uses for State ocean waters:

- Industrial water supply
- Water contact and non-water contact recreation
- Navigation
- Commercial and sport fishing
- Mariculture
- Preservation and enhancement of Areas of Special Biological Significance
- Preservation of rare and endangered species
- Preservation of marine habitat
- Fish migration
- Fish spawning and shellfish harvesting

The discharge is located from 0.3 to 1.5 miles beyond State Waters, and, therefore, the Ocean Plan is not directly applicable to the discharge from the Southwest Ocean Outfall. However, compliance with numbers borrowed from the Ocean Plan is required immediately after initial dilution. This requirement will assure that under worst-case conditions, state standards will be met within state waters, and provides the basis for EPA's determination that the discharge will comply with the requirements of section 403 of the Act.

Section 403(a) of the Clean Water Act (hereinafter referred to as "the Act") prohibits discharge to Ocean Waters except in compliance with guidelines established under section 403(c) of the Act. Section 403(c) of the Act requires that guidelines be promulgated for determining the degradation of marine waters. Federal Regulations at 40 CFR 125.122(b) (Determination of unreasonable degradation of the marine environment) state:

Discharges in compliance...with state water quality standards shall be presumed not to cause unreasonable degradation of the marine environment, for any specific pollutants or conditions specified in the... standard.

Because the discharge is in compliance with standards promulgated within state water quality standards (i.e. the 2001 California Ocean Plan) and because these standards address the criteria listed under 403(c)(1)of the Clean Water Act, the discharge from the SWOO is presumed not to cause unreasonable degradation. EPA's review of the application and monitoring data supplied by the City of San Francisco provides no basis for rebutting this presumption. Therefore, EPA determines that the discharge is permitted under section 403 of the Act.

The Ocean Plan contains water quality objectives intended to protect designated beneficial uses. These include bacteriological, physical, chemical, and biological objectives. Table B of the Ocean Plan includes numerical objectives for various toxic pollutants.

State Water Code

The California Water Code beginning with Section 13370 implements the NPDES program in State waters. As noted previously, the SWOO discharges to Federal waters (beyond the three mile limit). The shoreline combined sewer overflow (CSO) discharges are to State waters. The underlying statutory and regulatory basis for both the Federal and State programs are similar.

Marine Protection, Research, and Sanctuaries Act (MPRSA)

The Monterey Bay National Marine Sanctuary (MBNMS) was established in 1992, and is administered by the National Oceanic and Atmospheric Administration (NOAA). A Memorandum of Agreement between NOAA and various agencies, including EPA and the Board, establishes procedures for addressing Sanctuary concerns through existing regulatory programs. (See Attachment 3 for MOA Agreement) The MOA creates a buffer zone encompassing the anticipated discharge plume from San Francisco's Ocean Outfall. The MPRSA and its implementing regulations do not apply to the buffer zone.

An additional requirement is contained in the regulations which implement the Ocean Discharge Criteria (CWA section 403(c)). These regulations require that the determination of unreasonable degradation address marine sanctuaries (40 CFR 125.122(a)(5)).

Regulatory Status of a CSO

An opinion by the U.S. EPA's Office of General Counsel has classified facilities that treat combined sewer overflows as point sources subject to section 301(b)(1)(A), 301(b)(1)(C), and 301(b)(2) of the Clean Water Act (hereinafter referred to as "the Act"). Thus, they are not Publicly Owned Treatment Works (POTWs) and are not subject to the secondary treatment regulations of 40 CFR 133. This opinion is supported by subsequent case law (Montgomery Environmental Coalition v. Costle 646 F.2d 568 (1980)).

San Francisco's wet weather combined sewer flows have a more complicated regulatory status. On San Francisco's Westside, there are two types of treated combined sewer overflows (CSOs): the flows decanted from the Westside storage transport directly to the Ocean Outfall, and the flows decanted from the storage/transports to the shoreline combined sewer overflow (CSO) points. Both of these treated CSOs must meet the following technology-based requirements of the Act as follows:

<u>Best practicable control technology currently available (BPT)</u>
BPT is the basic control level which all discharges must attain (other than publicly owned treatment works (POTWs)). BPT was the initial technology-based control level required by the Clean Water Act. This treatment level is determined first and is used in calculating both of the following control levels which may be more stringent.

<u>Best conventional pollutant control technology (BCT)</u>
BCT is an incremental level of control beyond BPT for Suspended Solids, BOD, Oil & Grease, pH, and coliform bacteria. BCT is a technology-based control requirement.

<u>Best available technology economically achievable (BAT)</u>
BAT is the level of treatment beyond BPT which applies to toxicants and other non-conventional pollutants. BAT is also a technology-based control requirement.

A detailed evaluation performed by EPA Region 9, for the 1997 permit, concluded that the construction and operation of San Francisco's Oceanside wastewater treatment systems and CSO storage/transport facilities comply with BPT, BCT, and BAT requirements (for EPA's analysis please refer to the attachment 2). This analysis concluded:

a. The completed Westside facilities will provide effluent reduction at a cost in excess of that which would be required by BPT/BCT/BAT; and

b. No additional treatment facilities can be justified on a BPT/BCT/BAT cost basis.
c. By including requirements in the NPDES permit to ensure the continued implementation of the nine minimum control technologies outlined in the CSO Policy, the Board and EPA have established the technology-based requirements mandated by the Clean Water Act.

Combined Sewer Overflow Control Policy

On April 11, 1994, the EPA adopted the *Combined Sewer Overflow Control Policy* (50 FR 18688). This Policy establishes a consistent national approach for controlling discharges from CSOs to the Nation's waters through the National Pollutant Discharge Elimination System (NPDES) permit program. In 2000, the CWA was amended to include a reference to this Policy. Section 402(q) of the CWA now states:

> "...Each permit, order or decree issued pursuant to the Act...from a municipal combined storm and sanitary sewer shall conform to the Combined Sewer Overflow Control Policy..."

The Combined Sewer Overflow Control policy was developed through a negotiated process with environmental groups, federal and state officials, and representatives from municipalities.

San Francisco is served almost 100% by combined sewers and thus is directly affected by the CSO Control Policy. The CSO Control Policy addresses planning requirements, system performance, enforcement, and permitting. The key elements of the CSO Control Policy which affect this permit are the following.

(a) the permit and performance evaluation must address the system as a whole; the goal is to maximize system-wide pollutant removal,

(b) nine minimum control technologies are identified,

(c) flow to the treatment facilities must be maximized; the intent here is also to maximize system-wide pollutant removal,

(d) compliance with water quality standards during wet weather is based on the "presumption" approach (i.e., construction and implementation of a specified level of combined sewer controls places the system in compliance presumptively).

This Tentative Order in Section A. Discharge Prohibitions, Section B – Dry Weather Effluent Limitations, C. - Wet Weather Effluent Performance Criteria, and Section F. - Provisions, implements the *Policy* using the best professional judgment (BPJ) process.

Furthermore, all requirements recommended in the Policy for a Phase II CSO Permit have been included. These include:

(a) Requirements to implement technology-based controls including nine minimum controls (see Permit Provision 4 and Section C.);
(b) Narrative requirements which ensure that selected CSO controls are implemented, operated and maintained as described in Long Term CSO Control Plan (see Permit, Section C);
(c) Water quality-based effluent limits as described in "Presumption" approach (see Permit, Section C);
(d) Requirement to implement Post-Construction water quality assessment program (see Permit Provision 4.i);
(e) Requirement to maximize treatment of wet weather flows at the POTW (See Permit Provision 4.d.); and
(f) A re-opener clause authorizing the NPDES authority to implement additional requirements if CSO controls fail to meet WQS or to protect designated uses (See Permit Provision 15.e.).

Based on the CSO Control Policy, the permit includes limitations to control wet weather discharges.

During wet weather, Oceanside WPCP's secondary hydraulic capacity is 43 MGD with an additional primary hydraulic capacity of 22 MGD for a combined wet weather capacity of 65 MGD. During wet weather, the dry weather effluent limits do not apply to the SWOO discharge due to the large variability of flows and pollutant levels during storm events. Effluent discharges to the SWOO outfall during wet weather periods will be governed by the following effluent requirements:

1. The Discharger shall maximize the delivery of flows during wet weather to the treatment plant for treatment. In so doing, the Discharger will maximize the use of the available treatment facilities consistent with the reliable operations of these facilities.

2. The Discharger shall provide the maximum secondary treatment available in accordance with the operating manual and all wet weather flows passing the headworks shall receive at least primary clarification (defined as solids and floatable material removal and disposal) and any other treatment that can reasonably be provided with the existing facilities.

Water Quality Standards Review:
The CSO Policy calls for the development of a long-term control plan (LTCP) and also specifies that "[d]evelopment of the long-term plan should be coordinated with the review and appropriate revision of water quality standards (WQS) and implementation procedures on CSO-impacted receiving waters to ensure that the long-term controls will be sufficient to meet water quality standards" (59 FR 18694). Water quality standards reviews are an important step in integrating the development and implementation of affordable, well-designed and operated CSO control programs with the requirements of the Clean Water Act (CWA).

VI. EFFLUENT QUALITY

Dry Weather Values:
Average daily dry-weather values in 2002 for discharges from the Oceanside Water Pollution Control Plant are described below:

Table 5. – Effluent Quality

Constituents	ml/l-hr	mg/l
Settleable Matter	0.01	---
Biochemical Oxygen Demand (BOD)	---	15
Suspended Solids (TSS)	---	11
Grease and Oil	---	<5
Ammonia Nitrogen	---	32

Constituent - Turbidity	Nephelometric turbidity units (NTU)
Turbidity	6.0

Constituents - Toxicity (bioassay)		Toxicity Units (TUa^1/TUc^2)
Acute Toxicity	(Topsmelt)	0.0
Acute Toxicty	(Rainbow Trout)	0.46
Chronic Toxicity (Abalone)		31.6
Chronic Toxicity (Echinoderms)		13.3

1. TU_a (Toxic Units acute) equals log (100-S)/1.7 when percent survival in 100% effluent is >50%. (S equals % survival). Tu_a equals $100/LC_{50}$ when percent survival in 100% effluent is <50%. (LC_{50} is the effluent concentration at which 50% mortality occurs).
2. TUc (Toxic Units chronic) equals 100/NOEC, where NOEC is the no observed effect concentration, the highest effluent concentration to which organisms are exposed in a chronic test that causes no observable adverse effect on the test organisms.

Constituents (metals, other toxicants)
Dry weather monitoring was completed for 11 metals 28 times between January 2000 and December 2002. The highest concentration detected in any monitoring round is listed. Most were not detected in every sampling round.

Metals	µg/l
Arsenic	4.5
Cadmium	0.88
Chromium	7.5
Copper	25.6
Lead	14.4
Mercury	0.062
Nickel	4.4
Selenium	1.7
Silver	1.7
Zinc	102.9
Cyanide	<10

Constituents - Synthetic Organics
Dry weather monitoring was completed for 61 synthetic organic constituents and other toxicants eight times between January 1999 and December 2002. The following were detected in at least one monitoring effort. The highest concentration detected in any monitoring round is listed. Most were not detected in every sampling round.

Synthetic Organics and other toxicants	µg/l (unless otherwise noted)
Toluene	1.4
Tetrachloroethylene	11.0
Dichlorobenzene	1.5
Xylenes	0.7
Chloroform	8.7
Tributyltin	0.011
Dioxins (picograms/l; TEQ)	0.71 (pg/l)
Radiation	pCi/l
Alpha	3.23
Beta	39

VII. REVIEW OF THE PRESUMPTION APPROACH

This section reviews San Francisco's system as compared with the Presumption approach specified in the Combined

Sewer Overflow (CSO) Control Policy.

The CSO Control Policy in Section II.C.4.a. outlines the requirements of the "presumption" approach:

This section states:
"a. Presumption Approach

A program that meets any of the criteria listed below would be presumed to provide an adequate level of control to meet CWA requirements, provided the permitting authority determines that such presumption is reasonable in light of the data and analysis conducted in the characterization, monitoring, and modeling of the system and the consideration of sensitive areas described above. These criteria are provided because data and modeling of wet weather events often do not give a clear picture of the level of CSO controls necessary to protect WQS. However, this presumption will not apply if the permitting authority determines that the long-term CSO control plan will not result in attainment of CWA requirements.

i. no more than an average of four overflow events per year, provided that the permitting authority may allow up to two additional overflow events per year. For the purpose of this criterion, an overflow event is one or more overflows from a combined sewer system as the result of a precipitation event that does not receive the minimum treatment specified below; or

ii. the elimination or the capture for treatment of no less than 85% by volume of the combined sewage collected in the combined sewer system during precipitation events on a system-wide annual average basis; or

iii. the elimination or reduction of no less than the mass of the pollutants, identified as causing water quality impairment through the sewer system characterization, monitoring, and modeling effort, for the volumes that would be eliminated or captured for treatment under paragraph ii. above.

Combined sewer flow remaining after implementation of the nine minimum controls and within the criteria specified at II.C.4.a.i, ii or iii, should receive a minimum of:

> Primary clarification. (Removal of floatable materials and settleable solids may be achieved by any combination of treatment technologies or methods that are shown to be equivalent to primary clarification.);
>
> Solids and floatable materials disposal; and
>
> Disinfection of effluent, if necessary, to meet WQS, protect designated uses and protect human health, including removal of harmful disinfection chemical residuals, where necessary."

<u>San Francisco Program compared with the Presumption Approach</u>

In this comparison, we examine San Francisco's performance under the criteria of items 1., 2. and 3. above. However, compliance with only one is required.

1. <u>Discharge of no more than 4 untreated overflows per year (average.)</u>

The permitted overflow frequencies for San Francisco range from one per year to ten per year depending on the discharge zone. (Areas with more sensitive beneficial uses have lower frequencies.) All of San Francisco's overflows are discharges from the storage/transports and will have received flow-through treatment which meets the definition of treatment under the Policy. Thus, San Francisco has no untreated overflows. The storage/transports are specifically designed to provide both settling and floatable material removal as required in the Policy. Additionally, the performance of the storage/transports is in the range of the wet weather performance of primary clarifiers.

2. Treatment of 85% of the wet weather combined flow

This compliance option requires the combined sewer system to provide treatment (equivalent to primary clarification) to 85% of the combined flows on a system-wide annual basis. The San Francisco facilities provide secondary treatment to 39% of the flow, primary to 38% of the flow, and flow-through treatment within the storage/transports to the remaining 23%. Assuming that flow-through treatment meets the Policy's definition of treatment, as discussed above, then San Francisco provides 100% treatment and meets the criteria. By providing secondary level treatment to much of the storm flow, the City system's annual performance is much superior to a program which only meets the minimum requirements of this option (85% of flow receiving primary treatment, 15% untreated). See the following discussion.

3. The reduction (in discharge) of an equivalent mass of pollutants to option 2.

This compliance option requires the municipality to achieve a pollutant reduction performance equivalent to a community which has implemented option 2. This option was included for those communities, such as San Francisco, which have implemented site-specific control programs.

Option 2 requires a community to provide primary clarification to 85% of the combined flow. For this calculation, assume that primary treatment will achieve 50% removal of TSS. Therefore, the overall performance of a community implementing option 2 would be:

85% (of flow) X 50% (removal of suspended solids) = 42.5% overall removal.

- Overall removal refers to removal from the entire waste stream.
- The 50% removal efficiency assumed for primary clarifiers in wet weather is optimistic, as discussed earlier, and would likely be lower. Thus the overall removal for option 2 would probably be less than 42.5%.

San Francisco's overall pollutant removal has been calculated based on the following performance assumptions:

Treatment Process (San Francisco)	Wet Weather Pollutant Removal Efficiency (Percentage of TSS)
Secondary	80
Primary	55
Storage/Transports	30

The 30% removal efficiency for the storage/transports is a conservative assumption based on performance studies of the Westside Transport. Depending on the type of performance assessment, the TSS removal of the Westside Transport varied from 25% to 54% (long-term average). It is very difficult to determine the removal efficiencies of the storage/transports because of the variability of pollutant loading in the storm flows and the frequent inability to obtain representative and reproducible samples.

Using the data above, San Francisco obtains an overall pollutant removal from the combined sewer flows of 59%. This compares very favorably with the 42.5 % overall removal required by option 3 of the presumptive approach.

An additional requirement for options 1 and 2 of the presumptive approach, is that the treatment, as used in these options, should meet certain specifications:

The treatment must be:

a. "Primary clarification" (or technology equivalent to primary clarification that removes floatable materials and settleable solids).

b. Solids and floatable materials disposal

c. Disinfection, if necessary, and removal of disinfection residuals as necessary.

San Francisco's secondary and primary facilities provide, at least, primary clarification. Solids and floatable materials are removed, digested, and re-used in landfills or in land application. The Ocean discharge is 3.75 miles from shore and does not require chlorination to meet State WQS. As discussed previously, the flow-through treatment in removing floatable materials and settleable solids meets the requirements under the definition of primary clarification. The solids and floatable materials removed during the flow-through treatment are flushed to the treatment plants after the storms subside and receive the normal treatment and disposal.

The flow-through discharge is not chlorinated. The Discharger has evaluated disinfection for the storm flow overflow points and has determined that chlorination/de-chlorination of the shoreline discharges was neither cost-effective, technically viable, nor the environmentally preferred option. Particularly important is the fact that adequate time is not available to remove disinfection byproducts. Chlorine is acutely toxic and if not properly dosed and neutralized will kill fish and other aquatic life. Other alternatives were implemented including baffling, posting of the shoreline, and reduction of the annual overflow frequencies in critical areas.

In summary, the Discharger's wastewater facilities provide more treatment than that required by the "presumption"approach as outlined in the *Combined Sewer Overflow Control Policy.*

VIII. DETERMINATION OF TECHNOLOGY-BASED LIMITS FOR CSOs.

See EPA's BAT/BCT Determination, Fact Sheet: Attachment 1. This determination was based on the CSO Control Policy which equates the nine minimum controls with the technology-based requirements. This analysis was completed for the 1997 permit.

IX. BIOLOGICAL CONSIDERATIONS

Monterey Bay National Marine Sanctuary Concerns
The Sanctuary boundary lies 5,000 meters to the west of the end gates of the Southwest Ocean Outfall (Point B on Attachment 2). For several reasons, the treated effluent discharged through the Ocean Outfall is not expected to adversely impact the Sanctuary. The instantaneous dilution of the effluent (at least 76:1 and generally greater than 200:1) means that it is very unlikely that elevated concentrations caused by the wastewater discharge could occur within the Sanctuary.

The treated effluent plume responds primarily to the ebb and flood of the tidal cycle of San Francisco Bay and thus tends to move in northeast/southwest oscillation. The most probable point of contact on the Sanctuary boundary northerly of the outfall is 9.6 km north of the diffuser. Worst case analysis of total dilution averaged across the cross-section of the plume is estimated as follows:

Condition	Max. Flow (mgd)	Point A - Northerly Contact with Sanctuary	Point B - Westerly Contact with Sanctuary	Point C - Southerly Contact with Sanctuary
Dry weather	25.6	3,200:1	910:1	2,900:1
Wet weather	145	1,700:1	530:1	1,500:1

Reference: CH2M-Hill Technical Memoranda #2 and #3, March 25, 1993.

The self-monitoring program begun in 1997 greatly expanded the SWOO study area by incorporating additional randomly located stations that extend into the Sanctuary boundary from Rocky Point in Marin County to Point San Pedro in San Mateo County. This new regional monitoring design has been successful in addressing shortcomings in the previous monitoring efforts by accounting for effects of outflow through the Golden Gate and placing the discharge area in context of the larger region. The biggest advantage of the regional approach has been the characterization of reference areas that allow comparison of outfall stations to background conditions. Annual sampling of sediment quality (including contaminant loads) and analysis of invertebrate and fish communities (including body burdens) has shown that, when compared to appropriate reference areas outside the range of effluent discharge effects, there are no detectable differences. Sampling stations within the Sanctuary are included as part of the reference stations to which outfall stations are compared. These data provide additional information on Sanctuary conditions for the NOAA Sanctuary Program.

Also important are the existing requirements that the discharge comply with the technology-based and water quality-based standards of the Clean Water Act. In particular, the permit requires compliance with the chronic toxicity requirements of the Ocean Plan. This bioassay test is probably the most accurate method of determining if the wastewater presents a risk to the biota in the receiving water. The critical life stages of five organisms (including a fish, an invertebrate, and an aquatic plant) were tested using Oceanside WPCP effluent: *Atherinops affinis* (topsmelt), *Macrocystis pyrifera* (giant kelp), *Haliotis rufescens* (red abalone), *Mytilus* spp. (bivalve), *and Strongylocentrotus purpuratus* (purple urchin). Three different invertebrate tests (abalone development, bivalve development, and echinoderm development) were measured because invertebrates displayed the most sensitivity to the OWPCP effluent. Of the three tests performed, the abalone and echinoderm development tests were more sensitive than the bivalve test. Monthly testing using the red abalone *Haliotis rufescens* was initiated in 1997 and compliance with the chronic effluent limit has consistently been achieved. Testing using either bivalve larvae or echinoderm larvae were conducted when abalone stock organisms did not properly respond to test protocol. Figure 2 shows the location of the Ocean Outfall discharge, the buffer zone, and the Sanctuary.

Endangered Species Consultation
EPA is currently in the process of consulting with the U.S. National Marine Fishery Service and U.S. Fish and Wildlife Service as mandated by Section 7(a)(2) of the Endangered Species Act. The consultation may result in the need for the Discharger to perform special studies to ensure that federally-listed species are protected.

X. DETERMINATION OF WATER QUALITY BASED LIMITS

Reasonable Potential Determination
40 CFR 122.44(d)(1)(I) requires the permit to include limits for all pollutants "which the Director determines are or

may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any State water quality standard." The Ocean Plan sets forth the water quality standards which are directly applicable to the discharges into state waters. EPA has determined that based on compliance with section 403 of the Act, these standards are also applicable to the discharge from the SWOO into Federal Waters.

There are no requirements in the Ocean Plan as to how "reasonable potential" must be determined. Typically, the permit writer will review effluent data, mixing zones, and the water quality standards. EPA's Technical Support Document also suggests statistical approaches that can be used to compare effluent data with standards.

In August 2002 the City submitted draft reasonable potential calculations for the City's wastewater discharge through the SWOO. EPA has thoroughly reviewed the City's calculations, and has used them to conduct a reasonable potential analysis. The TSD procedures (discussed below) were followed as closely as possible. EPA's analysis of the reasonable potential calculations differed slightly from the City's analysis, but the conclusions were the same for pollutant-specific reasonable potential: no reasonable potential was found for any specific organic or inorganic pollutants. EPA used Ocean Plan criteria and background concentration levels, while the City used Federal criteria and a background concentration for copper that differed from values listed in the Ocean Plan.

As a result of the reasonable potential analysis, only effluent limits for Acute and Chronic Toxicity are retained in the permit. The previous permit contained a limit for mercury, however, based on the past three years of data, EPA does not find reasonable potential for mercury. Based on the origin of the effluent as domestic and industrial wastewater, acute toxicity and chronic toxicity limitations are contained in the permit on a professional judgement basis.

Whole Effluent Toxicity Testing is included in this permit to assure that the wastewater does not contain pollutants which, in combination, exhibit toxicity. Furthermore, monitoring of all priority pollutants listed in the Ocean Plan is still required throughout the life of the permit. Finally, a re-opener clause allows the permit to be reopened for the imposition of water-quality based effluent limitations if any of the WET testing or chemical specific monitoring indicates to EPA or the Board the need for such limits.

<u>Technical Support Document (TSD) Procedures for determining Reasonable Potential</u>
EPA's *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, Washington March, 1991 (TSD) contains a protocol for determining "reasonable potential" based on statistical evaluation of the effluent monitoring data. The TSD procedures were followed as closely as possible to determine reasonable potential. For criteria based on human health this is an extremely conservative approach because it does not take into account exposure rates of the human health non-carcinogens and carcinogens. In other words, it assumes that only one exceedance of the criteria at the edge of the zone of initial dilution (ZID) is enough to cause human health impact. In actuality, the human health criteria are derived assuming lifetime exposure (approximately 70 years).

To account for this longer exposure time, EPA would typically use a long-term dilution factor (e.g. 200:1)which would be greater than the worst-case 76:1 initial dilution used for these calculations. However, EPA is applying criteria from the 2001 California Ocean Plan which requires use of the "minimum probable initial dilution" in calculating the Waste Load Allocation

Tables 2 and 3 in the permit summarize the data collected and the reasonable potential conclusions. The attached reasonable potential calculations pages (Attachment 2) show all the data used for the calculations, and provide the results of each calculation.

Initial dilution:

The treated wastewater is discharged from SWOO through diffuser ports that are designed to promote rapid mixing with seawater. The discharge is freshwater and is more buoyant than seawater. It rises rapidly and the initial flow is turbulent. Eventually, the upward turbulent motion ceases and subsequent dilution is "passive" – resulting from currents, wave motion, and diffusion.

The area of mixing is called the mixing zone. The acute mixing zone is sometimes defined as the area of initial dilution, and may be referred to as the Zone of Initial Dilution (ZID). Acute criteria can be exceeded within the zone but must be met at its edge. The zone is sized for quick mixing and preventing lethality to passing organisms. Beyond the acute mixing zone and of larger area is the chronic mixing zone where, at the edge of this zone, chronic criteria must be met. Both mixing zones typically have maximum size and location restrictions and are sized to minimize impact upon the environment. Estimating dilution can either be accomplished through mathematical modeling (initial dilution models) or through dye studies.

The Ocean Discharge Criteria at 40 CFR 125.121(c) allow a 100-m (330-ft) radius mixing zone for initial dilution of discharges (or greater if the initial mixing zone is larger). At the edge of the mixing zone, marine water quality criteria shall be met. (For this permit, the criteria are the objectives borrowed from the Ocean Plan which are very similar to the U.S. EPA marine criteria.) Thus the Ocean Discharge Criteria establish a single regulatory mixing zone. The determination of whether a discharge meets water quality criteria at the edge of a mixing zone requires the computation of the amount of dilution that occurs in the mixing zone between the discharge location and the edge of the mixing zone. The calculated or measured dilution factor is used to determine the allowable pollutant concentration in the effluent before discharge.

For San Francisco, the measured dilution factor using dye studies in the zone of initial dilution was generally over 200:1 (two hundred parts seawater to one part wastewater). The average measured dilution factor was 473:1. The calculated dilution factor using the UDKHDEN model was 76:1 using conservative assumptions (e.g., no current, high flow, maximum measured density stratification). A conservative dilution is appropriate for comparison with acute criteria intended to protect marine biota from short-term exposures to worst case discharge situations. In effect, this establishes a relatively small "acute mixing zone." However, the San Francisco PUC has maintained that maximum 4-day average conditions are more appropriate for comparison with the chronic criteria (based on 4-day exposure). Furthermore, they suggest that long-term average conditions should be used for the dilution factor applied to the human health criteria (multi-year exposure).

The California Ocean Plan (COP) does not currently provide for different mixing zones for toxic pollutant objectives. It only provides for use of more than one mixing zone for whole effluent toxicity objectives. The COP identifies a minimum initial dilution factor that is applicable to the chronic toxicity objective based on the lowest average initial dilution for any single month of the year. The COP also identifies an acute toxicity mixing zone based on one tenth the mixing achieved in the chronic zone.

However, the use of more than one mixing zone is consistent with the EPA Technical Support Document for Water Quality-based Toxics Control (TSD) and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). Generally, both these references provide for smaller mixing zones for acute standards as compared to the larger ones for chronic standards. For human health protective standards, specifically those relating to bioconcentratable pollutants, both the TSD and the SIP suggest further restrictions on the size of the mixing zone to prevent tissue contamination of organisms. In summary, there are various approaches used for identifying the dilution factors to be used in calculating effluent limits.

The Reasonable Potential Analysis for SWOO and the effluent limitations used a dilution factor of 76:1 for all toxic constituents. As provided in the TSD, different dilution factors may be considered for different toxic constituents depending on the nature of the compound. For non-bioaccumulative constituents (or non-bioconcentratable pollutants using TSD terminology), 76:1 is a highly conservative approach since it does not take into account the average exposures on which the risk assumptions are based for the chronic criteria. For bioconcentratable pollutants, the TSD recommends restrictions on the dilution factor to prevent tissue contamination of organisms. Since sediment and tissue data from the SWOO Report show no elevation in concentrations of a select list of bioconcentratable pollutants in the vicinity of the SWOO compared to reference sites, some dilution above zero is appropriate for the SWOO (See Southwest Ocean Outfall Regional Monitoring Program, Five Year Summary Report, 1997-2001, Water Quality Bureau, 2003. City and County of San Francisco, Public Utilities Commission). Thus, 76:1 was also used for bioconcentratable constituents as it maintains past and current conditions for the Discharger. Future permits may use more appropriate dilution factors based on EPA and State guidance and discussions between the Discharger and EPA and the Board.

Contaminants in sediments and organism tissues have been monitored since 1997 (see Self Monitoring Program). Sediments throughout the study area were monitored for inorganic pollutants (Al, As, Ag, Cd, Cr, Cu, Fe, Hg, Mg, Ni, Pb, Se, Zn) and organic pollutants (PCBs, PAHs, DDT). English sole and Dungeness crab muscle tissues and liver/hepatopancreas tissues were measured for the same pollutants from organisms collected in the vicinity of the SWOO pipe and from organisms collected from the reference study area.

A comparison of data from 1997 through 2001 included in the 2003 Southwest Ocean Outfall Regional Monitoring Program, Five Year Summary Report, 1997-2001. (Water Quality Bureau, City and County of San Francisco, Public Utilities Commission) indicate some fluctuations in concentrations were measured between years. However, according to the Five Year Summary Report there were no increasing concentration trends for either inorganic or organic contaminants in any of the matrices measured. The Report also concluded that concentrations of contaminants in sediments and tissues in the vicinity of the SWOO were similar to reference station concentrations. Future permits may use more appropriate dilution factors based on U.S. EPA and State guidance and discussions between the discharger and U.S. EPA and the Board.

Acute and Chronic Toxicity

These effluent limitations are based on numbers borrowed from the Water Quality Control Plan for Ocean Waters of California (2001 Ocean Plan), and a technical study of initial dilution achieved by the discharger's outfall. The Ocean Plan sets forth the water quality standards which are directly applicable to the discharges into state waters. EPA has determined that based on compliance with section 403 of the Act, these standards borrowed from the Ocean Plan are also applicable to the discharge from the SWOO into Federal Waters. According to the Ocean Plan, effluent limitations for the acute toxicity objective shall be determined using the following formula:

. According to the Ocean Plan, effluent limitations for acute toxicity objective shall be determined using the following formula:

$$C_e = C_a + (0.1)\, D_m\, (C_a)$$

Where:

Ce	=	the effluent concentration limit,
Ca	=	the concentration (water quality objective) to be met at the edge of the acute mixing zone.
Dm	=	minimum probable initial dilution expressed as parts seawater per part wastewater (This equation only applies when Dm > 24).

XI. PERMIT SECTIONS A-G: SPECIFIC RATIONALE

The following provides a specific rationale for the proposed permit requirements in the Tentative Order:

SECTION A - Discharge Prohibitions:

a) Prohibition A.1 (no discharges other than as described in the permit): This prohibition is based on the previous permit and BPJ.

b) Prohibition A.3 (no bypass) . This prohibition is based on general concepts contained in Sections 13260 through 13264 of the California Water Code that relate to the discharge of waste to State waters without filing for and being issued a permit. Under certain circumstances, as stated in 40 CFR 122.41(m)(4), the facilities may bypass waste streams in order to prevent loss of life, personal injury, or severe property damage, or if there were no feasible alternatives to the bypass and the Discharger submitted notices of the anticipated bypass. This prohibition pertains to dry weather discharges only. Wet weather discharges are regulated under the EPA *Combined Sewer Overflow Control Policy* (59 FR 18688).

c) Prohibition A.4 (Minimum initial dilution of 76:1): This Dilution is based on the most conservative modeling procedures as required by the Ocean Plan, 76:1 is the worst-case minimum initial dilution from the SWOO. Since the acute toxicity limit and reasonable potential for toxic pollutants are based on 76:1, a prohibition of less than 76:1 is necessary to ensure protection of water quality.

d) Prohibition A.5 (no discharges from wet weather outfalls during dry weather period): This prohibition is based on the Nine Minimum Controls, previous permit, and BPJ. EPA's *Combined Sewer Overflow Control Policy* established a national policy on the regulation of combined sewer overflow. This Policy recommends the prohibition of CSOs during dry weather. It is the best professional judgment of the Board and EPA that this is an appropriate prohibition to apply to the San Francisco wastewater system. The Westside system is designed to transfer all dry weather flow to the Oceanside WPCP. Any discharge of dry weather effluent through the wet weather Combined Sewer Overflow points would indicate a failure of the dry weather collection and treatment system. Additionally, it is unlikely that any such dry weather discharge would comply with the Clean Water Act requirements that all dry weather effluent receive secondary treatment as defined in 40 CFR 133.

e) Prohibition A.6 (flow limit): This prohibition is based on the treatment capacity of the plant. Flows in excess of this rate will not receive adequate treatment and so, should be prohibited.

f) Prohibition A.7 (pollution or nuisance). This prohibition is self-explanatory and based on the California Water Code.

f) Prohibition A.8 (no degradation of shellfish harvest during dry weather): This prohibition is based on previous permit and protection of the beneficial uses defined for the receiving waters.

SECTION B – Dry Weather Effluent Limitations

Basis for Dry Weather Effluent Limitations

1. Technology-Based Limits based on the Secondary Treatment Regulation at 40 CFR 133.102 and 133.103, and the previous permit limits.

a. Constituent	Units	Monthly Average	Weekly Average	Daily Maximum.	Instantaneous Maximimum
Biochemical Oxygen Demand (BOD_5)	mg/l	30	45		---
Total Suspended Solids (TSS)	mg/l	30	45		---
Grease and Oil	mg/l	25	40	---	75
Turbidity	NTU	75	100	225	---
pH	within 6 to 9 at all times				

b. BOD_5 and TSS 85% removal

The arithmetic mean of the biochemical oxygen demand (five-day, 20°C) (BOD_5) and total suspended solids (TSS) concentration, for effluent samples collected in a calendar month shall not exceed 15 percent of the arithmetic mean of the respective values for influent samples collected at approximately the same times during the same period. Measurements taken on wet weather days shall not be included in calculating percent removal.

Basis:

a) Effluent Limitations B.1.a limits are technology-based limits representative of and intended to ensure adequate and reliable secondary level wastewater treatment during dry weather. These limits are based on Secondary Treatment Regulation at 40 CFR 133.102 and 133.103, and the previous permit . All limits apply independently to dry weather discharges to the Pacific Ocean.

b) BOD and TSS, 30 mg/L monthly average and 45 mg/L weekly average (Effluent Limitation B.1.a.): These are standard secondary treatment requirements, and existing permit effluent limitations that are based on numbers borrowed from the California Ocean Plan derived from federal requirements (40 CFR 133.102). These effluent limitations apply only to dry weather discharges.

c) Effluent Limitation B.1.b. (BOD and TSS monthly average 85 percent removal): These are standard secondary treatment requirements and existing permit effluent limitations are derived from federal requirements (40 CFR 133.102; definition in 133.101). Compliance has been demonstrated by existing plant performance for dry weather flows. During the past 3 years, the Discharger has consistently met these removal efficiency limits.

d) Oil & Grease and Turbidity. These limits are based on existing permit effluent limitations.

e) Effluent Limitation B.1.a. (pH): The pH limit is based on 40 CFR 133.102, which applies to indirect industrial dischargers. Based on Regional Board staff's professional judgment, the excursion allowance is extended to the Discharger.

2. Water Quality-Based Limits: Limits on acute and chronic toxicity are borrowed from the 2001 Ocean Plan. Acute and chronic Toxicity shall be measured in accordance with the attached Self Monitoring Program.

Constituent	Units	Daily Maximum.
Acute Toxicity	TUa	2.58
Chronic Toxicity	TUc	76*

* See specific quidance related to ammonia toxicity in the Self Monitoring Program

SECTION C – Wet Weather Effluent Performance Criteria (Including Nine Minimum Controls):

The CSO Control Policy identifies the nine minimum controls as meeting the technology-based requirements of the Act. For more detailed analysis of these requirements and a determination of the technology-based limitations for San Francisco's, Westside Wet Weather Control Facilities, please refer to EPA's BAT/BCT Determination in Attachment 1.

Basis:

a) <u>These criteria were derived from the design criteria of the wet weather facilities. This requirement is based on the CSO Policy.</u>

SECTION D - Receiving Water Limitations (Dry Weather)

Receiving Water Limitations are based on water quality objectives for physical, chemical and biological characteristics borrowed from Chapter II of the Ocean Plan. The Ocean Plan sets forth the water quality standards which are directly applicable to the discharges into state waters. EPA has determined that based on compliance with section 403 of the Act, these standards are borrowed for the discharge from the SWOO into Federal Waters. The rationale of the ocean monitoring program is found in Part B of the permit.

SECTION E - Basis for Self Monitoring Program Requirements

See Section VII. for the basis for the Self-Monitoring Program

SECTION F– Basis for Biosolid Management Practices

These requirements are derived from 40 CFR Parts 257, 258, and 503 and 13050 (l) and (m) of the California Water Code. The requirements in the permit are all applicable to the permittee, since as the biosolid preparer, the permittee is the person ultimately responsible for ensuring compliance with 40 CFR 503, as per 503.7. The language in the permit is intended to clarify certain sections of 503, and provides for adequate tracking of compliance with all aspects of 503.

SECTION G – Basis for Provisions

a) Provisions 1. (Permit compliance and rescission of previous permit): Time of compliance is based on 40 CFR 122. The basis of the order superseding and rescinding the previous permit order is 40 CFR 122.46.
b) Provision 2. (Marine Mammal Report). This provision is based on Professional Judgement. Human sewage has pathogens, viruses and bacteria. There is concern that marine mammals in the ocean could be adversely affected by un-disinfected discharges. The draft permit requires the Discharger to conduct a study to further investigate the potential affects of human sewage to marine mammals in general and to better ascertain the potential impacts to marine mammals to determine if further study is necessary.
c) Provision 3. (Pollution Prevention and Pollutant Minimization Program): This provision is based on the nine minimum controls).
d) Provision 4. (Nine Minimum Controls): This provision establishes technology based requirements for the Discharger's wet weather operations. This is based on the CSO Policy, Nine Minimum Controls, previous permit, and Professional Judgement.
e) Provision 5. (Whole Effluent Acute Toxicity): This provision is based on Professionial Judgement . See Finding 45 in the Permit for more detail.
f) Provision 6. (Whole Effluent Chronic Toxicity): This provision is based on Professional Judgement. See Finding 45 in the Permit for more detail.
g) Provision 7. (Pretreatment Program): The Discharger has implemented and is maintaining a U.S. EPA approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR 403) and the requirements specified in Attachment E "Pretreatment Requirements" and its revisions thereafter.
h) Provision 8. (Wastewater Facilities, Review and Evaluation, and Status Reports): This provision is based on the previous Order.
i) Provision 9. (Operations and Maintenance Manual, Review and Status Reports): This provision is based on the requirements of the 40 CFR 122 and the previous permit.
j) Provision 10. (Operation Plan Submittal)
k) Provision 11. (Contingency Plan). The Contingency Plan provision is based on the requirements stipulated

in Board Resolution No. 74-10 and the previous permit.

l) Provision 12. (Self-Monitoring Program Requirement): The Discharger is required to conduct monitoring of the permitted discharges in order to evaluate compliance with permit conditions. Monitoring requirements are given in the Self Monitoring Program (SMP) of the Permit. This provision requires compliance with the SMP, and is based on 40 CFR 122.44(i), 122.62, 122.63 and 124.5. The SMP is a standard requirement in almost all NPDES permits (including the Order) issued by the Regional Board. In addition to containing definitions of terms, it specifies general sampling/analytical protocols and the requirements of reporting of spills, violations, and routine monitoring data in accordance with NPDES regulations, the California Water Code, and Board's policies. The SMP also contains a sampling program specific for the Discharger's treatment facilities. It defines the sampling stations and frequency, pollutants to be monitored, and additional reporting requirements. Pollutants to be monitored include all parameters for which effluent limitations are specified. Additional constituents, for which no effluent limitations are established, are also required to be monitored to provide data for future determination of their reasonable potential of exceeding the applicable WQOs or WQCs in the receiving water.

m) Provision 13. (Standard Provisions and Reporting Requirements): The purpose of this provision is to require compliance during dry weather with the standard provisions and reporting requirements given in this Board's document titled, Standard Provisions and Reporting Requirements for NPDES Surface Water Discharge Permits, August 1993, or any amendments thereafter. This document is included as part of the permit as an attachment of the permit. Where provisions or reporting requirements specified in the permit are different from equivalent or related provisions or reporting requirements given in 'Standard Provisions', the specifications given in the permit shall apply. The standard provisions and reporting requirements given in the above document are based on various state and federal regulations with specific references cited therein.

n) Provision 14. (Change in Control or Ownership): This provision is based on 40 CFR 122.61.

o) Provision 15. (Permit Reopener): This provision is based on 40 CFR 123.

p) Provision 15.c. (New Water Quality Objectives): This provision allows future modification of the permit and permit effluent limits as necessary in response to updated water quality objectives that may be established in the future. This provision is based on 40 CFR 123.

q) Provision 16. (NPDES Permit and U.S. EPA concurrence). This provision is based on 40 CFR 123.

r) Provision 17 (Permit Expiration and Reapplication): This provision is based on 40 CFR 122.46 (a)

XII. MONITORING PROGRAM.

Self-Monitoring Program Background

The near shore/offshore monitoring program is described in the Self -Monitoring Program (SMP), a document that is incorporated in but is separate from the permit. The SMP is intended to be a dynamic document, with requirements that may change throughout the life of the permit in order to provide the most relevant information possible.

The SMP has been changed from the 1997 version in several ways. Acute toxicity monitoring requirements, such as the new requirement to use marine species for acute toxicity, have been changed to reflect the 2002 amendments to the California Ocean Plan.

Another change is the addition of monitoring requirements for E. coli as a surrogate for fecal coliform, and enterocoocus, in addition to the total coliform monitoring requirement. These monitoring requirements were added because scientific evidence has shown that E. coli and enterococcus may be better indicators of gastrointestinal illness than total coliform. (See U.S. EPA guidance document "Implementation Guidance for Ambient Water Quality Criteria for Bacteria.") Although the discharger will now be required to analyze for 3 constituents rather than one (total coliform), routine shoreline monitoring has been reduced in the new permit from 3 times/week to one time/week. EPA and the Board have proposed this change because monitoring over the past permit cycle has satisfactorily characterized the area (Baker Beach at the outflow of Lobos Creek) where bacteriological contamination is routinely found in the absence of a CSO.

As is presently the Discharger's practice, monitoring and posting of the beach after a CSO will be conducted daily (unless impracticable) until bacteriological levels drop below the levels specified in the SMP. The beach will be posted after a CSO until all three of the monitoring results drop below the following criteria (contained in the Self-Monitoring Program):

Total Coliform: 10,000 per 100 ml
E-coli (surrogate for fecal coliform): 400 per 100 ml
Enteroccocus: 104 per 100 ml

These three criteria are single sample maximums used by the California Department of Health Services and are contained in California's AB 411 language "Regulations for Public Beaches and Ocean Water-Contact Sports Areas" located in Title 17 of the California Code of Regulations. Under this regulation, San Francisco's beaches are not subject to this law because they do not meet the criteria for beaches "adjacent to storm drains." However, EPA and the Board believe that the use of the AB411 single sample maximums for posting after a CSO is reasonable, and is generally consistent with California Ocean Plan requirements, and thus with the posting requirement of State Board Order 79-16..

Metals
For all metals, monthly monitoring is required. For the other toxic constituents quarterly monitoring is required. These frequencies are reasonable to access impacts to receiving waters and to determine maximium effluent concentrations. These frequencies may be changed if required by modifying the self-monitoring plan.

Whole Effluent Toxicity Testing
Toxicity limits are borrowed from the California Ocean Plan (2001). California Ocean Plan requirements for chronic toxicity have not changed since the expired permit was issued in 1997, but the California Ocean Plan amendments adopted in 2001 included a change to acute toxicity requirements. Under the 2001 California Ocean Plan, acute toxicity is water quality-based rather than technology-based, and must use marine species instead of freshwater species. The acute toxicity limitation for this permit was calculated according to the water quality criteria borrowed from the 2001 California Ocean Plan (see Table B). Because no acute toxicity was measured during the last permit cycle, monitoring requirements for acute toxicity shall be conducted monthly for the first year. If the first 12 months of data do not detect acute toxicity, annual testing may be conducted thereafter during this permit cycle.

This Order gives the Discharger special allowances for chronic toxicity if they can demonstrate that the toxicity is caused by solely by ammonia and that the ammonia is within the Ocean Plan objectives. Based on toxicity work done by the Discharger for its Bayside discharge, the chronic toxicity organisms that will be used for Oceanside discharge are sensitive to ammonia at levels which may cause an exceedance of the chronic toxicity limit. The purpose of the chronic toxicity limit is to protect against synergistic effects of mixtures of pollutants, and as yet unknown pollutants. It's purpose is not as a substitute for ammonia, which is already guarded against by the Ocean Plan objectives for ammonia. It is appropriate therefore to grant the Discharger this special allowance.

Sections 308(a) and 402 of the Clean Water Act provide authority to EPA or the State to require that NPDES permittees/applicants use biological monitoring methods and provide chemical toxicity and in-stream biological data when necessary for the establishment of effluent limits, the detection of violations, or the assurance of compliance with water quality standards.

40 CFR Part 122.44(d)(1)(ii) discusses procedures to be used to determine if a discharge causes, has a reasonable potential to cause, or contributes to an excursion of a water quality standard. The procedures include consideration of four general factors: "...existing controls on point and non point sources...variability of the pollutant...in the

effluent, the sensitivity of the species to toxicity testing...and...the dilution of the effluent in the receiving stream."

Because of the variability of pollutants inherent in POTW discharges, reasonable potential does exist to require whole effluent toxicity testing and permit limitations.

June 13, 2003

Comments on Tentative Order, Self Monitoring Program and Fact Sheet (NPDES Permit No. CA 0037681) for City and County of San Francisco Oceanside Treatment Plant, Southwest Ocean Outfall, and Westside Wet Weather Facilities
(San Francisco Bay Regional Water Quality Control Board (Board) and U.S. Environmental Protection Agency (U.S. EPA) final draft for public comment)

San Francisco Public Utilities Commission, Planning Bureau
415 934-5700

The comments that follow include general concept issues as well as specific recommendations on changes to document language for accuracy and clarification.

SWOO Discharge

Issue 1: CALIFORNIA OCEAN PLAN

Inappropriate Application of the California Ocean Plan

Basis for Water Quality Standards Applied to Discharge from SWOO – Finding 29 of the Tentative Order and various parts of the Fact Sheet in Sections V, X, XI and XII

Finding 29 accurately states that the SWOO discharge is located outside State waters and that, the California Ocean Plan does not directly apply to the SWOO at the point of discharge. Federal regulations and Federal water quality criteria which ensure receiving waters are protected, are available and San Francisco considers those guidance documents appropriate use for the SWOO discharge which is in Federal waters. Federal Ocean Discharge Criteria regulations exist (40 CFR part 125, subpart M) which include guidance to "prevent unreasonable degradation of the marine environment and to authorize imposition of effluent limitations, including a prohibition of discharge, if necessary, to ensure this goal" (45 FR 65942, October 3, 1980). It is San Francisco's position that Federal marine water quality criteria (Federal Register Vol. 63, No. 237, December 10, 1998) and U.S. EPA's Quality Criteria for Water 1986 (the "Gold Book") are the appropriate guidance to use in evaluating compliance of the SWOO discharge with the Ocean Discharge Criteria regulations. For ammonia, criteria are from U.S. EPA's Ambient Water Quality Criteria for Ammonia (Saltwater)-1989.

U.S. EPA has stated that it is necessary to use water quality criteria from the California Ocean Plan to determine SWOO compliance in order to ensure that the discharge will not cause unreasonable degradation as stated in 40 CFR 125.122(b). However, additional Federal guidance indicates the use of State criteria is not the only option to ensure against unreasonable degradation.

> *EPA criteria/toxic benchmark recommendations are considered by the States in developing water quality criteria for State waters. The criteria are not steadfast standards in federal offshore waters, but EPA takes them into account in making a determination of whether a discharge will cause* ***unreasonable degradation*** *of the marine environment (See 40 CFR Part 125.122(a)(10).*

Finding 29 further indicates that the U.S. EPA has elected to use water quality criteria from the 2001 California Ocean Plan to determine SWOO compliance: "compliance with parameters borrowed from the Ocean Plan is required immediately after initial dilution". The rationale given for using Ocean Plan numeric criteria is to ensure that State standards will be met within State waters. Because the Ocean Plan does not apply to the SWOO discharge (the discharge is in Federal waters), the U.S. EPA can only legally "borrow" the numbers, as is so indicated in the first sentence of Finding 29. However, because the Ocean Plan does not legally apply to the SWOO discharge it is necessary that any reference to the use of Ocean Plan criteria throughout all permit documents be accurately prefaced as being 'borrowed". (Note that the use of Ocean Plan criteria is unnecessary and inappropriate, as Federal criteria exist which can be used.) San Francisco, also, firmly insists that although U.S. EPA is intent on using a guidance option that allows Federal compliance determination based on borrowed State water quality criteria, the Ocean Plan in its entirety does not and cannot be applied to regulate the SWOO discharge.

The following sentences in Finding 29 need to be modified in order to correctly and legally reference the California Ocean Plan.

- Paragraph 1, sentence 4: "In addition, compliance with numbers borrowed from the Ocean Plan immediately after initial dilution..."
- Paragraph 2, sentence 2: "However, because the discharge is in compliance with numeric standards promulgated for ocean discharges within state waters (i.e., the 2001 California Ocean Plan) and because these standards address the criteria listed under 4003(c)(1) of the Act, EPA concludes that compliance with numbers borrowed from the Ocean Plan provides a reasonable basis for concluding that the discharge from the SWOO..."

The following sentences in the Fact Sheet need to be modified in order to correctly and legally reference the California Ocean Plan.

- Section V. Federal Regulations Implementing the CWA – water quality-based requirements, paragraph 3, sentence 4: "Compliance with water quality objectives borrowed from the Ocean Plan provides the basis for EPA's ..."
- Section V. The California Ocean Plan and Federal Ocean Discharge Criteria, paragraph 1, sentence 2: "However, compliance with numbers borrowed from the Ocean Plan is required..."
- Section X. Acute and Chronic Toxicity, paragraph 1, sentence 1: "These effluent limitations are based on numbers borrowed from the Water Quality Control Plan for Ocean Waters of California (2001 Ocean Plan), ..."
- Section X. Acute and Chronic Toxicity, paragraph 1, sentence 3: "EPA has determined that based on compliance with section 403 of the Act, these standards borrowed from the Ocean Plan, are also applicable to the discharge from the SWOO into Federal Waters."
- Section XI. B.1.b.b), Discharge Prohibition, BOD and TSS: Change to read: "These are standard secondary treatment requirements, and existing permit effluent limitations that are based on numbers borrowed from the California Ocean Plan derived from federal requirements (40 CFR 133.102)."
- Section XI. B.2., Water Quality-Based Limits, sentence 1: "Limits on acute and chronic toxicity are borrowed from the 2001 Ocean Plan."
- Section XI. D. Receiving Water Limitations (Dry Weather), sentence 1: "Receiving Water Limitations are based on water quality objectives for physical, chemical and biological characteristics borrowed from Chapter II of the Ocean Plan."
- Section XII. Whole Effluent Toxicity Testing, paragraph 1, sentence 1: "Toxicity limits are borrowed from the California Ocean Plan (2001)."

- Section XII. Whole Effluent Toxicity Testing, paragraph 1, sentence 4: "The acute toxicity limitation for this permit was calculated according to water quality criteria borrowed from the 2001 California Ocean Plan (see Table B)."

Issue 2: INITIAL DILUTION

Basis for Dilution Credit, Tentative Order (Finding 29, Finding 41) and Fact Sheet

As discussed above, the California Ocean Plan is not applicable to the SWOO at the point of discharge, because the SWOO discharge is in Federal waters. The discharge is located between 0.3 and 1.5 miles beyond State waters. Although U.S. EPA has borrowed numerical standards from the Ocean Plan to assess compliance of this permit in order to ensure that State standards will be met in State waters and that there is no unreasonable degradation of marine waters as allowed in 40 CFR 125.122(b), the Ocean Plan in its entirety does not apply. It is noted that the cited regulation used to determine "no unreasonable degradation" in Finding 29 and Section V of the Fact Sheet is only one of many recommended options that could be used to ensure such conditions, and may be unnecessarily restrictive.

In the design stages of the Oceanside Water Pollution Control Plant, the City requested a 301(h) waiver from secondary treatment as allowed in the Clean Water Act. That waiver was granted by U.S. EPA. In order to receive a 301(h) waiver, a discharge must have applicable State standards, and therefore State standards are "extended" into Federal waters for such discharges. Discharges into State waters are governed by the Ocean Plan, which specifies that the mixing zone is defined by the area of initial mixing and also assumes no current. Using a very conservative approach as is noted in Finding 41 of the Tentative Order and Section X of the Fact Sheet, the initial dilution for the SWOO discharge was calculated as 76:1. The City conducted dye studies in conjunction with U.S. EPA and the National Oceanic and Atmospheric Administration (NOAA) under worst case field conditions and calculated infield initial dilutions generally greater than 200:1. In 1989, the City withdrew its request for waiver from secondary treatment and designed the Oceanside facility to provide full secondary treatment for up to 43 MGD. Dilution was never recalculated using Federal criteria, and the dilution credit of 76:1 continues to be retained in the Oceanside permit.

Because the SWOO discharge is in Federal waters, Federal regulations apply, specifically 40 CFR 125.121(c), which states that discharges to Federal waters are allowed a mixing zone of 100 meters. Therefore, although U.S. EPA is borrowing Ocean Plan numeric standards, the entire Ocean Plan cannot be borrowed, and dilution must be calculated using Federal Regulations. There is no justification for the U.S. EPA to apply "minimum probably initial dilution" from the Ocean Plan in calculating Waste Load Allocation to the SWOO, because the Ocean Plan does not apply to the SWOO discharge (Fact Sheet, Section X). Discussions among the City, the Board, and U.S. EPA on the dilution credit applied to the SWOO discharge recognized the fact that the SWOO discharge was allowed a recalculation of dilution credit for aquatic life and human health criteria under Federal Regulations, as is also noted in Section X in the Fact Sheet, "To account for this longer exposure time, EPA would typically use a long-term dilution factor (e.g. 200:1) which would be greater than the worst-case 76:1 initial dilution used for these calculations.". San Francisco strongly insists that a dilution factor based on the Federal mixing zone be used for compliance purposes for chronic and human health criteria and purposes of any future reasonable potential analysis.

The City has prepared a draft report (attached) on dilution modeling for the SWOO discharge in which dilution ratios using a mixing zone based on Federal guidance are calculated. (Note that preliminary calculations indicate a dilution ratio of 465:1 for the SWOO discharge.) The City has submitted the dilution modeling report to Dr. Philip Roberts (Georgia Tech University), a renowned expert in the field of ocean discharge modeling, for review. In his review (attached), Dr. Roberts indicates that the original dilution model used for the SWOO discharge was overly conservative and incorporated inaccurate assumptions. Dr. Roberts indicates that "considerable advances have been made in understanding the mixing and dynamics of buoyant outfall plumes [since 1990], and earlier predictions are now archaic". Dr. Roberts states "[c]learly, the dilution value of 76:1 used in the previous [SWOO NPDES] permit is unrealistically low". Although all of the assumptions in the City dilution model are not yet verified, Dr. Roberts suggests a more accurate dilution factor for the SWOO would range from 200:1 to 985:1. The City intends to continue to refine the SWOO dilution modeling efforts with the aid of Dr. Roberts, and finalize the document within the next month. San Francisco expects the SWOO dilution factor of 76:1 will be revised prior to re-issuance of the Oceanside permit, or that the inclusion of language that allows such a revision within the current permit cycle, based upon said studies, will be included.

Specific Language Changes

a) Tentative Order, Finding 29: Based upon the previous discussion and the inappropriateness of using California Ocean Plan initial dilution models for the SWOO discharge, the following language in this Finding must be changed. Change the phrase "after initial dilution" in sentence 1 of the Finding to "at the edge of the mixing zone as defined in 40 CFR 125.121(c)." Change the phrase "after initial dilution" in sentence 4 of the Finding to "at the edge of the mixing zone as defined in Federal Regulations".
b) Tentative Order, Finding 41: Change sentence 4 of this Finding to read: "For compliance purposes and for any future Reasonable Potential Analysis the dilution factor of 465:1, based on the Federal mixing zone will be used."
c) Tentative Order, Finding 41, and Fact Sheet Section X, Paragraph 7: The third sentences of Finding 41 and Paragraph 7 reference the SWOO dilution factor and bioconcentratable pollutants. The sentences do not make sense and do not provide any additional information, so should be deleted.
d) Tentative Order, Discharge Prohibition A.4: Change to read: "Discharge of effluent from the Oceanside WPCP which does not exhibit a dilution of at least 465:1 at the edge of the mixing zone as defined in Federal Regulations is prohibited." Change similar language in the Fact Sheet in Section XI.A.c).
e) Tentative Order, Dry Weather Effluent Limitations B.2, Chronic Toxicity; and Fact Sheet, Section XI.B.2.: Change the chronic toxicity limit from 76 to 465.
f) Fact Sheet, Section V. The California Ocean Plan and Federal Ocean Discharge Criteria, Paragraph 1, sentence 2: Change to read: "However, compliance with numbers borrowed from the Ocean Plan is required immediately at the edge of the mixing zone as defined in Federal Regulations."

Issue 3: SPECIAL STUDIES
Marine Mammal Report, Tentative Order, Section F, Provision 2; Fact Sheet Section IX, G.

There is no causal link justifying inclusion of this issue as a provision requirement in the Oceanside permit. While there has been some speculation by researchers that the recent deaths of sea otters along the central California coast may be due to infection by feline virus associated with storm water runoff this theory has not been corroborated. If those agencies and scientific research groups that are tasked with studying marine mammals along the California coast cannot come to a consensus on the origin of the infection and the transport path of infectious agents to marine mammals, then a requirement in the Oceanside permit for the City to develop a study plan and marine mammal report appears to be premature. A coastal watershed approach addressing all storm water and wastewater discharges along the central coast may provide information needed by the research community. A small isolated study by San Francisco would not be money well spent nor would it likely provide information to address this problem.

The City recognizes that the issue of marine mammal infections is currently of concern, and the City is agreeable to including language addressing this issue into the permit. However that language should reflect and support current scientific findings. There is no justification to require the City to initiate research for this issue, which may likely be a statewide problem and may be best addressed through a watershed approach. The topic in the Tentative Order should be identified as the "Marine Mammal Program" both in Section F. Provision 2 and the Table of Contents, as well as in the Fact Sheet. The following language can be substituted in Provision 2.

> "The U.S. EPA, in consultation with NOAA, is concerned about the effects of viruses on marine mammals, especially federally listed species. If it is demonstrated in other ongoing investigations that there is a connection between non-disinfected municipal or industrial wastewater and marine mammal viral infections, the discharger shall work cooperatively with the U.S. EPA and other parties to develop a coordinated approach to address this issue."

The Fact Sheet (Section XI.,G – Basis for Provisions) indicates the inclusion of this issue on marine mammals in the Oceanside permit is based on Professional Judgment. Although the SWOO discharge is not disinfected, there is no indication that infections marine mammals from the central California coast are attributable to the Oceanside discharge. Therefore, the inclusion of such a provision in the Oceanside permit is inappropriate, as no marine mammals have reportedly been infected in the area of the discharge. The fact that infections are occurring along the central California coast indicates that the transport path must be something other than non-disinfected wastewater. If further research concludes that storm water is determined to be the source of the virus infections, then a watershed-based approach would be the most appropriate means to deal with this issue. This provision requires that San Francisco engage in a research effort to assess the affects of human sewage on marine mammals in general, an effort as indicated above which would not be money well spent nor would it likely provide useful information to address this problem. The language in Section G. b) should be changed to indicate:

There is a growing concern about the effects of viruses on marine mammals. Future research may indicate the need to address this issue locally with individual dischargers, or globally using a watershed-based approach.

Issue 4: BACTERIA MONITORING

a) The requirement for Total Coliform Bacteria monitoring for the duration of the permit cycle is inappropriate and unwarranted.

The Tentative Order, the Self Monitoring Program (SMP) and the Fact Sheet require the analysis of total coliform, *E. coli* (as a surrogate for fecal coliform), and enterococcus as indicator organisms in shoreline bacteria monitoring. The permit discusses this issue in Finding 18, Beach Postings and Bacteria Monitoring. The SMP discusses it in Section II Shoreline Monitoring (Surf Zone Sampling) under both A. Routine Monitoring and B. Monitoring in Response to a CSO. The Fact Sheet discusses bacteria monitoring in Section XII, Self Monitoring Program Background. All permit documents justify the inclusion of *E. coli* (as a surrogate for fecal coliform) and enterococcus into the beach monitoring program with reference to the most recent draft U.S. EPA guidance document "Implementation Guidance for Ambient Water Quality Criteria for Bacteria" which states that "E-coli and enterococcus are considered better indicators of gastrointestinal illness than total coliform." The guidance document more specifically states that *E. coli* is the recommended indicator organism over fecal coliform for fresh water systems, while enterococcus is a better bacteria indicator for marine systems. The guidance document does not recommend the collection of, or analysis for total coliform bacteria as a useful indicator organism for any water contact recreation assessment.

During the previous permit cycle, the City conducted shoreline bacteria monitoring using only total coliform bacteria as an indicator organism. The recent inclusion of bacteria indicators such as *E. coli* and enterococcus in other bacteria monitoring programs has resulted in a greater frequency of samples that exceed water contact recreation standards and a greater incidence in the number of times beaches are posted. In order for the City to assess past shoreline bacteria concentrations and posting responses, with concentrations and postings generated using the added bacteria indicators of *E. coli* and enterococcus under this new permit, monitoring using all three indicator organisms (total coliform, *E. coli*, and enterococcus) is appropriate for a designated time period.

However, since total coliform is not a recommended bacteria indicator, there is no justification to require the continued collection of total coliform bacteria data for the life of the permit once the relationship with previous data is established; a period of one year of data collection for all three indicators should be adequate. After one year of data collection using all three indicator organisms, shoreline monitoring should include *E. coli* (as a surrogate for fecal coliform) and enterococcus as recommended by U. S. EPA guidance. This level of monitoring is recommended by the U.S. EPA and follows the guidance of the State of California Water Resources Control Board in current efforts to coordinate and standardize beach water quality monitoring along the coast of California.

b) Routine Shoreline Bacteria Monitoring

There is no legal basis for requiring the City to conduct weekly shoreline monitoring for bacteria "regardless of the occurrence of CSO events". This statement is made in Finding 18 of the Tentative Order, and an inference to this monitoring is made in Section II.A of the SMP and in the Fact Sheet under Section XII. Shoreline bacteria monitoring is the responsibility of local county health departments. The only reasonable justification to include shoreline sampling in the City's NPDES permit is to monitor the effects of CSO events which is appropriately required in the SMP under Section II.B. There is no reasonable potential for elevated bacteria counts observed during dry weather or during wet weather in the absence of a CSO event to be attributable to the City's wastewater treatment system. Although the San Francisco PUC may elect to coordinate monitoring with the City Health Department for public health concerns, the NPDES permit for wastewater discharge cannot require it.

c) Language Changes in Reference to Total Coliform as an Indicator Organism

1. Specific language changes need to be made to sentence 5 of Finding 18 in the tentative order, and sentence 3 of the Discussion in the SMP Section II. The following language is suggested as a replacement for the permit and SMP.

   "...monitoring under this permit will include all three indicators – total coliform, E-coli (as a surrogate for fecal coliform), and enterococcus for the first year of the permit cycle. One year of data collection using all three indicator organisms will provide a comparison of bacteriological conditions with previous permit data. After the first year, shoreline monitoring will include E-coli (as a surrogate for fecal coliform) and enterococcus as recommended by U. S. EPA guidance. Future research in this field may require changes to the indicator organisms measured to assess water contact recreation."
2. Sentence 3 of Finding 18 in the Tentative Order needs to indicate that beach postings will be removed when "the levels of all measured indicators drop below" the criteria.
3. Sentence 2 of Requirements in Section II. A. Routine Monitoring in the SMP should read:

   "Samples shall be collected in the surf and sampled for those indicators referenced in the previous discussion paragraph.".
4. References to the three indicator organisms in sentences 1, 5 and 7 of Requirements in Section II.,B. Monitoring in Response to a CSO in the SMP should read:

   Sentence 1: the Discharger "...shall conduct shoreline monitoring for those indicators referenced in the previous discussion paragraph of this section...";
   Sentence 5: "Samples shall be collected in the surf and sampled for those indicators referenced in the previous discussion paragraph.";
   Sentence 7: "Monitoring shall be conducted daily, and the beach shall remain posted until levels of all bacteria indicators measured drop below the following:"
5. Sentence 4 of paragraph 3 in Section XII in the Fact Sheet should be changed to read:

   "The Discharger will now analyze for E-coli (as a surrogate for fecal coliform) and enterococcus as recommended by U.S. EPA guidance. For the first year of the permit, the Discharger will also analyze for total coliform in order to compare previous permit bacteria data. Routine shoreline monitoring has been reduced in the new permit from 3 times/week to one time/week because monitoring over the past permit cycle has satisfactorily…"

d) Monitoring Efforts During a CSO Event – Misleading SMP, Section II.B.

The first sentence of this section indicates that shoreline monitoring will occur at a minimum of ten stations whenever a CSO occurs. Sentence 4 of this section indicates that monitoring will be conducted at those stations in closest proximity to the CSO discharge. For clarification and consistency the last portion of the first sentence should indicate that the Discharger

> "…shall conduct shoreline monitoring for those indicators referenced in the previous discussion paragraph of this section at those stations in closest proximity to the CSO discharge (see Station Descriptions below). Shoreline sampling following a CSO discharge will occur at up to ten stations located from Baker Beach along the shoreline perimeter to Fort Funston on Ocean Beach as soon as practicable with regard to safety."

This modification allows the removal of sentences 4 and 5 of the existing paragraph as they are repetitive.

Issue 5: Maximum Daily Effluent Limits (MDEL) – Finding 32

This finding goes into some length to support the application of daily maximum limits to POTWs. As noted in the Tentative Order, the federal regulations [40 CFR 122.45(d)(2)] specifically state that limitations for POTWs be specified only in terms of weekly and monthly averages *unless impracticable*. The permit cites U.S. EPA guidance in the Technical Support Document to provide the basis to establish MDELs, specifically in relation to water quality-based limits for toxicity. Although it appears that the Board and U.S. EPA interpret less than weekly or monthly averages would be *impractical* to protect against "acute toxicity impacts", that interpretation is unsubstantiated. Additionally, even if the arguments for daily limits for toxicity are accepted, there is no justification to apply daily maximum limits to technology-based limits for BOD and TSS, which are very clearly supposed to be limited on only a weekly and monthly basis. Consequently, the daily maximum and instantaneous maximum limitations are inappropriate and should be removed from the Dry Weather Effluent Limitations Tables B.1 and B.2 in the Tentative Order and in Section XI.B.1 and B.2 of the Fact Sheet.

Recent court decisions support the removal of Maximum Daily Effluent Limits in NPDES permits for POTWs. One of the appeal issues in the LA and Burbank POTW permits was the presence of less than weekly limits. LA and Burbank brought suit against the State Water Resources Control Board and the Los Angeles Regional Water Quality Control Board. The trial court determined that the Boards were in error.

From the decision of the Appeals Court (J. Kitchen): *"The trial court also sustained the petitions on the grounds that the Regional Board failed to adequately show how numerical permit effluent limitations were derived from the narrative criteria; the effluent limitations are not supported by adequate findings and evidence in the administrative record; <u>the permits improperly impose daily maximum limits rather than average weekly and average monthly limits</u>; and the permits improperly specify the manner of compliance. Water Boards do not challenge this latter group of rulings on* *appeal and acknowledge that they must issue new permits in compliance with these rulings."* *(2002 WL 31867863 (Cal.App. 2 Dist.)) [emphasis added]*

Issue 6: Receiving Water Ambient Background Data Used in the RPA – Finding 42 of the Tentative Order

As already noted in above comments, the California Ocean Plan is not applicable to the SWOO discharge, as the discharge occurs in Federal waters. Although the Board and U.S. EPA are ensuring that the discharge meets State water quality standards by requiring compliance in this permit with numbers borrowed from the Ocean Plan, those numbers are inappropriate to use when more recent environmental data are more relevant, and actions to use more recent data are precedent. The copper value (2.0 ug/L) ambient background concentration is not accurate. In a Tentative Decision Document[1] issued on February 8, 2002 by U.S. EPA, Region IX in conjunction with the Ocean Outfall Permit for San Diego (NPDES CA0107409), the U.S. EPA stated, "The assumption in the COP [Ocean Plan] may be overly conservative. Flegal, *et al.*, (1991) reported that background copper concentrations in California coastal water were around 0.1 ug/L" (TDD, page 17).

Consequently, the RPA for the Oceanside permit should use 0.1 ug/L rather than 2.0 ug/L as the background copper concentration, and this should be reflected in Finding 42.

Issue 7: REPORTING AND SUBMITTAL DATES
Reporting dates need to be consistent throughout the Tentative Order, SMP, Fact Sheet and Attachments

a) SMP, Section V. Reporting Requirements, A.: In order to accommodate for less than 30 days in the month of February, change the Self-Monitoring Report monthly 'received' date to be 'no later than the last day of the following month'.
b) SMP, Section V. Reporting Requirements, B.: In order to make reporting dates consistent throughout permits, change the annual report covering effluent sampling from January 30 to February 28; and change the annual summary of wet weather activities and receiving water results from July 31 to August 30. This will make reporting consistent with other sections of this NPDES permit and with the other San Francisco NPDES permits.
c) SMP, Section V. Reporting Requirements, D.: To make all reporting submittal dates consistent and easier to track, change the annual report of the offshore monitoring data from July 30 to August 30.
d) Attachment E, Pre-treatment, Items 5 & 6: To make all reporting submittal dates consistent with other sections of this NPDES permit and with the other San Francisco NPDES permits and easier to track, change the semi-annual report due date from July 31 to August 31 and from January 31 to February 28; change the annual report due date from January 31 to February 28.

[1] The EPA 301(h) *Tentative Decision Document* is posted on the internet at: http://www.swrcb.ca.gov/rwqcb9/Programs/Outfall_Permit/301_h_TDD.pdf

Issue 8: Document Clarifications

1) Tentative Order, Finding 29, paragraph 1, sentence 1: The location of the SWOO discharge should be described as "0.3 to 1.5 miles beyond State waters" as is indicated in the Fact Sheet.
2) Fact Sheet (page 33 of 33), Whole Effluent Toxicity Testing: The last sentence I Paragraph 1 of this item indicates that acute toxicity testing has been decreased from monthly to quarterly. The SMP, Section B.1.b. indicates that acute testing will be conducted monthly for the first year and then if no toxicity is observed, annually thereafter. The information in these two documents must be made consistent.

Combined Sewer Overflows

Issue 1: REGIONAL AND STATE BOARD HISTORICAL EXCEPTION ORDERS
Inaccurate interpretation of historical orders that allow an exception to the California Ocean Plan, and address the long term average number of overflows (State Board Order No. 79-16 and Regional Board Order No. 79-12).

a) The discussion and references to Orders 79-12 and 79-16 in Finding 15 of the Tentative Order are unclearly stated and somewhat misleading. The sequence of events began with the San Francisco Bay Regional Water Quality Control Board adopting Order 79-12 which allowed an average of eight overflows per year, and based on evidence presented at a public hearing, determined that an exception to the Ocean Plan was warranted. The Regional Board requested that the State Board review and approve the exception to the Ocean Plan as recommended in Order 79-12. Following an additional public hearing, the State Board adopted Order 79-16 which supported the Regional Board assessment that a long term average of eight overflows per year would provide protection of beneficial uses and approved the exception to the Ocean Plan. Order 79-16 specifically states "...the proposed wet weather discharges by the City and County of San Francisco from the eight diversion structures in the Richmond Sunset Sewerage Zone are excepted from the requirements of the Ocean Plan."

The third sentence of Finding 15 of the Permit should be deleted as it is unclear and misleading. Sentences 1 and 2 should be combined to read:

> "In 1979, the San Francisco Bay Regional Water Quality Control Board "Board" issue Order No. 79-12 (See Attachment I) and the State Water Resources Control Board "State Board" issued Order 79-16 (See Attachment H) for the wet weather facilities; State Board Order No. 79-16 and Regional Board Order No. 79-12 found that a long term average of 8 overflows per year would provide adequate overall protection of beneficial uses."

The following sentence should be added just prior to the last sentence in paragraph 1 of Finding 15:

> "The State Board Order No. 79-16 defined an overflow...from the combined sewer collection system. When an overflow occurs, there may be discharges from multiple structures simultaneously. To be considered a discrete overflow event, ..."

b) The reference to State Board Order No. 79-16 in Finding 30 of the Tentative Order, Applicable Water Quality Objectives – State Waters implies that Order No. 79-16 granted an exception to only bacterial water contact and shellfish harvesting standards in the California Ocean Plan to shoreline CSOs. State Board Order No. 79-16 in fact granted an exception to standards contained in Chapters II through V of the California Ocean Plan to the City's CSO discharges. The Order states under "Section III. Exception Subject to Conditions: Subject to the following conditions, this Order excepts the proposed by-passes from the terms of the Ocean Plan." The conditions include performance of a self-monitoring plan; posting of beaches following a CSO event; warning signs where shellfish may be harvested following a CSO event; to the greatest extent practical, design, construction and operation of facilities that conform with standards in Chapters II and III of the Ocean Plan; containment of all storm water excepting an average of eight overflows per year; implementation of a pretreatment and pollution prevention program. The City has complied with all conditions of the exception order.

Issue 2: COMBINED SEWER OVERFLOW POLICY
<u>Post Construction Monitoring Program</u>

The last sentence in Finding 20 of the Tentative Order requires the Discharger "to continue the implementation of the nine minimum controls, properly operate and maintain the completed CSO controls in accordance with the operational plan, and implement the post-construction monitoring program." The City completed construction of CSO controls in January 1997 and to date has completed six years of post-construction monitoring. The last phrase of this sentence should be changed to read: "...to continue the implementation of the nine minimum controls, properly operate and maintain the completed CSO controls in accordance with the operational plan, and <u>continue to</u> implement the post-construction monitoring program, <u>*e.g.*, CSO monitoring</u>.

Issue 3: DISCHARGE PROHIBITIONS
<u>Definition of Nuisance Conditions – Tentative Order, Section A. Discharge Prohibition 7</u>

This prohibition states that "The discharge of waste shall not create a condition of pollution or nuisance as defined in the California Water Code." The City requests that this prohibition be limited to dry weather conditions. Combined sewer overflow discharges during wet weather periods may be perceived by the general public as the creation of nuisance conditions. Such discharges are a result of the system capacity exceeded by the volume of storm water flow. The City has no control over the volume of storm water that enters the system and has already implemented engineering strategies that comply with the Federal CSO Policy to control the release of floatable materials during a CSO event, *e.g.*, baffles.

Issue 4: SPECIAL STUDIES - SOFT
<u>Tentative Order, Screening of Feasible Technologies (SOFT) Report, Section F. Provision 3.b.</u>

There is no legally justifiable basis for requiring the City to address the SOFT report under the Oceanside NPDES Permit process. As written, this provision requires the City to develop a new master plan that incorporates priorities determined by the input of "interested stakeholders", regardless of their expertise on the issues. The City is responsible to all citizens of San Francisco, whether or not they consider themselves interested stakeholders. Because the City is in the process of developing a comprehensive wastewater master plan, any reference to this program should ensure that no single entity is the controlling factor in the outcome. The following language can be used to replace Provision 3.b.

> "The Discharger is currently in the process of developing a new comprehensive wastewater master plan. The "Screening of Feasible Technologies" (SOFT), 2000 draft report should be finalized for use in the master plan process. The Discharger is encouraged to continue to work with interested stakeholders in the development of the master plan."

Fact Sheet, Section IV, Reassessment of Treated Overflows, 2nd paragraph (page 12 of 33), reference to SOFT report

The last sentence of the paragraph integrates the SOFT report into the City's pollution prevention program, which is incorrect. The sentence should read:

> "The City is currently initiating the development of a comprehensive wastewater master plan, and within that process will continue to evaluate the feasibility of implementing such options as those described in the SOFT report."

Issue 5: Tentative Order, Update Website Address

The San Francisco PUC website has been updated with a direct link to the shoreline bacteria page, Beaches and Bay Water Quality. Change the website address (http://www.sfwater.org) in the very last line of Section F. Provisions, Item 4. CSO Requirements, h. Notify the Public of Overflows to http://beaches.sfwater.org. (Note there is no www. included in this address.)

Issue 6: Tentative Order, CSO Study Section F.4.i.

Some of the language in this section is unclear. The City understands that one of the purposes of the CSO study is to evaluate historical CSO monitoring data as well as CSO monitoring data collected under this permit cycle to establish trends and better characterize CSO discharges, as discussed in Task B, items 1 and 2. The action discussed in Task B, item 3 is written circuitously and should be deleted after the parenthetical.

An additional component to the CSO study is to include monitoring to address recreational use observations. The second sentence in Task A is unnecessarily prescriptive and indicates that recreational use monitoring "will serve to track changes in uses over time". The general patterns of recreational use or changes in the general patterns of recreational use over time do not provide pertinent information on CSO impacts and should not be included as a task of this permit. Recreational use observations during or following a CSO event will provide information on the number of recreational users exposed to CSO discharges. The second sentence should be written:

> "The study shall propose monitoring, including follow-up monitoring to the Recreational Use Survey, to aid in the evaluation of CSO controls."

Issue 7: Document Clarifications

1) Tentative Order, Provision 7.c. – Ongoing Programs, Pretreatment Program: Change Attachment F to Attachment E, Appendix A.
2) Fact Sheet, Section III (page 5 of 33), paragraph 1, last sentence: For clarification, add "and discharged directly to the SWOO" after the word 'periods'

– "Flows receiving less than secondary treatment during wet weather periods and discharged directly to the SWOO are considered CSOs, but are not…"

3) Fact Sheet (page 15 of 33), Table 4, 2000: Delete bullet #4 "Permanent program for curbside pickup of used motor oil and latex paint." This item was incorrectly added to the year 2000 and is already correctly listed under the year 2001.

Other

Issue 1: Biosolid Management Practices – Tentative Order, Section E, Item 1.

The City currently re-uses all biosolids generated from the Oceanside wastewater treatment plant. Although the difference in definition between dispose and re-use may be subtle, that difference is important and distinct, and the City should be recognized for participating in a program that encourages recycling and re-use. The first sentence of Item 1, page 28 of 39 should be changed to read:

> "The Discharger presently re-uses all stabilized, dewatered sewage sludge (biosolids) from the Discharger's wastewater treatment plant beneficially at permitted sites."

Issue 2: Section F. Provisions. 10. Operation Plan Submittal

The Tentative Order currently reads on page 37 of 39:

> "The Discharger shall submit the Operation Plan by July 1, 2003, for approval by the Executive Officer."

Since the new Oceanside NPDES Permit will not be adopted until sometime after July 1, 2003, the designated date is incorrect. The Oceanside wastewater treatment plant Operations staff is currently using an approved Operations Plan that was submitted to the Board during the permit re-issuance process. Changes to the existing Operations Plan are submitted to the Board and Executive Officer at the time they are implemented. A complete Operations Plan is submitted prior to permit renewal for evaluation for the next permit cycle. In following with that process, this section should indicate the Operation Plan should be submitted by July 1, 2007, one year prior to permit expiration (assuming approval in July 2003).

Issue 3: Document Clarifications

1) Fact Sheet, List of Tables: Table 4 should be listed as "Pollution Prevention Program Highlights"; Table 5 is Effluent Quality. The Page Numbers for the Tables are as follows: Table 1 – Page 7; Table 2 – Page 8; Table 3 – Page 11; Table 4 – Page 13; Table 5 – Page 20.

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Comments on Dilution Modeling for the San Francisco Southwest Ocean Outfall

Prepared for:

City and County of San Francisco

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1. Introduction

Dilutions for the San Francisco Southwest Ocean Outfall have recently been computed by mathematical models in support of the NPDES permit application. The computed dilutions are considerably higher than used in previous permits. The purpose of this report is to comment on the predictions and methods and procedures used in *Dilution Modeling for the San Francisco Southwest Ocean Outfall,* June 5, 2003, subsequently referred to as DM.

The outfall is governed by federal water quality regulations as set forth in *Ocean Discharge Criteria at 40 CFR 125.121(c).* These regulations specify a mixing zone, which is a limited area where initial dilution takes place and where numeric water quality criteria can be exceeded but acutely toxic conditions are prevented. The dilution factor must be met at the edge of the mixing zone, and depends on the dimensions of the mixing zone. The *Ocean Discharge Criteria at 40 CFR 125.121(c).*defines the mixing zone for federal waters as:

> The zone extending from the sea's surface to seabed and extending laterally to a distance of 100 meters in all directions from the discharge point(s) or to the boundary of the zone of initial dilution as calculated by a plume model approved by the director, whichever is greater…

It is assumed that the Criteria Continuous Concentration (CCC) water quality criteria are appropriate to protect the ecosystem from chronic effects and also to protect human health. Protection from chronic effects implies protection from average concentration levels of toxic materials, as opposed to transient levels, which may be much higher.

The federal regulations do not specify how the dilution calculations are to be done, so considerable judgment is necessary to decide which oceanographic conditions, density stratification, flow rates, and averaging times are used. It also does not define how dilution is defined. Finally, different mathematical models produce different results for similar input conditions.

Therefore, the major issues are how the regulations are interpreted, and the appropriateness of the mathematical models used. These issues are discussed below.

2. Previous Work

In the previous NPDES permit, in 1990, the dilution factor was computed to be 76:1. This is a flux-averaged value based on simulations with the mathematical model UDKHDEN assuming zero current speed, a worst-case density profile, a flow of 25.6 mgd, and that only 12 risers were functioning. This value is lower even than predictions by the model ULINE, which is usually conservative. Since 1990 considerable advances have been made in understanding the mixing and dynamics of buoyant outfall plumes, and these earlier predictions are now archaic. In particular, considerable mixing and dilution occurs in the spreading layer after the plume reaches its terminal rise height. This mixing is not included in UDKHDEN (nor in the UM3 module of *Visual Plumes* used in DM), resulting in considerable underestimation of dilution, particularly at low current speeds. The mixing in the spreading layer is included in ULINE, although this model has now been superseded by RSB (which was also used in DM).

There is other work available that would make the dilution calculations more credible, particularly the discussion of the dye tests and physical modeling of the outfall (Roberts and Wilson, 1990). Dilutions measured in the field dye study ranged from 182 to greater than 1000:1. In addition, physical modeling of the plumes was done in a large stratified towing tank to provide additional insight into the mixing processes. These tests were done as part of the physical modeling for the design of the Boston outfall. Recent field measurements on the Boston outfall (Roberts, et al., 2002) have provided strong confirmation of the validity of this physical modeling. The physical model study for the San Francisco outfall showed dilution increasing from about 200 to 985 as the current speed increased from zero to 25 cm/s. The dilution at 15 cm/s (the assumed speed for dilution calculations in DM) was 625. Good predictions of the dilutions were given by RSB.

Clearly, the dilution value of 76:1 used in the previous permit is unrealistically low. As pointed out in DM, the dilution depends strongly on current speed and stratification. Computation of a more realistic value depends on how the regulations are interpreted.

In DM, it was assumed that the average current speed can be used to compute dilution. The currents in the vicinity of the diffuser are strongly tidal. A typical frequency distribution of current speeds, obtained from a moored current meter in May 1987 is given in Table 1. The median speed is close to the average speed of 15 cm/s assumed in DM.

Table 1. Frequency Distribution of Currents Near Diffuser

Percentile	Speed (cm/s)
10	4.8
25	9.8
50	17.2
75	28.2
90	38.3

Some simulations were made using the model RSB. The effect of current speed on dilution is shown in Table 2. Conditions are similar to those assumed in DM, i.e. flow is 18 mgd, 12 risers operating. The worst-case density stratification profile (21 January 1976) was used. The dilution and the length of the near field increases considerably with current speed.

Table 2. Effect of Current Speed.

Current speed (cm/s)	Near-field dilution	Length of near field (m)
0.0	129	9.5
4.8	142	21.2
15.0	402	87.8

The use of the average current speed in computing dilution does not appear to be justified. On p. 12 of DM it is stated that:

> However, the current is never actually zero when it is slowest. Instead it moves in elliptical wave motion, so the average current of 15 cm/s is more realistic and also more appropriate for assessing chronic and long-term exposure.

While it is probably true that the current is never actually zero, the statement about waves is irrelevant as they are unrelated to currents. This does not justify use of the average speed. Also, the dilution averaged over all possible current speeds is not the same as the dilution computed at the average current speed. If the intent is to compute average concentrations of toxics, use of the *harmonic* dilution average would be more appropriate, i.e.

$$\bar{S} = \frac{1}{\frac{1}{n}\sum_{i=1}^{n}\frac{1}{S}} \qquad (1)$$

where S is the dilution at current speed u_n. Another possibility is to use dilution calculated at the 10-percentile current speed, as this value is allowed in the 301(h) regulations.

The flux-average dilution is used in DM. This apparently follows from the wording in the California Ocean Plan which specifies "...the lowest average initial dilution..." which is usually assumed to be a flux-averaged value. The flux average is difficult to measure in the field or laboratory, however, and the value computed in mathematical models such as UM3' depends on the assumptions made on the shapes of the velocity and concentration profiles. A more defensible and measurable value is the minimum dilution (similar to centerline dilution). The earlier models discussed above were conservative in not including additional mixing, and the minimum dilution predicted with newer models is often close to the flux-average dilution predicted with older models.

The regulations and DM also refer to a *Zone of Initial Dilution*. This is defined as the region where dilution is due to combined affects of the discharge buoyancy and momentum. Better terminology is to call this the near field. This is the region where dilution is due to turbulence and other processes associated with the discharge, as opposed to the far field where dilution is due to ambient (oceanic) turbulence. The near field is also sometimes called the hydrodynamic mixing zone, as opposed to a regulatory mixing zone. The near field is exactly the output that is given by RSB.

CONCLUSIONS AND RECOMMENDATIONS

The value of 76:1 used in the previous NPDES permit in 1990 is clearly unrealistically low. Which value to replace this with, however, depends on how the permit requirements are interpreted. It is essential that the final numbers be technically defensible with the assumptions clearly stated. The federal regulations allow sufficient flexibility in interpretation that a good case can be made for a higher dilution value. In particular:

- There does not seem to be any justification for using the average current speed to determine dilution;
- Use of the "worst-case" density profile is overly restrictive and gives an overly pessimistic prediction of dilution under typical conditions;
- A better approach would be to run the dilution model with time series of measured currents and stratifications to get good statistical pictures of dilution at the 100 m distance (Roberts, 1999). Then compute (harmonic) average dilutions and use the lowest value at the 100 m boundary as "the" dilution value;
- I would recommend using minimum dilution values rather than flux-average. Minimum dilutions are more easily measured in the laboratory and field and therefor ultimately more defensible;
- If the differences between the predictions of the various mathematical models becomes an important issue and better dilution predictions are required, physical modeling using modern methods with Laser-Induced Fluorescence could be used (Roberts, et al., 2002).

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Dilution Modeling for the San Francisco Southwest Ocean Outfall

Submitted by

City and County of San Francisco
Public Utilities Commission
Planning Bureau

Submitted to

U.S. Environmental Protection Agency
San Francisco

San Francisco Bay Regional Water Quality Control Board
Oakland

June 5, 2003

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Dilution Modeling for the San Francisco Southwest Ocean Outfall

City and County of San Francisco
June 5, 2003

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Dilution Modeling for the San Francisco Southwest Ocean Outfall

Summary

This report provides the results of the modeling program *Visual Plumes* used to determine the dilution characteristics of wastewater discharged through the Southwest Ocean Outfall (SWOO). The purpose is to identify a dilution factor to be used in the NPDES permit that regulates this discharge (NPDES No. CA 0037681). In federal waters, the regulatory dilution factor is defined as the dilution at the edge of a mixing zone extending laterally to a distance of 100 meters in all directions from the discharge point or the modeled zone of initial dilution, whichever is greater (see *40 CFR 125.121(c)*).

This effort uses an EPA program named *Visual Plumes*[1], specifically the *UM3* model within the program. Input to the model includes outfall and receiving water data. Although 21 risers are open on SWOO, visual inspection during dry weather indicates that only 12 are discharging effluent. Using the *UM3* model and average flow, the estimated dilution factors depending on various assumptions are the following:

Number of risers:	*12*	*21*
Option A – single port	**465:1**	**741:1**
Option B – double port	**870:1**	**896:1**

SWOO risers each have eight separate ports; however, the model can only address a single port per riser. Therefore, two simplified alternatives were modeled. Option A assumes a single theoretical port with a cross-sectional area adjusted to be the equivalent of the eight actual ports. Option B assumes two separated risers (in place of a single riser) spaced equidistant, each with one theoretical port equivalent to 4 actual ports. Both of these options likely underestimate the actual dilution provided by the eight separate ports per riser.

The discharge was also modeled using EPA's *NRField* model,[2] which yielded similar results.

We propose the factor of **465:1** [12 ports, option A] for regulatory purposes in assessing compliance with effluent limits and in completing the Reasonable Potential Analysis. In particular, the results will be used to evaluate compliance with the human health criteria which are based on long-term exposure, and therefore average discharge conditions. This factor would also be appropriate for evaluation of the criteria established for the protection from chronic effects. A separate factor, not addressed in this modeling effort, may be necessary for the evaluation of acute criteria.

The dilution factors calculated during this modeling effort appear to be similar or possibly conservative when compared with the actual dilution measured during a dye study. The measured

1 EPA's Visual Plumes, Experimental PVD Version by Walter Frick, Philip Roberts, Lorin Davis, Donald Baumgarter, Jennifer Keyes, and Kenwyn George.

2 *NRField* model is based on RSB and is contained within Visual Plumes.

dilution, averaged across all of the stations in the 100 m radius and not including non-detects, was 694:1.

The following material describes in more detail the assumptions used in the modeling and related issues. *Attachment A – Model Results for Other Outfalls,* includes information on models completed for other large scale marine wastewater discharges in California and elsewhere.

Background

Southwest Ocean Outfall - The Southwest Ocean Outfall (SWOO) is 4.5 miles long. It carries the treated wastewater out to a diffuser system beginning approximately 3.75 miles from shore and at a depth of 78 feet (23.77 m). (See Figure 8 , page 16.) The end of the outfall consists of a diffuser section approximately 965 meters in length, with varying diameter (3.65, 3.05, 2.44m), with risers located every 11 meters. Twenty-one out of 85 risers are currently in operation to maintain port velocity because the present peak wet-weather flow through the outfall is only 38% of capacity[3]. Every other riser located along the outer 439 meters of the diffuser section is active. Each riser is constructed with eight discharge ports of diameter 0.1095 meters.[4]

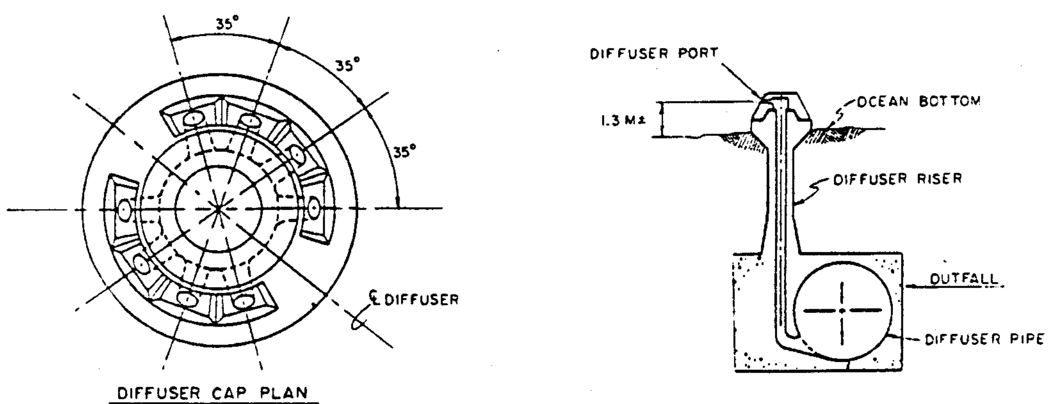

Figure 1 - Design drawing of outfall riser and diffuser port

San Francisco completed construction of the SWOO in 1986 and began discharging Richmond-Sunset plant effluent to federal waters via the new outfall in September 1986. After completion of the Oceanside Water Pollution Control Plant (WPCP) in 1993, the Richmond-Sunset plant was abandoned and eventually razed. The flow through the SWOO varies from the dry weather average of 18 MGD to a maximum wet weather rate of approximately 120 MGD[5].

The discharge location is in federal waters since it is beyond the three-mile limit of the state's territorial sea.

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3 Assuming maximum wet weather flow of 175 MGD and capacity of 465 MGD. The average dry weather flow is 18 MGD (4% of capacity).

4 The diffuser port dimensions are 3.60", 3.82", 4.04" and 4.31" for diffuser riser numbers D1-D15, D16-D28, D29-D50, and D51-D85, respectively. The odd number risers from D45 to D81 are open. For practical purposes, we can use 4.31" which is 0.1095 meter.

5 The maximum design capacity of the SWOO is approximately 465 MGD (or less depending on tide elevation). It was designed with this overall capacity to accept all dry and wet weather flows from the entire city.

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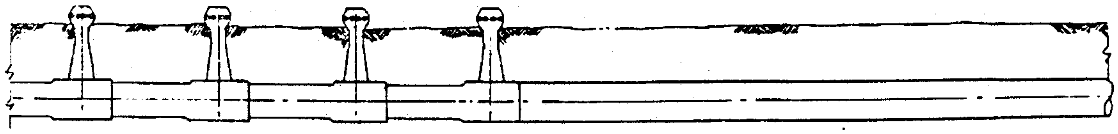

Figure 2 - Outfall schematic

Regulatory Mixing Zone for the SWOO Discharge

A *mixing zone* is a limited area where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but acutely toxic conditions are prevented. A *regulatory mixing zone* is the specific mixing zone identified in state water quality standards or, in this case, by federal regulations. The dilution factor is dependent on the characteristics of the mixing zone.

The *Ocean Discharge Criteria* at *40 CFR 125.121(c)*[6] define a mixing zone for discharges to federal waters:

> The zone extending from the sea's surface to seabed and extending laterally to a distance of 100 meters in all directions from the discharge point(s) or to the boundary of the zone of initial dilution as calculated by a plume model approved by the director, whichever is greater...

For this effort, we determined the dilution levels at the edge of the Zone of Initial Dilution (ZID) and at the edge of the mixing zone, set at 100m.

If the ZID is determined by the model to be of a smaller radius than 100m, then the dilution at 100m will be composed of the initial dilution plus some additional "far-field" dilution. Far-field dilution is the mixing that takes place due to currents and wave action after momentum and buoyancy-induced mixing has ceased (neutral buoyancy).

The *Technical Support Document for Water Quality-based Toxics Control*[7] identifies three possible mixing zones and notes that independently established mixing zone specifications may apply to each. The smallest would be the acute mixing zone where the EPA Criteria Maximum Concentration (CMC) would apply at the boundary and the goal is to prevent lethality to passing organisms. A larger zone would apply the Criteria Continuous Concentration (CCC) with the goal of protecting the ecology of the waterbody as a whole. A third zone, using long-term average conditions, would apply to the human health criteria.

For this discharge the federal regulations only specify the 100m mixing zone (or greater if based on model). We have assumed that the dilution factor at 100 m would be applied to both the chronic (CCC[8]) and human health criteria. This follows EPA Region IX's approach in the draft permit for the Offshore Oil Platforms. For the SWOO discharge, the plume attains its maximum initial dilution within a few minutes and acute toxicity to passing organisms appears to not be an issue.

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6 Posted at http://www.epa.gov/owow/oceans/regulatory/criteriasubptm.html

7 EPA/505/2-90-001, March 1991.

8 Criterion Continuous Concentration (CCC) – Protective of chronic effects.

Mixing Zones Used for Other Discharges
Discharges into state ocean waters in California are governed by the provisions of the California Ocean Plan (COP). This plan specifies that the mixing zone is defined by the area of initial mixing and also assumes no current. For some California discharges into federal waters, the permitting agencies (EPA and the local Regional Board), have applied the COP mixing zone because these discharges operate with 301(h) waivers from the secondary treatment requirements of the Clean Water Act.[9]

Zone of Initial Dilution
The Zone of Initial Dilution is that area of a plume where dilution is achieved due to the combined effects of the effluent's momentum and buoyancy. The momentum is the result of the pressure in the outfall pipe and the shape of the port orifice. The buoyancy results from the temperature and density differential. The effluent is warmer than seawater and is essentially freshwater and therefore more buoyant than seawater. The ZID is defined differently for purposes of permits issued under section 301(h) of the Clean Water Act. Section 301(h) allows waivers from the standard requirement to provide secondary-level treatment for wastewater discharged from publicly owned treatment works (POTWs). For discharges with 301(h) waivers, the ZID is defined as a lateral distance around the outfall equal in length to the depth of the outfall.[10]

The Oceanside WPCP provides secondary treatment and the SWOO discharge does not operate under a 301(h) variance. For this reason, the ZID for SWOO is defined by the limits of the initial mixing induced by buoyancy and momentum. In our case, it will be defined by the distance from the diffuser at which the plume surfaces or ceases upward movement.

Other Regulatory Issues
Virtually all of San Francisco is served by a combined sewer system. To regulate the treatment plant's operation during wet weather, the NPDES discharge permit applies requirements from EPA's *Combined Sewer Overflow Control Policy*. One goal of the policy is to the maximum possible amount of this flow is directed to the treatment plant. Consequently, numerical effluent limits do not apply during wet weather, so this modeling effort uses dry weather average flows.

Model Assumptions

The following material describes the model that was used to determine the dilution factors and the assumptions that were used in the model. The model is used to determine both the zone of initial dilution (ZID), which is defined as the limit of dilution resulting from momentum and buoyancy, and the dilution expected at the 100m radius around the diffuser.

The Discussion makes reference to the document *Wastefield Transport and Bacteriological Compliance Studies of the San Francisco Ocean Outfall*, CH2M-Hill (1989). These references are identified in parentheses.

Selected Model
In order to predict the various levels of dilution of effluent released by the San Francisco Southwest Ocean Outfall, we used the Windows-based program *Visual Plumes*, Version 1.0,

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9 In order to receive a 301(h) waiver, the discharge must have applicable water quality standards and therefore the state standards have been "extended" into federal waters for these discharges since no federal standards have been promulgated for these waters.

10 See the EPA Office of Water *Amended Section 301(h) Technical Support Document*, III.A.2., http://www.epa.gov/OWOW/oceans/regs/sec301tech/3a.html

released in August 2001.[11] Within this program, we used the *UM3* model that is capable of modeling single as well as multiport systems. As a check on the *UM3* results, we also modeled the discharge using EPA's *NRField* model (also part of VP).

Outfall characteristics
The SWOO diffuser has 85 risers spaced at 10.97m intervals, but 64 of them have been capped leaving every other riser of the last 41 risers open (*Wastefield* 1-22). However, during dry weather, inspections indicate that only 12 of the risers are operational, the first 11 and the last one in the series (*Wastefield* 5-10). The depth of the ocean floor at the diffuser section is 23.77m (*Wastefield* 1-22). The eight ports on each riser have a diameter 0.1095 meters.

Diffuser Conditions
The port elevation is 1.3m (*Wastefield* 1-21). The ports are set at a vertical angle of 0° from the *x*-axis while we will set the horizontal angle or the direction in which it is pointing to 90°, which in *Visual Plumes*, indicates north (*Wastefield* 5-13) for the purposes of our modeling. In an effort to simplify the problem for modeling, we will assume that the 12 functioning risers are all equally spaced in a horizontal line 21.95 m apart. This will result in slightly lower dilution results than are actually present, and so the model is conservative.

Port Modeling Options
Each of the risers contains eight ports oriented around the risers in a circular fashion (see diagram on page 2). The *Wastefield Transport* report identifies four alternative options for modeling the diffuser section. However, we will only make use of two of them. In both our cases, we underestimate the total dilution factor:

Option A: We assume that all eight ports on each riser behave as one large port: 12 single ports spaced 21.95 m apart. In an effort to conserve the area of the ports, we multiply the original port diameter (0.1095 m) by a factor of 2.828 = sq rt 8. We then set the combined port diameter to 0.3097m (*Wastefield* 5-15).[12]

Option B: We divide the eight ports into groups of four (acting as a single port) that are oriented in opposite directions, and imagine that each set of four consolidated ports is on a separate riser. In this case, we would have 24 ports (rather than 12), spaced 10.98m apart with a port diameter of 0.219m (*Wastefield* 5-19).

Effluent Conditions

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11 This can be found on the EPA's website at: http://www.epa.gov/ceampubl/swater/vpulme/

12 *Wastefield* does not elaborate on how the equivalent port diameter was obtained. However, if we set the port areas equal and solve, we arrive at the following manner for determining combined port size that agrees with the *Wastefield* figures.

D_a = actual port diameter D_{eq} = combined port diameter P = # of ports combined
Area of actual ports = $\pi(D_a/2)^2$ Area of combined port = $\pi(D_{eq}/2)^2$
Therefore we set $P\pi(D_a/2)^2 = \pi(D_{eq}/2)^2 \Rightarrow PD_a^2 = D_{eq}^2 \Rightarrow D_{eq} = P^{1/2} D_a$

Therefore, we have $Diameter_{equiv} = Diameter_{actual} \times \#Ports^{1/2}$

Dave Jones (Technical Memo, 4/13/90) presents the equation as $Diameter_{equiv} = Diameter_{actual} \times \#Ports^{0.4}$. This approach decreases the combined port diameter, but increases the port velocity. The increase in port velocity causes the plume to surface further away with a somewhat higher dilution level, but at any given distance from the diffuser before the plume surfaces, offers a lower dilution level than an exponent of ½.

The depth of the ports is 22.80m (taking into account the height of the riser - *Wastefield Table* 5-3). We will also assume an average dry weather flow of 18 MGD.[13]

The effluent prior to discharge has a salinity of 0.2 ppt and an average temperature of 15°C (*Wastefield* Table 5-3). Since we are calculating the dilution of the effluent, we will set the pre-discharge effluent concentration at 100%.

Ambient (Receiving Water) Conditions.
The ambient conditions around the diffuser vary by tide and season.

Current: The ambient conditions around the diffuser vary depending on tide and season. Although the current speed can reach up to 40 cm/s in either direction, the average current speed is 15 cm/s perpendicular to the diffuser (*Wastefield* 1-13). The current direction will be 90° degrees, the program's method of indicating north. This is a more conservative estimate than south because we have oriented the port north as well (Option A) due to the simplicity of the model, although it technically points in eight different directions.

Salinity, Temperature, and Density Profile: Based on charts of the salinity during September and May (*Wastefield* figures 4-22, 23) the approximate salinity appears to be 32.5 ppt while ranging from 31.5 to 33.5 ppt. In addition, the approximate temperature of the seawater is 12° C (*Wastefield* figures 4-22, 23). We will also run this model in a linear mode since the ambient conditions are not near freezing nor exceptionally briny (*Visual Plumes Help Draft 2001*, pg 46). The model uses this information to calculate the density profile which should represent average conditions. This is appropriate since we are primarily interested in obtaining an average/long-term dilution factor for use with the human health criteria.

Other input: The background concentration and pollutant decay rate will be set at zero. The background concentration is not zero for a few constituents; however, the background value is taken into account in the equations used to calculate effluent limits or Reasonable Potential.

We will also take the Far-Field current speed and direction to be the same as the Near-Field current speed and direction.

We also use a conservative *Far-Field diffusion coefficient* as recommended by *Visual Plumes* of $0.0003m^{0.67}/s^2$ (*Visual Plumes Help Draft*, 2001, pg 39). (The Offshore Oil Permit No.CAG280000 requires $0.000462m^{0.67}/s^2$ although this difference is too small to significantly alter the calculated dilution factor.) The *Measurement* depths are set to 0m and 25m, a distance greater than the surface, which *Plumes* uses to extrapolate for every depth although the exact number is not very relevant.

Table 1: *Visual Plume* Modeling Input for San Francisco Ocean Outfall

Diffuser Inputs	***Port Diameter***	***Port Elevation***	***Vertical angle***	***Horizont. angle***	***Number of Ports***	***Port spacing***	
	0.3097 m	1.3 m	0°	90°	12	21.95 m	
Flow and Mixing Zone Inputs	***Acute mix zone***	***Chronic mix zone***	***Port depth***	***Effluent flow***	***Effluent salinity***	***Effluent temp***	***Effluent conc.***
	25 m (arbitrary)	100 m	22.80 m	18 MGD	0.2 psu	15°C	100%

13 Average quarterly flow was specified by EPA for the draft NPDES Permit No. CAG280000 for offshore oil platforms in federal waters.

Ambient Inputs	Near-Field current speed	Near-Field current direction	Ambient salinity	Ambient tempera-ture	Back-ground concentrat.	Pollut. decay rate	Far-field diffusion coeff.
	15 cm/s	90°	32.5 psu	12°C	0	0	0.0003

Special Settings
The Far-Field increment was set to 20m to ensure detailed output. This setting does not affect the dilution results, just the presentation. The contraction coefficient was set at 1.0, which is the default value for ports that narrow in the direction of the water flow, although a commonly accepted value of 0.61 for simple cylindrical holes in a pipe does not significantly change the results.

Effect of the Assumptions
The variety of assumptions that we have made are designed to result in conservative estimates of the average effluent dilution. The first key assumption was to imagine the ports are pointed with the flow of the current instead of against, the latter of which would increase mixing. Secondly, and perhaps more significant, we have tried to model the multiport risers as single ports in order to use *Visual Plumes*. The parameters in *Options A* and *B* are chosen to be as accurate as possible without overestimating the resulting mixing.

In addition, using the average current speed is a significant assumption. Using a lower speed means a much smaller zone of initial dilution because the plume surfaces much closer to the diffuser, while a greater speed results in significantly higher values for both since the plume surfaces much further away. Nonetheless, we presume that all of our assumptions together err on the side of caution and somewhat underestimate the actual average dilution levels.

Model Results and Dilution Graphs

After running the *Visual Plumes* model *UM3* it was determined that if we model the discharge of 18 MGD through 12 risers under *Option A*, the dilution at the edge of the ZID will be 464:1, while the dilution at 100m will be 465:1. The plumes will not merge, but reach a diameter of 15.2 m at the edge of the ZID. If we use the second *Option B*, the dilution at the edge of the ZID will be 869:1 while the dilution at 100m will be 870:1 and the plumes do merge with a diameter at the edge of the ZID of 16.8 m. Using the *NRField* model, similar results were found. The *NRField* model predicts a dilution of 497: 1 and 543:1 for *Options A* and *B* respectively at 100m.

Now if we were to assume that all 21 of the risers were functioning then with *Option A*, we have 21 ports with diameter 0.3097m, spaced 10.97 m apart, which results in a ZID dilution of 740:1, a 100m dilution of 741:1, and a plume diameter of 16.8 m. *Option B* results in 42 ports of diameter 0.219m separated by 5.49m. This results in a ZID dilution of 895:1, a 100m dilution of 896:1, and a plume diameter of 19.0 m. The plumes merge in both of the modeling options. The *NRField* model predicts a dilution of 452: 1 and 570:1 for *Options A* and *B* respectively at 100m, which is significantly lower.

On the other hand, if we assume a 22MGD effluent flow instead we end up with slightly lower dilution factors. The resulting ZID dilution was 377:1 while the 100m dilution was 378:1 with *Option A*, but 713:1 and 714:1 respectively using modeling *Option B*. And, like our 18 MGD flow, the plumes of diameter 14.9 m from the *Option A* model do not merge while those of diameter 17.1 m from the *Option B* model do. The *NRField* model predicts a dilution of 414: 1 and 452:1 for *Options A* and *B* respectively at 100m, similar to the *UM3* results.

Table 2:

Dilution Summary	18 MGD 12 Risers		18 MGD 21 Risers		22 MGD 12 Risers	
	ZID	***100 m***	***ZID***	***100 m***	***ZID***	***100 m***
Option A	464:1 at 24.15m	465:1	740:1 at 28.19m	741:1	377:1 at 23.3m	378:1
Option B	869:1 at 31.56m	870:1	895:1 at 32.17 m	896:1	713:1 at 29.74 m	714:1

It is important to "note that the far-field algorithm causes very little additional dilution between the end of the initial dilution distance and the 100m mixing zone" – Walter Frick, EPA, (Personal Communication).

The model also provides the time of travel from the point of discharge to the edge of the zone of initial dilution for edge of the 100m mixing zone. Using the *Option A* model (18 MGD of effluent discharged from 12 risers), we have an zone of initial dilution of 24.15 m. The time of travel to the edge of the zone of initial dilution (24.15 m) is two minutes and 40 seconds.

The following graphs show the results of the model for differing assumptions.

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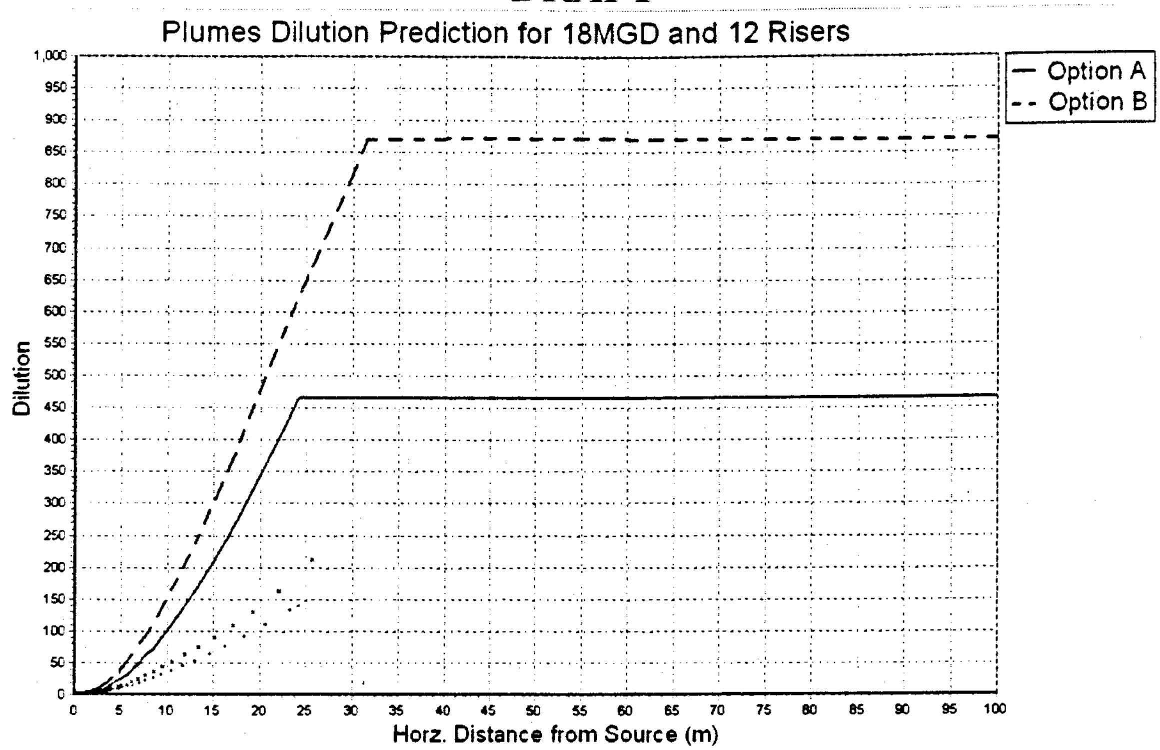

Figure 3: This is a prediction of dilution as a function of distance for 18 MGD effluent flow using *UM3*. *Option A*, combining eight ports per riser into one port resulting in 12 ports, is represented by the red line. *Option B*, combining only four ports together resulting in 24 ports, is represented by the blue dotted line.

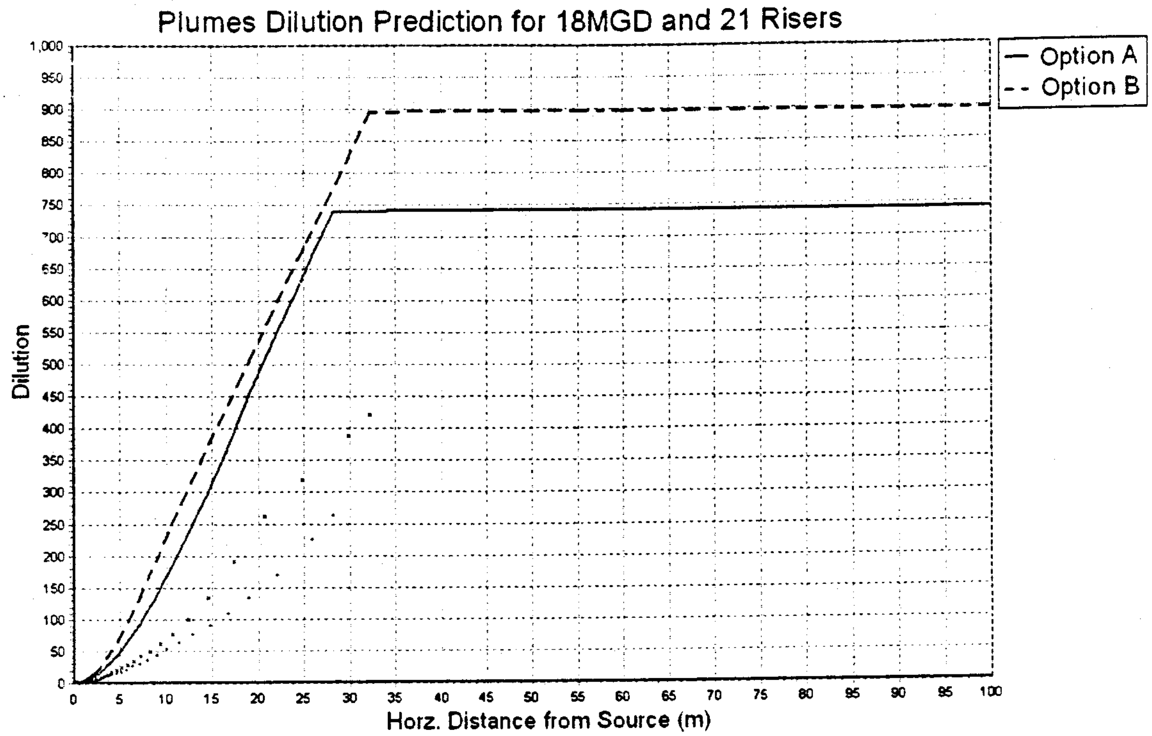

Figure 4: This is a prediction of dilution as a function of distance for 18MGD effluent flow, but with 21 open risers using *UM3*. *Option A*, combining the eight ports per riser into one port resulting in 21 ports, is represented by the red line. *Option B*, combining only four ports together resulting in 42 ports, is represented by the blue dotted line.

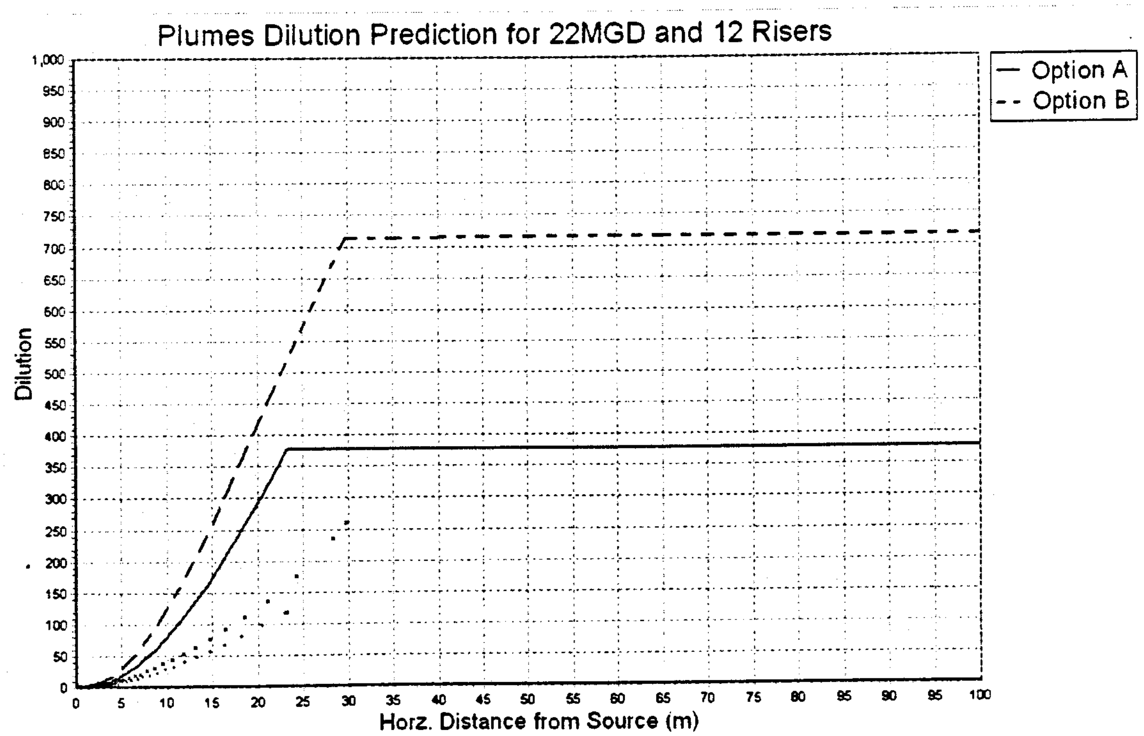

Figure 5: This is a prediction of dilution as a function of distance for 22 MGD effluent flow using *UM3*. *Option A*, combining eight ports per riser into one port resulting in 12 ports, is represented by the red line. *Option B*, combining only four ports together resulting in 24 ports, is represented by the blue dotted line.

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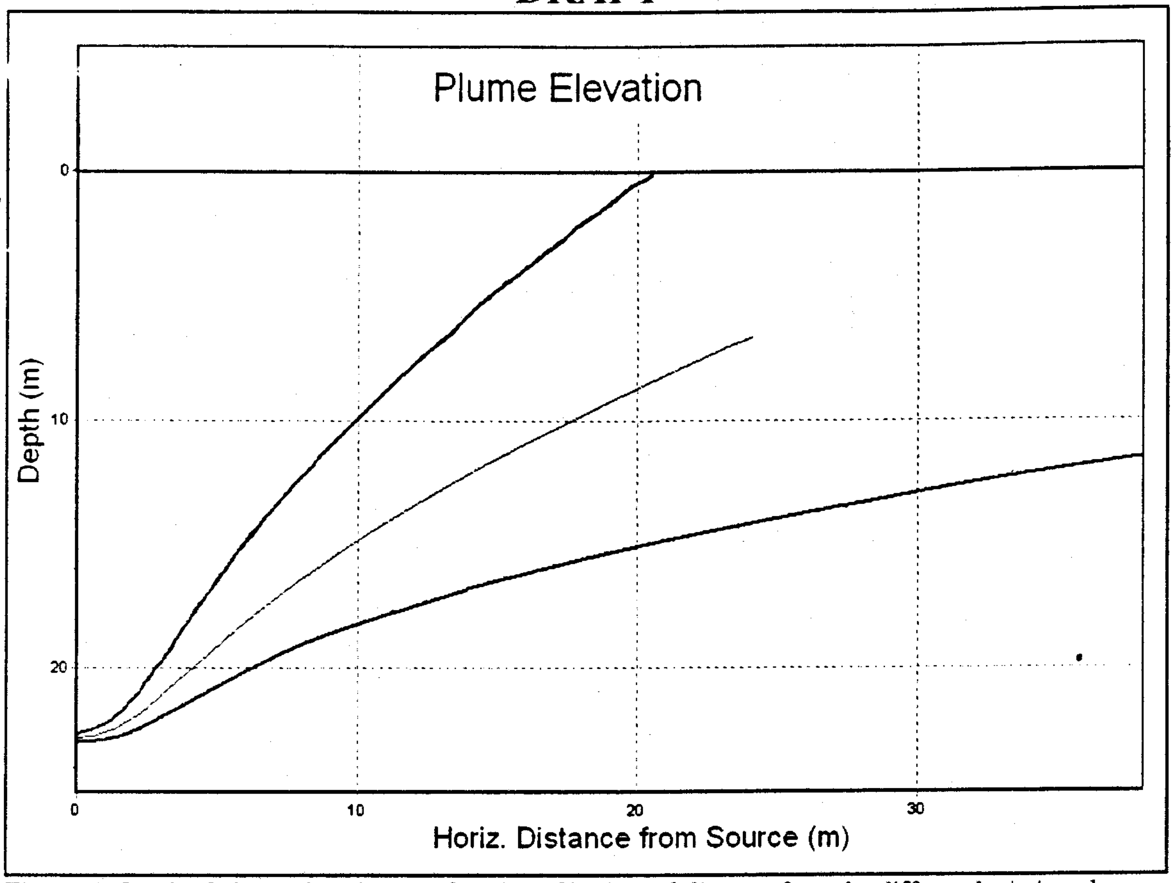

Figure 6: Graph of plume elevation as a function of horizontal distance from the diffuser depicting plume centerline as well as boundaries for an 18 MGD discharge from 12 risers.

Discussion

It would appear that the model results for *Option A* are more reliable and we have greater agreement between the *UM3* and *NRField* for that option as well. Therefore, the ratio of **465:1** for the SWOO average dilution level seems reasonable for use with the human health and chronic criteria.

At first, these dilution levels seem high since other coastal modeling efforts yielded lower estimates. One cause of this difference is the speed of the current. At this location current conditions regularly range from zero to 40 cm/s. If we were to run our models at zero current, then we would get the much lower dilution level of **98:1** assuming 18 MGD flowing through 12 risers. As we would expect, a current of 40 cm/s yields a dilution of **1573:1** since the plume does not surface for 101m. This range corresponds well with the dye studies whose results ranged from 100:1 to undetectable levels in the zone of initial dilution.

It is also important to note that the Southwest Ocean Outfall has a very low average flow of 18 MGD during dry weather, even though it has a 200MGD capacity (465 with all risers open). In comparison, San Diego's Outfall handles 205 MGD and has lower average current speeds. This is somewhat offset by the greater depth of 61-67 m of their diffuser and greater number of ports. These factors in combination result in an initial dilution level of **204:1**[14] (this may be based on a no-current assumption). The Orange County Sanitation District Outfall has similar conditions to San Diego in that it too has a depth of 60 m, a flow rate of 395 MGD, and a greater number of ports.[15] The resulting mean initial dilution is **341:1**, but the range of **119:1** to **2411:1** is similar to San Francisco's current-dependant range. (*Note*: Both San Diego and Orange County received 301(h) waivers from secondary treatment and were therefore required to apply state standards, including the Ocean Plan's no-current assumption for minimum dilution.)

The mixing zone approach assumes that chronic (or long-term criteria) will be attained at the edge of the calculated or measured mixing zone. It is also important that the concentrations *within* the mixing zone not create a condition to toxicity. The EPA's acute criteria (CMC) are based on the assumption of a brief exposure and are higher than the chronic criteria. Working from the *Option A* model (18 MGD of effluent discharged from 12 risers), we have a zone of initial dilution of 24.15 m. Fish will generally avoid the plume because it is freshwater. However, diatoms and other free-floating organisms may become entrained within the plume. Assuming the average current speed of 15 m/s, a marine organism floating in the plume at its greatest length would be in a zone that has less than the regulatory dilution factor (**465:1**) for two minutes and 40 seconds. This is a very brief exposure period.

Comparison with Dye Studies

Dye studies of the effluent conducted in 1988 indicated that the minimum dilution is at least 100:1 and generally exceeds 200:1 within 100m of the diffuser. However, that low value was measured only two meters south of the diffuser at a depth of 16.7 m – clearly very close to the diffuser – and at a relatively slow current speed of 9 m/s. Nevertheless, in many cases researchers were unable to detect any dye above background levels at their stations. According to the *Wastefield* report, dilutions generally ranged from 250 to 500 during the two dye studies

14 Fact Sheet for the NPDES Permit for the E.W. Blom Point Loma Metropolitan Wastewater Treatment Plant Discharge to the Pacific Ocean through the Point Loma Ocean Outfall, San Diego County

15 NPDES Permit Application, Orange County Sanitation District, December 2, 2002, Appendix M – Initial Dilution.

conducted in Oct. '87 and Jun. '88.[16] The minimum dilution measured, averaged across all of the stations in the 100 m radius and not including non-detects, was **694:1**. It is also important to note that these are minimum dilutions, and are therefore conservative. Our modeled dilution levels for *Option A* fit nicely with this range. We also note that emphasis was placed on determining the minimum dilution at each station rather than on average dilution so the dye studies yielded conservative estimates in that regard.[17] It is very difficult to measure the concentration of tracer material over the cross section of the plume since it varies widely.[18]

The following figure summarizes the results of the dye studies for the zone of initial dilution and the 150m zone from the diffuser.

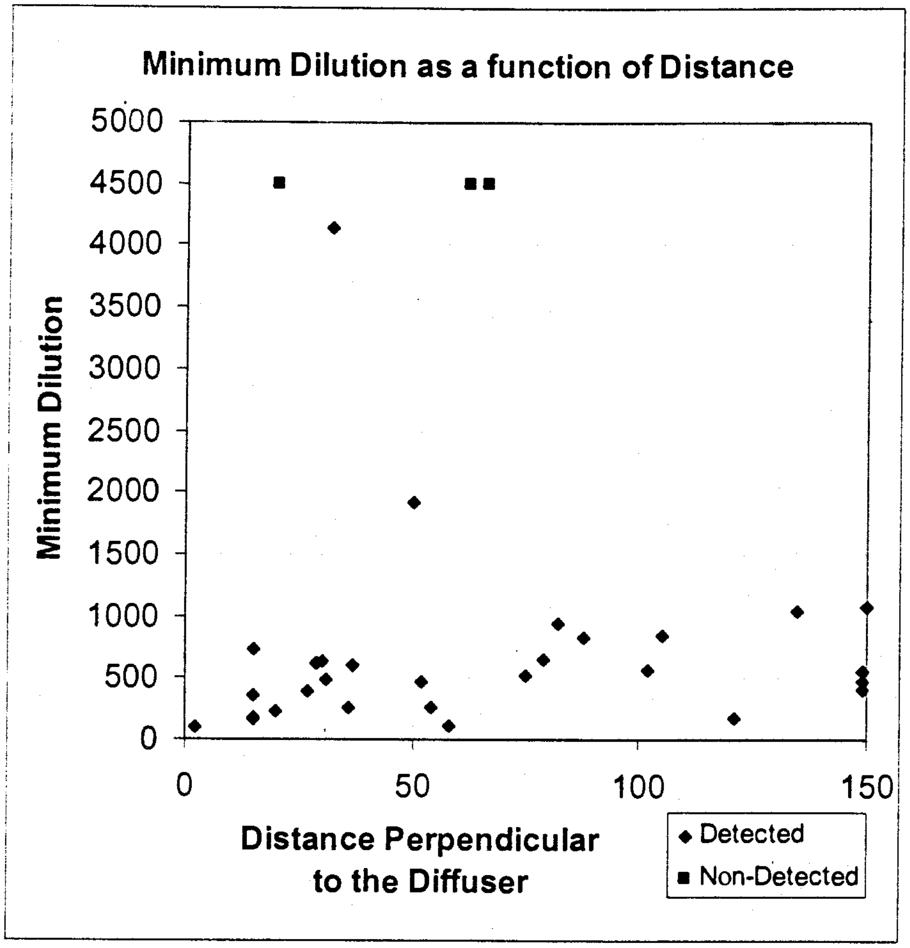

Figure 7: This figure demonstrates the Minimum Dilution as a function of Distance Perpendicular to the Diffuser in both the Oct. 1987 and Jun. 1988. Dye studies in the immediate area of the SWOO.

Previous San Francisco Modeling

In 1990, San Francisco applied the UDKHDEN model to the discharge. Assuming no current, the model result was **76:1** for initial dilution. In addition, the effluent flow level was set at 25.6 MGD instead of 18 MGD. Both of these assumptions have great effect on the resulting dilution

16 *Wastefield* 5-4

17 *Wastefield* 5-37

18 *Wastefield* 5-38

level. Running the *UM3* model from the more recently developed *Visual Plumes* results in a **83:1** dilution at the edge of the zone of initial dilution using these same restrictive assumptions (i.e., 25.6 MGD, no current). This is very close to the **76:1** determined with UDKHDEN. However, the current is never actually zero when it is slowest. Instead it moves in elliptical wave motion, so the average current of 15cm/s is more realistic and also more appropriate for assessing chronic and long-term exposure.

San Francisco originally applied for a 301(h) waiver and therefore may have been using the more restrictive mixing zone assumptions required for 301(h) permits. In addition, the UDKHDEN may have problems addressing buoyancy. EPA noted in the Fact Sheet for the Offshore OCS dischargers:[19]

> The Southern California OCS discharges are mostly buoyant for several reasons. It is a combination of temperature and salinity differences that produce large density differences, or buoyancy. However, the low Froude numbers also reflect discharges that combine large diameter discharge pipes with low flow rates. All these parameters are well-modeled by PLUMES-UM, as has been demonstrated in numerous verification studies. In contrast, some models are unable to predict these discharges for various reasons, including numerical limitations. For example, the UDKHDEN model has a numerical scheme that fails to converge at low Froude numbers. This non-convergence is a mathematical artifact that limits neither nature nor PLUMES-UM. This is an important reason to use PLUMES-UM. Other reasons include a combination of factors such as the depth of the discharges compared to the ocean depth, the complex water temperature stratifications, and a higher level of ambient ocean turbulence.

Orange County Comparison – Dilution factors

As an assessment of whether the effort to model the SWOO discharge is being approached in a similar manner to that used for other coastal dischargers, we modeled the Orange County discharge. This discharge was chosen because a significant portion of the relevant input documentation was readily available.

Table 3: Visual Plume Modeling Input for Orange County

Diffuser Inputs	**Port Diameter**	**Port Elevation**	**Vertical angle**	**Hor angle**	**Num of Ports**	**Port spacing**	
	0.09 m	0.1 m	0°	7 surv-deg	503	3.64 m	
Flow and Mixing Zone Inputs	**Acute mix zone**	**Chronic mix zone**	**Port depth**	**Effluent flow**	**Effluent density**	**Effluent temp.**	**Effluent conc.**
	25 m	100 m	54.6 m	**17.3 m^3/s**	997.2 kg/m^3	26.9°C	100%
Ambient Inputs	**Near-field current speed**	**Near-field current dir.**	**Ambient density**	**Ambient temp.**	**Back-ground concentra-tion**	**Pollutant decay rate**	**Far-field diffusion coeff.**
	7 cm/s	**7°**	1025.8 kg/m^3	**11.3°C**	0	0	**0.0003**

Table 3 Note: The numbers in bold were are unclear from the permit application and had to be estimated

19 Fact Sheet, Page 27, posted at: http://www.epa.gov/region9/water/npdes/factsheet1.pdf

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By reviewing the NPDES Permit Application, Orange County Sanitation District, December 2, 2002. *Appendix M – Initial Dilution*, we were able to collect most of the relevant data to run our own simulation. However, several estimates had to be made. Orange Co. ran *Visual Plumes* for many different conditions of measured flow, current, and temperature. Since those individual measurements were not presented, we could only make estimate the general conditions. After evaluating the figures presented for current speed and averaging the temperatures presented over 12 months we assumed a current speed of 7 cm/s and an ambient temperature of 11.3°C. The Far-Field diffusion coefficient was left the same and the current was set in the same direction as the ports. The effluent flow was set at 17.3 m^3/s although several figures were presented. Using the *RSB* model, we calculated a dilution of **361:1** at 100 m. This is very close to the dilution that Orange Co. arrived at of **341:1**. This difference can be attributed to our rough estimate of the ambient conditions. However, the similarity between the figures indicates that the SWOO dilution levels were calculated in a similar manner to that used by Orange Co.

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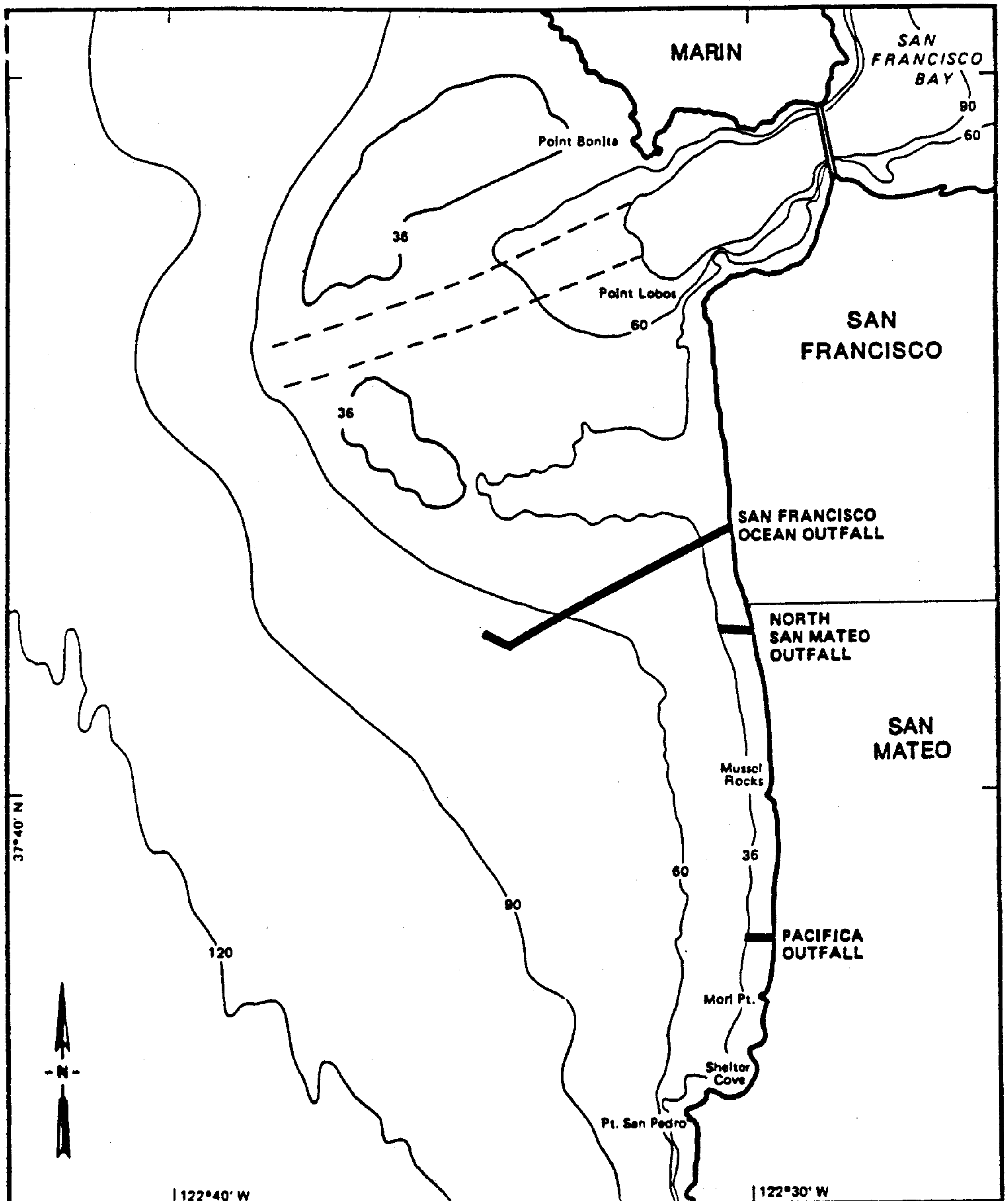
Map of San Francisco Southwest Ocean Outfall – *Fig. 8*



Southwest Ocean Outfall
and Other Coastal Outfalls

Attachment 1

Determination of Technology-Based Requirements

DETERMINATION OF TECHNOLOGY-BASED REQUIREMENTS FOR NPDES PERMIT NO. CA0037681: WESTSIDE WET-WEATHER FACILITIES AND SOUTHWEST OCEAN OUTFALL, CITY AND COUNTY OF SAN FRANCISCO.

The Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) permit program to regulate all point source discharges to the nation's waters. All dischargers must comply with two sets of requirements: (1) technology-based minimum requirements that apply to all dischargers of a specified class or (2) more stringent effluent limits, if necessary, to meet local water quality standards (WQSs). (CWA, Section 301(b)). Thus, effluent discharge permit limitations are either technology-based or water quality based. The technology-based requirements for non-POTW discharges (such as Combined Sewer Overflows[1] (CSOs)) must reflect:

1. *Best Practicable Control Technology Currently Available (BPT)*: The basic control level that all discharges (other than POTWs) must attain BPT was the initial technology-based control level required by the CWA and usually reflected the average of the best existing performance in a category. This treatment level is determined first and then used in calculating the following two control levels, which may be more stringent.

2. *Best Conventional Pollutant Control Technology (BCT)*: Treatment that may be applied in addition to BPT for removal of conventional pollutants such as suspended solids, biochemical oxygen demand, oil and grease, pH, and coliform bacteria.

3. *Best Available Technology Economically Achievable (BAT)*: Treatment that may be applied in addition to BPT for removal of toxic pollutants and other non-toxic, non-conventional pollutants such as floatables.

EPA establishes some technology-based requirements by issuing industry-wide effluent guidelines. For CSOs, no effluent guidelines have been promulgated for BPT, BCT, or BAT. The permit writer must therefore use Best Professional Judgement (BPJ) to determine the level of treatment that BPT, BCT and BAT represent and must establish limits to ensure these levels of treatment.

The San Francisco CSO control and treatment program includes a combination of containment and treatment facilities in addition to non-structural controls. (See fact sheet for Westside permit and Section II.A.ii of this permit for a detailed description of San Francisco□s Westside CSO facilities). There are also a number of discharge locations. The technology-based controls (BPT, BCT, BAT) are applicable to the following elements of San Francisco's Westside Combined Sewer System as follows:

Oceanside Water Pollution Control Plant
The Oceanside Water Pollution Control Plant (Oceanside WPCP) is a Publicly Owned Treatment Works (POTW) recently brought on-line to replace an outmoded secondary treatment facility. All flows directed to this POTW must receive treatment to the secondary standards identified in the regulations (40 CFR 133) (except for flows which meet the definition of an authorized "bypass" as discussed in Section I.4 below). The BPT/BCT/BAT analysis is therefore not applicable to the discharge from the Oceanside WPCP since the secondary standards establish the technology-based treatment requirements.

Flow-through Treatment in the Storage/Transports with Discharge to the Southwest Ocean Outfall ("Decant")
The wastewater from the storage/transports discharged directly (after flow-through treatment) to the Southwest Ocean Outfall (SWOO) does not enter the Oceanside Water Pollution Control Plant, and,

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1 CSO is defined under Section I.A. of EPA□s 1994 CSO Control Policy as □ the discharge from a combined sewer system (CSS) at a point prior to the Publicly Owned Treatment Works (POTW) treatment plant.□ A CSS is defined as □A wastewater collection system owned by a State or municipality which conveys sanitary wastewater (domestic, commercial, and industrial wastewater) and storm water through a single pipe system to a POTW treatment plant.□

therefore, is not subject to secondary treatment requirements. See In the Matter of City & County of San Francisco, NPDES Appeal No. 91-18. Instead, this discharge must meet BPT/BAT/BCT-based limits established using BPJ. This discharge is defined as a Combined Sewer Overflow (CSO).

Flow-through Treatment in the Storage/Transports with Discharge to the Shoreline
This wastewater discharged from the storage/transports (after flow-through treatment) to the shoreline also does not enter the Oceanside Treatment Plant, and, therefore, is not subject to secondary treatment requirements. Instead, this discharge must meet BPT/BCT/BAT-based limits established using BPJ. This discharge is also defined as a CSO.

Summary of Analysis:
In Section I of this document, the U.S. Environmental Protection Agency (EPA) Region IX examines the nine minimum controls established in the 1994 CSO Policy. EPA concludes that these measures are a cost-effective means for achieving effluent reductions of both conventional and non-conventional pollutants. EPA also concludes that implementation of these measures is consistent with the treatment processes and engineering systems employed by San Francisco and would result in no deleterious non-water quality environmental impacts. Therefore, these measures pass the BPT/BCT/BAT cost test. The NPDES permit for CSO discharges from the Southwest Ocean Outfall therefore establish the nine minimum controls as technology-based requirements and will contain provisions to ensure compliance with these controls.

In Section II of this document, EPA performs a BPJ analysis for the City of San Francisco's Combined Sewer System discharge from the Southwest Ocean Outfall and concludes:

a. The system currently in place provides effluent reduction at a cost in excess of that which would be required by BPT/BCT/BAT; and

b. No additional treatment facilities can be justified on a BPT/BCT/BAT cost basis.

The NPDES permit for Westside CSO discharges to be issued jointly by EPA and the Regional Water Quality Control Board (the Board or RWQCB) will include requirements to ensure proper operation of the existing CSO facilities. This will provide treatment in excess of that which would be required based on BPT/BCT/BAT requirements. This analysis also provides EPA Region IX's reconsideration of whether effluent limitations based on increased storage of wet weather flows can be justified on a BAT or BCT basis. EPA Region IX proposed to carry out this analysis when it withdrew portions of the previous NPDES permit.

In conclusion, by including requirements in the draft NPDES permit to ensure the continued implementation of the nine measures outlined in the CSO Policy and to require proper operation of the existing CSO facilities, EPA has established the technology-based requirements mandated by the Clean Water Act.

I. Establishment of the Nine Minimum Controls as Minimum BCT/BAT Requirements:

EPA adopted a CSO Policy which provides guidance to the permit writer. 59 Fed. Reg. 18688 (April 19, 1994). This CSO Policy was developed with extensive input from key stakeholders including representatives from States, environmental groups, and municipal organizations. The policy establishes a consistent approach for controlling discharges from CSOs to the Nation's waters through the NPDES program. The nine minimum controls outlined in the CSO Policy were developed after extensive review of existing CSO control systems, the cost of the controls and the effectiveness of the technologies. Though the CSO Policy has not been promulgated as a federal regulation, the nine minimum controls are often established as BAT/BCT requirements. This approach is consistent with EPA's 1994 CSO Policy, which states (Section IV. Expectations for Permitting Authorities):

> *All permits for CSO discharges should require the nine minimum controls as a minimum best available technology economically achievable and best conventional technology (BAT/BCT) established on a best professional judgment (BPJ) basis by the permitting authority (40 CFR Section 125.3).*

These nine measurements are as follows:
1. Proper operation and regular maintenance
2. Maximum use of the collection system for storage
3. Review and modification of pretreatment programs
4. Maximization of flow to the POTW for treatment
5. Prohibition of dry weather overflows
6. Control of solid and floatable materials in CSO discharges
7. Pollution prevention programs
8. Public notification
9. Monitoring

Thus, pursuant to the Policy, these nine minimum controls will constitute the *minimum* technology as required by Section 301(b)(2) of the Clean Water Act. The EPA and Board staff, based on their best professional judgment, have determined that these controls can be appropriately applied to the discharger. Furthermore, an evaluation of the City's consistency with the nine minimum control technologies shows that the City has met or exceeded each technology.

The following text describes how San Francisco has implemented each of the nine control technologies and describes the permit conditions that ensure future consistency with these objectives. Finally, each control is identified as a BCT control (for the removal of conventional pollutants) and/or at BAT control (for the removal of toxic and/or non-conventionals including floatables. (See Part II for a more detailed discussion of BPT, BCT, and BAT).

1. *Proper Operation and Regular Maintenance:* Proper operation and maintenance of Combined Sewer Systems (CSSs) decreases pollutant loadings that occur during wet-weather events. Solids can settle out of the sewage and collect in the large combined sewers during dry-weather periods; these solids can become remobilized and flushed from the combined system by the first storm, or the so-called "first flush" phenomenon. San Francisco's hilly topography minimizes the amount of sewage solids that settle out of the wastewater. Sewer system inspection and maintenance ensures that breaks and blockages do not occur when the system is fully charged, as it is during storm events. Operation and maintenance of the City's CSS fall within the purview of three bureaus within the City's Department of Public Works: the Bureau of Street and Sewer Repair, the Bureau of Water Pollution Control, and the Bureau of Engineering. The City has an aggressive program of sewer system maintenance, including cleaning sewer pipes and catch basins, repairing main and side sewers, relieving flooded catch basins and plugged main sewers, and investigating public requests. The City also has a program whereby television cameras are routed through sewer lines to visually inspect lines for breaks, illegal connections, etc.

   Operation and maintenance procedures for the City's Westside Facilities are described in the City's Westside Operation Plan[1]. The system allows for combined flows to be routed first to the Oceanside Water Pollution Control Plant or stored in the Westside Transport for later treatment; decanted discharge can also be pumped to the Southwest Ocean Outfall for ocean disposal. Only after these steps have been taken are overflows of decanted combined effluent discharged to the near-shore waters. Procedures described in the Operation Plan ensure that the system operates as it was designed and constructed.

The draft NPDES permit requires that the City review and update its Operations and Maintenance Manual annually. This manual is subject to the review and approval of EPA. This requirement represents both a BCT and BAT control because it results in the removal of conventional, toxic and non-conventional pollutants.

2. *Maximum Use of the Collection System for Storage:* This requirement refers to the use of existing sewers to hold a portion of surplus flows during storm events. To the extent allowed by existing facilities, this has always been San Francisco's policy. The City's hilly terrain, however, previously limited the ability of the sewer system to store flows. The storage/transport construction program has increased the citywide storage capacity of existing sewers to an estimated 23 MG[2].

   The Westside facilities provide for the temporary storage of about 70 MG of combined flows that exceed the treatment plant capacity[3]. This amount of storage is sufficient to hold all runoff from a rainfall event of approximately 0.52 inches. Stored wastewater is treated after the storm flow subsides. Only after the storage facilities are filled to capacity and the treatment plants are operating at full capacity does an overflow to the beach occur. The storage in both the sewers themselves and the system as a whole is therefore maximized before an overflow event occurs. However, it should be noted that the storage/transport facilities were constructed as necessary components of the Master Plan to meet water quality standards. The increased storage of 23 MGD in the existing sewers is an incidental benefit. Minimum technology #2 refers to sewer system storage rather than the large volume storage provided by the storage/transports.

   Since the maximization of collection system for storage is inherent in the design of these facilities, no NPDES permit condition is necessary to ensure future consistency with this provision other than the standard NPDES permit conditions requiring proper operation and maintenance and prohibiting unnecessary bypass of treatment facilities. The maximization of the collection system for storage represents both a BCT and BAT control because it results in the removal of conventional, toxic and non-conventional pollutants.

3. *Review and Modification of Pretreatment Requirements:* Pretreatment programs limit the amount of toxic pollutants discharged to the sewer system from industries and related sources. San Francisco has an approved and fully functioning Industrial Waste Pretreatment Program, including the establishment of Local Limits for several pollutants[4]. Although San Francisco has relatively few industrial sources (particularly on the Westside), the City has an ongoing effort to identify industrial and other pollutant sources and reduce the loading of toxic pollutants and other pollutants of concern. This program, administered by the City's Bureau of Environmental Regulation and Management (BERM), includes enforcement inspections, pretreatment monitoring, collection system monitoring, and permitting of Significant Industrial Users (SIUs).

   The main dischargers of toxic pollutants to the Westside system are hospitals and other medical facilities, with lesser amounts contributed by laundry, photographic, and car wash facilities[5]. Laboratory analysis indicates the presence of copper, lead, mercury, nickel, silver, zinc, and PAHs in wet-weather effluent from the Richmond-Sunset Water Pollution Control Plant (RSWPCP)[6]. Most of these pollutants are believed to originate from motor vehicles and would therefore be unaffected by pretreatment programs.

   The draft NPDES permit requires the implementation, review and modification of pretreatment requirements. This requirement represents a BAT control because it results primarily in the removal of toxic pollutants.

4. *Maximization of Flow to the POTW for Treatment:* This requirement refers to operating treatment plants at maximum capacity during storm events. This requirement has always been

San Francisco's policy. The City's system has been designed and constructed to maximize flows to the Oceanside Water Pollution Control Plant. The Oceanside WPCP recently replaced the RSWPCP, constructed in 1938, which provided a maximum of 45 million gallons per day (MGD) of primary treatment capacity[7]. The Oceanside WPCP provides up to 43 MGD of secondary treatment capacity (average dry-weather flow is about 24 MGD), and another 22 MGD of primary treatment capacity during wet-weather periods, for a total treatment capacity of 65 MGD during wet weather. Treated effluent is combined prior to discharge to the Pacific Ocean via the Southwest Ocean Outfall (SWOO). Flows to the Oceanside WPCP are maximized prior to any discharge of decant from the Westside Transport to either the SWOO or to the near-shore waters of the Pacific Ocean.

While the City can treat 65 MGD of flow to primary levels at the Oceanside WPCP, the plant can provide secondary treatment for only 43 MGD. Thus, when wet weather flow exceed 43 MGD, Oceanside WPCP is designed to allow excess flows (between 43 MGD and 65 MGD) to bypass the secondary treatment processes and discharge to the SWOO after receiving only primary treatment. The CSO Policy describes the circumstances where such bypassing may be explicitly authorized in a CSO permit. 59 Fed. Reg. 18693.

For such bypassing to be permitted, the permittee must justify the cut-off point at which the flow will be diverted from the secondary treatment portions of the treatment plant, and provide a benefit-cost analysis demonstrating that the conveyance of wet weather flow to the POTW for primary treatment is more beneficial than other CSO abatement alternatives such as storage and pump back for secondary treatment, sewer separation, or satellite treatment.

The City performed a benefit-cost on CSO abatement alternatives as part of its 1972 Master Plan. The system currently being implemented was determined to be significantly more beneficial than any of the other options analyzed. In particular, the Master Plan determined that sewer separation was extremely costly, highly disruptive, and undesirable in that it would not address stormwater pollution. In addition, the analysis performed as part of this permit demonstrates that providing either additional storage (to increase secondary treatment of stored wastewater) or additional secondary treatment capacity is both extraordinarily expensive and highly disruptive to the local community. EPA therefore concludes that no further wet-weather storage or treatment can be justified.

In addition, the permittee must demonstrate compliance with the requirements of 40 CFR 122.41(m)(4) for the bypass to be permitted. The bypass must be unavoidable to prevent loss of life, personal injury or severe property damage. For purposes of CSO permits, severe property damage includes situations where flows above a certain level wash out the POTW's secondary treatment system. See 59 Fed. Reg. 18694. Also, there must be no feasible alternatives to the bypass. For purposes of CSO permits, this provision is met if:

a. the secondary treatment system is properly operated and maintained;
b. the secondary system has been designed to meet secondary limits for flows greater than peak dry weather flow, plus an appropriate quantity of wet weather flow; and
c. it is either technically or financially infeasible to provide secondary treatment at the existing facilities for greater amount of wet weather flow.

Finally, the permittee must provide notice of the need for the bypass. This last provision is satisfied by the City's NPDES permit application describing the Oceanside WPCP facilities and its wet-weather operation plans.

The Oceanside WPCP can provide 43 MGD of secondary treatment nearly double the peak dry weather flow of 24 MGD. If the City attempts to provide secondary treatment to more than 43 MGD of flow during wet weather, the City risks washing out its biological treatment processes. This would result in serious property damage at the Oceanside WPCP. In addition, it would degrade treatment performance significantly until the biological treatment process could be reestablished. The Master Plan for the City's Westside facilities documents the financial infeasibility of providing more secondary treatment capacity for wet weather flows at the OWPCP. This is confirmed by EPA's BPT/BCT/BAT Cost Analysis. (See Section I). In addition, the location of the Oceanside WPCP near the San Francisco Zoo is physically limited. Expansion of the treatment works on site is essentially impossible without severe disruption to zoo facilities.

The draft permit requires compliance with this objective. It requires the City to provide secondary treatment for all flows reaching the Oceanside WPCP up to 43 MGD. For flows up to 65 MGD, the City must provide primary treatment at the Oceanside WPCP for the flows in excess of 43 MGD. In addition, the City is required to use the storage capacity in the Westside Transport to maximize, to the extent feasible, storage of wet weather flows for later treatment during dry weather periods. This requirement represents both a BCT and BAT control because it results in the removal of conventional, toxic and non-conventional pollutants.

5. *Prohibition of Dry-Weather Overflows:* Previous wastewater permits issued to the City have prohibited dry-weather discharge of untreated wastewater from the CSS. Even prior to the Master Plan construction program, the system was designed to hold and treat all dry weather flow. The Westside Transport has enough storage capacity to provide for about three days of dry weather flow. After the 1989 Loma Prieta earthquake, the RSWPCP was without electrical power for more than one day. All wastewater generated in the Westside service area during the power outage was stored in the Westside Transport and subsequently treated.

   The draft NPDES permit prohibits dry-weather overflows. This requirement represents both a BCT and BAT control because it results in the removal of conventional, toxic and non-conventional pollutants.

6. *Control of Solid and Floatable Materials in CSO Discharges:* Control technologies assumed as part of the 1986 Strategy include, for example, baffles to control floatables and screening or swirl concentrators to control solids. These technologies remove aesthetically objectionable materials that would otherwise remain on beaches or float on water surfaces after a storm; they have little effect, however, on suspended solids or bacterial loading of the overflows. Rotary screening provides only about five percent total suspended solids (TSS) removal, and swirl concentrators provide about 15 percent removal.

   The City's storage/transport system provides a substantially higher level of control of solid and floatable materials in CSO decant discharged to the Bay, the SWOO, and to near-shore waters of the Pacific Ocean. Baffles control floatables, and the flow is passed over a weir to remove settleable solids. A study was conducted to determine the solids removal efficiency of the Westside Transport, which concluded that the performance of the Transport was not markedly different from that of a primary treatment plant, providing between 15 and 50 percent removal of TSS; the baffling system was shown to retain the majority of the macroscopic floatable material that entered the Transport[8]. Beach deposition of CSO floatables has therefore been largely eliminated.

   Because the design of the facilities ensures continual consistency with this objective, there is no need for any additional permit requirement other than the standard NPDES permit conditions requiring proper operation and maintenance and prohibiting unnecessary bypass of treatment facilities. The baffled storage/transport represents both a BCT and BAT control because it results in the removal of conventional, toxic and non-conventional pollutants.

7. *Pollution Prevention:* Pollution prevention is source reduction and other practices that reduce or eliminate pollutants through the increased efficiency in the use of resources or the protection of

resources by conservation. Two major source reduction efforts implemented by the City's BERM focus on reducing the pollutants released to the environment through the sewer system: (1) the development of an overall pollution prevention program and (2) the implementation of a wastewater waste minimization program as part of the pretreatment requirements. The City's proactive water pollution prevention and pretreatment programs, managed by BERM, minimize the introduction of toxic pollutants into the CSS. (The pretreatment program is discussed in greater detail under Item 3 above.)

The City undertook a study of Best Management Practices (BMPs) to determine which would provide the most cost-effective reduction in pollutant loadings into the CSS during both dry- and wet-weather periods[9]. The most important pollutants of concern during wet-weather periods include PAHs, copper, lead, and cyanide. The main sources of these pollutants are automobiles and automotive-related businesses; other sources include tar shingles, wood preservatives, paints, algicides, and manufacturing.

A key BMP is the City's street sweeping program, which directly reduces pollutants originating from street surfaces; all City streets are swept at least once per week with vacuum sweepers. Catch basins are also cleaned regularly to reduce the pollutant loading during storm events. Other BMPs selected for implementation include an education program and provision of alternative disposal methods for residential hazardous waste, regulatory measures to reduce the risk of toxic spills, and public agency measures to prevent contact of rainfall runoff with potential contaminants.

Table 1 illustrates the total estimated pollutant reduction that could occur from implementation of the City's source reduction strategies. Note that these are estimates, and reductions could increase if previously unknown pollutant sources are identified and targeted for source reduction strategies.

The draft NPDES permit requires the implementation and continual development of a Pollution Prevention Plan. This plan is subject to the review and approval of EPA. This requirement represents a BAT control because it primarily results in the removal of toxic pollutants.

Pollutant	Estimated Reductions	
	lbs/dy	mg/l
Copper (Cu)	14.7	0.0027
Mercury (Hg)	0.16	0.0003
Lead (Pb)	3.7	0.007
Nickel (Ni)	1.9	0.004
Silver (Ag)	2.2	0.004
Zinc (Zn)	24.2	0.045
Cyanide (Cn)	0.87	0.0015

(Source: City and County of San Francisco, 1994 NPDES Permit Program, Attachment #1, Appendix A, page 6)

8. *Public Notification:* The City has a long-term practice of posting notices along the shoreline for three days following any shoreline discharge. When a CSO event occurs, the City posts notices on beaches in the vicinity of the overflow warning the public that waters contain high levels of bacteria and may therefore be unsuitable for water contact recreation. Warning signs remain posted until monitoring indicates that bacteriological levels are within an acceptable range. Additionally, if a shoreline discharge occurs, or if routine monitoring indicates high bacteriological levels, the City notifies the surfing and windsurfing communities through a recorded hotline, warning that waters are unsafe and surfing is not recommended. When bacterial counts have returned to safe levels, this message is discontinued.

   Public notification is required under the draft permit. This requirement represents a BPT/BCT control for helps to prevent exposure to conventional pollutants (primarily bacteria).

9. *Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls:* The City has ongoing shoreline, Ocean, and Bay monitoring programs that include both routine long-term monitoring of overflow and receiving waters and special short-term studies undertaken to support development of CSO control strategies or characterize CSO impacts on beneficial uses. Shoreline samples are collected for bacteriological analysis three times per week along the San Francisco Bay and Pacific Ocean. Water and sediment sampling is routinely conducted both in the Bay and Ocean. Numerous special studies have been conducted since 1966, when the City first undertook an in-depth study of the CSO problem.

   Shoreline bacteriological levels have been monitored for the past 15 years at 45 locations around the City at a frequency of 8 to 12 times per month at each site; visual observations of overflow debris and recreational uses in the vicinity of the overflow structures are also reported. Monitoring results show that coliform levels are elevated at shoreline stations near CSO structures during and shortly after CSO events, but generally return to background levels within one or two tidal cycles following the cessation of the overflow.

Water quality monitoring of overflows has been routinely conducted since 1983, when the City's first CSO control facilities became operational. Flow-weighted, storm-composite samples are collected using automatic samplers and analyzed for constituents including BOD, TSS, oil and grease, phenols, and metals; in recent years, total PAHs have been added to the routine analysis. Full-priority pollutant scans are run on representative storm-composite samples of CSO one to two times per year. As new CSO control facilities come on-line, they will be added to monitoring program. A special monitoring program in the southeastern portion of the City documents benefits of CSO control on water contact recreation and shellfishing. Collected data are submitted annually to the The Board.

The draft NPDES permit requires continued receiving water monitoring. This requirement represents both a BCT and BAT control because it helps the City, the Regional Board, and EPA to evaluate the efficacy of the previous controls to remove conventional, toxic and non-conventional pollutants.

{tc \l 2 ""}II. BPJ Analysis of Treatment Beyond the Nine Minimum Controls

In Part I of this analysis, EPA has concluded that the nine minimum controls outlined in the Policy are appropriate as *minimum* BCT/BAT requirements. In Part II, EPA performs a BPJ analysis on the Westside CSO system in order to determine whether additional technology-based controls should be required in the NPDES permit. This analysis is also intended to reconsider the issue identified by the Regional Administrator in his Notice of Decision to Repropose Under 40 C.F.R. . 124.60(b), dated January 31, 1992:

> Whether BAT or BCT requires effluent limitations that reflect the additional amount of pollutant removal achievable through expansion of the [Westside] Transport's existing capacity to store combined flows for later treatment at the new Oceanside Plant, thus reducing the amount of decant discharged to the SWOO.

A. Determination of Best Practicable Control Technology Currently Available (BPT) for Combined Sewer Overflows

For many industrial categories, the BPT limitations (as well as BCT and BAT limitations) have been promulgated as regulations (effluent guidelines). EPA has not formally promulgated technology-based limitations for CSOs and therefore the permit writer must use best professional judgement (BPJ) on a case-by-case basis to develop the appropriate limitations. The regulations specify the factors to be used by the permit writer (40 CFR 125.3(d)(1)):

(I) The total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application;
(ii) The age of equipment and facilities involved;
(ii) The process employed;
(iv) The engineering aspects of the application of various types of control techniques;
(v) Process changes; and
(vi) Non-water quality environmental impact (including energy requirements).

The key factor here is item (I), the comparison of costs and performance. Senator Muskie, one of the authors of the legislation, noted:

> *The balancing test between total cost and effluent reduction benefits is intended to limit the application of technology only where the additional degree of effluent reduction is wholly out of proportion to the costs of achieving such marginal level of reduction for any class or category of sources.*[10]

In other words, Congress expected significant efforts toward pollutant control as a result of the BPT requirements. Costs for the construction of treatment facilities would be a limiting factor only if they were comparably much higher than experienced by similar industrial sources. However, very high costs for treatment characterize CSO controls. The costs of controlling CSOs are very expensive because CSOs are caused by large volumes of highly variable storm runoff which may occur at flow rates much greater than the flow rates of the dry weather sewage. Additionally, CSO control facilities are only used on an intermittent basis; they are idle most of the year. As a result of these two factors, costs per pound of pollutant removed for CSO facilities usually greatly exceed the comparable costs for other wastewater pollutant control measures. This is particularly true in San Francisco where rainfall generally occurs only during a six month period of the year at a rate of approximately 20.5 "/year.

The high costs for CSO control and treatment have resulted in a long-term EPA policy of equating BPT with limited controls not involving significant construction. Consequently, CSO treatment facilities have been built only when necessary to meet water quality needs.

Application of the Cost Factor to the Determination of BPT for San Francisco:

The determination of BPT requires an examination of the six factors above. Each of these factors is evaluated below:

(I) **The total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application**; (40 CFR 125.3(d)(1))
To determine if the benefits are reasonable compared with costs we can compare San Francisco Westside CSO treatment costs and benefits with sewage treatment plant costs and benefits. The dry weather pollutants entering sewage treatment plants and the pollutants discharged as CSOs are similar in nature and so a comparison can be made.

Table 2 includes the costs and effluent reductions (benefits) achieved in terms of dollars per pound of suspended solids removed from the wastewater. Table 2 includes cost data for two Bay area sewage treatment plants and for the San Francisco Westside combined sewer overflow control and treatment facilities. The two sewage treatment plants treat the wastewater to the secondary level which is the technology-based minimum required by the Clean Water Act.

Table 2

Facility	Suspended Solids (Unit cost for removal) ($/lb)
East Bay MUD*	$ 0.26
Central Contra Costa S.D.[11]	$ 0.51
S.F. Westside CSO control facilities[12]	$ 10.78

Cost Assumptions for S.F. Westside CSO facilities	
Tons per year of TSS Removed	676 tons
Required Storage	69 MG
Westside CSO Control Costs	$213,750,000
Expected CSO facility life	50 years
Assumed interest rate	6.5%
Capital Recovery factor	.0679139
Annual Costs	
Capital	$14,516,602
O&M (at 0.02 of Cap. Costs)	$42,750
Total	$14,559,352
Cost per pound of TSS removed	$10.78

As shown in the table, based on suspended solids removal, CSO control costs as implemented on San Francisco's Westside are wholly out of proportion to the benefits when compared with comparable costs and benefits at local POTWs. Consequently, CSO control facilities as built in San Francisco could not be justified based solely on BPT technology-based requirements. Instead the justification for constructing treatment facilities must be (and was) based on water quality needs.

There are additional methods of evaluating CSO performance. However, suspended solids removal is a practical and useful factor to compare since most pollutants of concern occur as suspended solids and suspended solids by themselves can have detrimental effects.

Though analysis of factor 1 is sufficient to show that the measures employed by San Francisco exceed BPT, this analysis will also examine the other BPT factors:

(ii) **The age of equipment and facilities involved; and (iii) The process employed;** San Francisco began planning for wastewater facilities improvement in 1972, with the preparation of the first Wastewater Master Plan. Implementation of the Master Plan will be complete in 1996. The Master Plan evaluated three basic options for wastewater control: (1) constructing high-capacity wastewater treatment plants, (2) storing excess flows for later treatment, and (3) separating sewers. The City selected a combination of increased treatment capacity and large volume storage as the most cost-effective means of controlling water quality. EPA concurred in San Francisco's analysis at the time the Master Plan was developed, and remains convinced that it represents the most cost-effective and environmentally protective strategy for addressing the City's CSO problems. Sewer separation was rejected because of high costs, the need to excavate every street in the City, and the failure to address pollution caused by stormwater runoff.

On the City's Westside, key facilities are the Oceanside Water Pollution Control Plant (Oceanside WPCP), the Southwest Ocean Outfall (SWOO), and the Westside

Storage/Transport facilities. The Oceanside WPCP came on-line in spring 1994, replacing the Richmond-Sunset treatment plant. The Oceanside WPCP provides both a higher level of treatment (full secondary treatment) and a larger treatment capacity (total of 65 MGD) than the former treatment facility. The Westside Storage/Transport facilities capture combined sewage and stormwater runoff and hold as much as possible for later treatment at the Oceanside WPCP. The SWOO was completed in 1986, and discharges treated wastewater effluent approximately 4.5 miles from shore, and provides effective initial dilution of the effluent. The Westside Storage/Transport, a 2.5 mile long, box-like structure located beneath the Great Highway, is one of the largest wastewater storage structures in the nation. Storm flows that cannot be stored pass over a weir and under a baffle into a second box, called the decant structure; settleable solids and floatables remain in the first box, and are flushed to the treatment plant after the storm subsides. Overflow from the decant box passes over another weir and under a baffle, and is routed to the SWOO. If SWOO's capacity is exceeded, effluent is discharged to the shoreline. Thus, any combined flows discharged from the storage/transport structures receive primary-equivalent treatment, which removes essentially all macroscopic floatables and most settleable solids. Once a storm subsides, stored flows are routed to the treatment plant. Storage/transport structures are subsequently drained to the treatment facilities.

All untreated combined sewage formerly discharged to the shoreline is captured and treated as a result of the Westside construction program. During rainy weather, approximately 50 percent of the flows are held for treatment at the Oceanside WPCP; the remaining 50 percent receive flow-through treatment within the storage/transport structures. On average, approximately 87 percent of the combined flows are discharged through the SWOO, and 13 percent are discharged to the shoreline. These percentages are long-term averages that may not reflect the system's performance for a particular year because of the dynamic nature of the interaction between the system and the characteristics and sequence of storm events. For example, the system might capture all flows during a relatively intense rainfall of short duration with no overflow, especially when the transport/storage structures are empty at the start of the storm; a storm event of similar intensity and duration, however, might result in an overflow if previous rainfall had partially filled the transports.

Parameter	Pre-Program	Master Plan	Percent Reduction
Average Number of Beach Overflows (Range)	114[a] (26–193)	8[b] (1–18)	93
Average Annual Volume of Wastewater Discharged, MG (Range)	2,870 (926–5,030)	449 (15–1,070)	84
Average Percentage of Sanitary Flow	12	6.5	46
Average Number of Days Recreational Uses Impaired (Range)	119 (67–147)	25 (6–51)	79
Average BOD, lbs/yr x 10^3 (Range)	1,220 (394–2,140)	191 (6–460)	84
Average TSS, lbs/yr x 10^3 (Range)	12,100 (3,890–21,200)	1,890 (63–4,550)	84

(Source: City and County of San Francisco, Revised Overflow Control Study, 1978, plate 8)

[a] Subsequent to the publication of the 1978 study, the SWRCB changed the definition of an overflow event. Under the current definition, the Westside facilities overflowed an average of 54 times per year.

[b] Using the present definition of overflow.

(iv) The engineering aspects of the application of various types of control techniques;

The range of available CSO control technologies is essentially limited to four core technologies: storage basins, deep tunnels, swirl concentrators, and screening facilities[13]. These four technologies fall into two groups. The first group of CSO control measures, storage basins and deep tunnels, are implemented where receiving water quality impacts are of the greatest concern, and required levels of CSO control are consequently high. These technologies rely on the storage of excess CSO, with subsequent treatment at existing water pollution control plants, to achieve high pollutant removal rates and effective disinfection levels. The second group of CSO controls, swirl concentrators and screening facilities, are implemented to reduce settleable solids and floatables. These technologies are typically applied where receiving water quality conditions do not warrant high BOD/TSS removal. Sewer separation, a third type of CSO control strategy, is typically used by municipalities that have only a relatively small area served by combined sewers.

Storage BasinsStorage Basins{tc \l 3 "Storage Basins"}

Storage basins are typically concrete tanks located at overflow points or near treatment plants. This structurally intensive technology involves the capture and storage of CSOs, with subsequent treatment of captured flows. Combined flows that exceed the storage capacity of the basin may receive coarse screening, primary settling, floatable removal, and/or disinfection prior to discharge. Once flow capacity is available at the treatment plant, the stored volume is treated and discharged. This technology is very flexible because extremely variable CSO flows can be stored and treated, and high removal of BOD and TSS can be achieved[14].

Deep TunnelsDeep Tunnels{tc \l 3 "Deep Tunnels"}

Deep tunnels provide consolidated storage in underground tunnels, from which the CSO is pumped to an existing treatment plant when capacity becomes available. Pollutant removal effectiveness is limited by the volume of the tunnel; CSO discharges that exceed the storage capacity of the tunnel typically do not receive treatment. Thus, the CSO that is stored in tunnels can receive a high level of treatment prior to discharge, but flows in excess of the tunnel's capacity typically receive no treatment.

Swirl ConcentratorsSwirl Concentrators{tc \l 3 "Swirl Concentrators"}

The swirl concentrator is a specially configured gravity solids separator that retains floatables in the unit, passes concentrated solids to the sewer, and discharges the remaining flow to the receiving waterbody. The swirl concentrator can provide effective separation of floatables over a wide range of hydraulic loadings, while removing approximately 15 percent of suspended solids[15].

Screening FacilitiesScreening Facilities{tc \l 3 "Screening Facilities"}

Screening of CSOs can be effective in removing large solids and floatables and is typically used in conjunction with other storage and treatment systems. The effectiveness of this technology is directly related to the size of the screen openings, which can vary from bar racks to coarse and fine screens and microstrainers. Screened materials are generally removed mechanically. Screening, a physical treatment process for CSO discharges, is usually applied when a high level of BOD/TSS removal is not necessary.

ConclusionConclusion{tc \l 3 "Conclusion"}
Based on this brief review of available CSO control technologies, San Francisco's transport/storage facilities clearly provide the highest level of water quality protection available. Swirl concentrators and screening facilities can reduce floatables, but provide limited removal of BOD and suspended solids. Deep tunnels allow for a high level of treatment for combined flows that do not exceed its storage capacity, although combined flows in excess of tunnel capacity receive little or no treatment. In San Francisco's system, combined flows are either stored for later treatment when capacity becomes available at the treatment plant or are subjected to primary-equivalent treatment prior to discharge when transport/storage capacity is exceeded. This treatment provides the storage benefits of deep tunnels and storage basins, and a high rate of removal for BOD, TSS, floatables, and settleable solids that is not possible with deep tunnels, swirl concentrators, or screening facilities.

(v) **Process changes;**
This factor only applies to point source discharges from industrial plants, because industrial plants can consider alterations to processes that affect wastewater quality and quantity.

(vi) **Non-water quality environmental impact (including energy requirements).**
See BAT analysis

BPT Summary
The construction of CSO control and treatment facilities cannot be justified based on the application of the BPT cost/benefit criteria to San Francisco's Westside System. This conclusion is consistent with the long-term policy of both EPA, Region IX and the Regional Water Quality Control Board to base San Francisco's CSO permits (and resultant facility construction) on the need to achieve water quality standards. BPT does not require any additional measures beyond the six control measures outlined in the 1989 CSO Control Strategy. NPDES Permit CA0037681 contains effluent limitations that require proper operation of San Francisco's CSO facilities. Therefore, these effluent limitations ensure that San Francisco will provide treatment in excess of that mandated by BPT requirements.

B. The Determination of Best Conventional Pollutant Control Technology (BCT) for CSOs.

BCT applies to the following constituents of the combined sewer overflows: suspended solids, biochemical oxygen demand (BOD), oil & grease, pH, and coliform bacteria. BCT represents an incremental level of control beyond BPT for the specified pollutants. The first part of this analysis has shown that the current system surpasses BPT for CSOs. This portion of the analysis will determine whether the current system also meets BCT or whether additional treatment is necessary. In addition, EPA's CSO Policy recommends consideration of certain technologies as potential bases for setting BCT effluent limitations. These are discussed in Section II.

The regulations specify the factors to be used by the permit writer to determine BCT:

(I) The reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived;

(ii) The comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources.

(iii) The age of equipment and facilities involved;

(iv) The process employed;
(v) The engineering aspects of the application of various types of control techniques;
(vi) Process changes; and
(vii) Non-water quality environmental impact (including energy requirements).

The determination of BCT requires an examination of the seven factors above. Each of these factors is evaluated below:

(I) The reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived;

This portion of the analysis could simply compare the costs of the current treatment with the effluent reduction benefits derived as done in Table 1 above. However, since San Francisco built these facilities to meet water quality standards, the question has arisen as to whether any additional treatment could be justified by BCT. For example, would further conventional pollutant reductions brought about by increased storage (and therefore increased treatment) be incrementally cheap enough to pass the "reasonableness" test? This analysis therefore compares the most economical additional treatment necessary to further reduce conventionals (i.e. suspended solids) with the cost of the increased treatment:

Analysis of Increased Storage

To further reduce suspended solids, additional storage capacity would have to be added to the current facility. At a minimum the City estimates that it would cost $2.35 for each additional gallon of storage. If the portion of decanted wastewater discharged through the SWOO was to first receive treatment at the Oceanside Treatment facility (60% secondary, 40% primary), an additional 69.6 million gallons of storage capacity would be needed. This facility enhancement would only reduce suspended solids by additional 209 tons per year and would cost approximately $163.6 million or an amortized cost of $11.1 million per year. (Assuming a 50 year project life. 6.5% interest, and a 0.02% of capital costs O&M). This facility enhancement would thereby cost approximately $25/lb of TSS removed.[16] (See Table 4 below).

Analysis of Full Containment

Full containment of storm flow is not required under the CWA's BAT/BCT requirements or by the CSO Control Policy. In fact, "full containment" of CSOs is extremely difficult to achieve because of the nature of precipitation events and usually defined stochastically (e.g., long-term average of 1, 0.2, or 0.05 overflows to the shoreline per year). The following section analyzes the costs and environmental benefits of full containment of all Westside storm flows (defined as one overflow per year), which allow for secondary treatment of all combined flows. Two options that would meet the necessary combination of increased treatment and storage are examined.

Option 1 would provide a limited increase in treatment capacity and a major increase in storage. This option assumes that the lack of available land or difficulties of constructing satisfactory treatment methods prevent the City from building more than 20 MGD of additional secondary treatment. Assuming one allowable overflow per year, an additional 515 MG of storage would need to be constructed, over and above an existing 70 MG: a second storage/transport box under the Great Highway and additional storage/transports under Avenues 45 through 48. Thirty-foot diameter tunnels would be constructed under Avenues 41 through 44 and part of 40th Avenue; tunnels would be constructed, because the street grade is too high for open-cut construction. Estimated capital costs for these facilities would be $1.3 billion[17].

Option 2 assumes that constructing a new 65 MGD secondary treatment plant on the Westside would be possible to double the existing treatment capacity. In this case, an additional 220 MG of storage would be necessary to provide full secondary treatment to all combined flows, allowing one overflow per year. Estimated capital cost for this option, not including land acquisition costs for the treatment plant, would be $840 million.

Implementation of one of the above options would reduce TSS loading to the Pacific Ocean by an estimated 420 tons per year, at an incremental removal cost of approximately $68 per pound (Table 4). The capital cost per City resident would be at least $1,160.

Table 1 shows that the cost of pollutant reduction for San Francisco's present system is exorbitant. Table 4 shows incremental pollutant reductions which could be gained with increased storage and treatment is even more costly. Therefore, the costs of both the current facilities and any additional storage or treatment facilities could not be considered "reasonable" when compared to the effluent reduction benefits derived.

Stage	Annual Cost ($, millions)	Average TSS Discharged (tons/yr)	Average TSS Removed[a] (tons/yr)	Percent TSS Removal [a]	Increm. Cost of TSS Removal ($/lb)[b]
Pre-program Facilities[c]	□	3,800	□	□	□
Full Master Plan (1996)	46.5[d]	1,580	2,220	58	10.8
Increased Storage Option	11.1[d,g]	1,371	2, 429	64	24.8[f]
Full Secondary on Westside (1 overflow)	57.2[d,e,g]	1,160	2,640	69	68[f]

[a]Total reductions compared to Pre-Program facilities.

[b]Divides total annual cost by pounds of TSS removed; other measures of water pollutant loading (e.g., BOD and toxic pollutants) also improve.

[c]Pre-program facilities represent the baseline for comparison of TSS emissions.

[d]Assumes a 50-year life, 6.5% interest rate, and O&M of 0.02% of capital cost.

[e]Excludes land acquisition costs for a 65 MGD treatment plant.

[f] For comparison, secondary treatment of wastewater costs approximately $0.26 per pound of TSS removed for the East Bay Municipal Utilities District and approximately $0.51 per pound TSS removal for the Central Contra Costa Sanitation District.

[g] Costs are in addition to those incurred in construction and operation of full master plan.

(ii) The comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources.

The intent of this factor was summarized in *Chemical Manufacturer's Association v. EPA*:

> *Representative Roberts, the author of the conference report on the 1977 amendments, emphasized that the additional technology requirements of BCT were to be imposed only to remove additional "cheap pounds" of conventional pollutants beyond BPT.*[18]

Best conventional pollutant control technology (BCT) is intended as an incremental level of control beyond the best practicable control technology currently available (BPT). The intent of the requirement is to impose additional controls only if the additional removal of conventional pollutants is comparable to removal costs at POTWs. As shown in Table 2, however, the CSO control technology implemented by San Francisco is very expensive compared with POTW costs and therefore could not be justified under BCT. Other CSO treatment technologies, as listed in Table 5, are far more costly than POTWs, and therefore, also cannot be justified.

Control Technology		TSS Reduction (percent)	TSS Removal Cost ($/lb)
CSO Control[a]	Rotary Screening	5	46
	Swirl Concentrators	15	21
	High-Rate Filtration	20	17
	Sedimentation	33	6
Local POTWs[b]	East Bay Municipal Utilities District	85	0.26
	Central Contra Costa County Sanitation Dist.	85	0.51
San Francisco	Westside Facilities	60	10.5

(Source: RWQCB San Francisco Bay Region and the City of San Francisco)

a. The control technology costs in Table are taken from the California Regional Water Quality Control Board BCT/BAT analysis as developed for NPDES CA0037681 (7/26/1990 final permit). The costs were originally developed by East Bay Municipal Utility District. Note that with the exception of sedimentation, these costs for partial treatment are significantly higher than the costs for full-scale CSO control as implemented by San Francisco on the Westside.

The TSS Reduction and the corresponding TSS Removal Cost for the CSO Control technologies are calculated assuming that the stormwater/wastewater influent has not undergone any prior treatment. The TSS percent reduction would be significantly lower and the TSS Removal Cost would be significantly higher if one of these CSO Controls were added to the existing system which already reduces TSS by at least 60%.

b. POTWs in general have significantly lower treatment costs since they do not treat stormwater.

(iii) The age of equipment and facilities involved;
See BPT analysis above.

(iv) The process employed;
See BPT analysis above.

(v) The engineering aspects of the application of various types of control techniques;
See BPT analysis above.

(vi) Process changes;
Not Applicable.

(vii) Non-water quality environmental impact (including energy requirements).
See BAT analysis below.

BCT Summary
Best Conventional Treatment applies to the removal of conventional pollutants (TSS, BOD, etc.). The viability of a potential BCT treatment is determined by comparing treatment costs with POTW treatment costs. The costs of the CSO facilities actually built by San Francisco, the costs of increased storage for later treatment, and the costs for other potential CSO treatment technologies all greatly exceed POTW treatment costs. Therefore no additional treatment can be justified based solely on BCT. NPDES Permit CA0037681 contains effluent limitations that require proper operation San Francisco's CSO facilities. Therefore, these effluent limitations ensure that San Francisco will provide treatment in excess of that mandated by EPA's BCT requirements.

C. The Determination of Best Available Technology Economically Achievable (BAT) for CSOs.

BAT requirements are requirements that go beyond BCT by specifying controls for two groups of pollutants: (1) toxic pollutants (e.g., copper, lead, zinc, polynuclear aromatic hydrocarbons [PAHs], pesticides, and other organics) and (2) non-toxic, non-conventional pollutants. For CSOs, floatables are the only non-toxic, non-conventional pollutant of concern. The following CWA regulations for BAT specify factors are used by the permit writer (40 CFR 125.3(d)(3)):

(I) The age of equipment and facilities involved;
(ii) The process employed;
(iii) The engineering aspects of the application of various types of control techniques;
(iv) Process changes;
(v) The cost of achieving such effluent reduction; and
(vi) Non-water quality environmental impacts (including energy requirements).

Since all wastewater receives at least primary treatment including baffling as it is decanted, San Francisco's system provides substantial treatment for floatables. EPA has not been able to identify any treatment process that would significantly improve floatables removal, and so finds that baffling constitutes BAT for floatables.

To determine BAT for toxic pollutants (beyond the nine minimum controls discussed in section I), EPA analyzed the existing San Francisco CSO containment and treatment system, and compared it to the regulatory requirements for BAT. In addition, the Clean Water Act requires EPA to promulgate effluent limitations requiring the elimination of discharges of all pollutants if EPA determines that such elimination is technically and economically achievable. CWA . 301(b)(2)(A). Therefore, EPA has analyzed the technical and economical achievability of effluent limitations that would effectively eliminate San Francisco's CSO discharge.

The determination of BAT requires an examination of the six factors above. Each of these factors is evaluated below:

(I) The age of equipment and facilities involved;
See BPT analysis.

(ii) The process employed;
See BPT analysis. The City and County has also implemented a Source Control program which will significantly help to reduce toxic pollutants discharged by the public and industry. (See discussion under Section I of this Fact Sheet Amendment, *Control # 7, Pollution Prevention.*)

(iii) The engineering aspects of the application of various types of control techniques;
See BPT analysis

(iv) Process changes;
Not applicable. See discussion in BPT analysis.

(v) The cost of achieving such effluent reduction;
This item is the key issue. The high cost of CSO control has prevented many U.S. cities from providing treatment, even when WQSs are being violated. The City's capital investment for water pollution control has been about $1,900 per person and would be substantially higher in current dollars. This level of investment represents one of the highest per capita investments for in the nation for a medium or large city. As noted earlier, this equates to approximately $10.8/lb of TSS removal. Roughly two thirds of this expense was dedicated to CSO control.
The application of the cost test in the BAT analysis is discussed by the court in NRDC v. EPA, 863 F.2d 1420 (9th Cir. 1988). The court concluded:

> *To demonstrate economic achievability, no formal balancing of costs and benefits is required; BAT should represent "a commitment of the maximum resources economically possible to the ultimate goal of eliminating all polluting discharges." EPA has considerable discretion in weighing the costs of BAT.... The Administrator should be bound by a test of reasonableness.* NRDC v. EPA, 863 F.2d at 1426 ,(citations omitted).

San Francisco has made an extraordinarily large investment in CSO control technology. This is consistent with BAT requirements to commit the maximum resources economically possible to the goal of eliminating pollutant discharges. However, without the associated water quality benefits that justified this investment, EPA would not conclude that this was a reasonable expense to require. Therefore, EPA concludes that the existing level of storage and treatment for CSOs exceeds BAT requirements for toxic pollutant removals.

This, however, does not conclude EPA's analysis of BAT. Given the existing treatment system, and the existing resource commitment, EPA has also examined possible mechanisms to improve reductions of toxic pollutants. This review is appropriate to determine whether it is reasonable to require additional steps to address toxic pollutants when considering the costs already incurred by the program as a whole and the incremental costs and benefits of potential improvements. Without such a review, cost-effective improvements to toxic pollutant removal could escape consideration simply because so much has been already spent. The toxic pollutant removal technology examined is increased primary and secondary treatment of all wastewater and stormwater, as well as toxic pollutant control strategies in EPA's CSO Policy (see Section I).

Analysis of toxic pollutant removal efficiencies through primary and secondary treatment (activated sludge).
For purpose of this cost analysis, additional primary and activated sludge treatment was selected as the most cost efficient toxic removal technology. This selection is based on a study of 40 POTWs. The study compares removal efficiencies through primary treatment, activated sludge (secondary), trickling filter, and tertiary treatment.[19] Copper, Lead, and Zinc were chosen for this analysis. Removal efficiencies for Copper, Lead, and Zinc are as follows:

	Primary	Primary and Secondary
Cu:	22%	86%
Pb:	57%	61%
Zn:	27%	79%

Decanting was conservatively estimated to have no effect on metals removal. (Since decanting does remove some suspended solids, it would likely have some effect on removing metals. However, no data exists to estimate the amount.)

Site-specific wet-weather influent data for 1994 and 1995 was used. The most cost efficient means to increase the amount of wastewater that receives primary and secondary treatment is to increase storage capacity (as opposed to increasing treatment facilities).

Analysis of Increased Storage
Under this scenario (similar scenario as discussed under BCT above), the 1,280 million gallons per year (MGY) that currently is decanted would receive a combination of primary and secondary (an additional 40 MGY would receive primary and 1,056 (MGY) would receive secondary). The remaining 184 MGY would be discharged to the shoreline. (See Table 6). By multiplying these flows by the removal efficiencies for primary and secondary above, the reductions in loadings were calculated. Assuming an amortized $11.1 million yearly cost for the additional treatment, the cost/lb of removal was estimated.[20]

Metal	% Reduction	$$/lb removed
Copper	26%	$300
Lead	12%	$1,400
Zinc	21%	$100

Analysis of Full Secondary
By increasing the storage capacity by another 108 Million Gallons, all stormwater/wastewater (except for the eight shoreline overflows) could receive secondary treatment (See Table 6). While this would further reduce the loadings of metals to the ocean, the cost, of course, would increase significantly. (This scenario is not the same as the "Full Containment" Options discussed under the BCT Analysis. The scenario is cheaper because is assumes eight overflows per year, and therefore does not require additional treatment facilities.) The reduction in metals discharged to the ocean was calculated. Assuming an amortized yearly cost of $28 million, the cost per pound removed was also calculated.[21]

Metal	% Reduction	$$/lb removed
Copper	37%	$500
Lead	12%	$3,700
Zinc	28%	$200

Both the Increased Storage and Full Secondary alternatives would achieve, at best, marginal reductions in toxic pollutant loadings (12% to 37%) at extremely high costs ($100 to $3,700/lb). These expenditures would be wholly unreasonable given their limited effectiveness.

Table 6: Flow Scenarios for BAT Analysis

Scenario	Storage Volume (MGY)	Capital Costs for Add. Stor.	Secondary & Primary (MGY)	Primary Only (MGY)	SWOO Decant (MGY)	Shore Decant (MGY)
Current	69.4		8816	664	1280	440

Option 1	**139**	**$164 M**	**9872**	**704**	**0**	**624**
Option 2	**247**	**$417 M**	**10493**	**0**	**0**	**707**

(vi) Non-water quality environmental impacts (including energy requirements).
By 1996, the City will have constructed about 70 MG of storage on the Westside, consisting of 47.6 MG in the Westside Storage/Transport project, 19.7 MG in the Richmond and Lake Merced Storage/Transport project, and an additional 2.2 MG of storage in the sewer lines. The Westside Storage/Transport, one of the largest wastewater storage structures in the nation, is a 2.5-mile long, box-like structure located beneath the Great Highway. Approaching full containment of combined flows (assuming one overflow per year) would require the construction of either an additional 515 MG of storage or the construction of a 65 MGD wastewater treatment plant and an additional 220 MG of storage[22].

Constructing the required storage facilities would involve the excavation of many miles of City streets and would be extremely disruptive to local residents. Constructing an additional wastewater treatment plant in a densely populated city such as San Francisco would be extremely difficult, possibly involving the condemnation of private property. Neighborhood disruption resulting from construction on this scale would include street closure for up to one year, dust and noise nuisances, potential vibration damage from the excavation and pile-driving equipment, and traffic disruption from truck deliveries and workers commuting to and from construction sites. Although land and property values would probably be unaffected in the long term, properties in the vicinity of construction activities would likely take longer to sell during the construction period than they would normally.

The fact that these extensive construction activities would occur in a densely populated city and adjacent to environmentally sensitive coastal areas was a consideration for designing and constructing the City's current system to allow for an average of eight overflows per year, rather than one. In 1979, the SWRCB (with EPA concurrence) granted an exemption to the Ocean Plan that allowed up to eight overflows per year on the Westside, partially due to the fact that the Central Coast Regional Coastal Commission had denied the City a required development permit based on one overflow per year because of the size and location of the transport necessary for a one overflow system[23]. The major increase in facility size that would be needed was judged to be too disruptive to the coastal area. Other concerns voiced by the Coastal Commission include future beach erosion, sewer exposure, seismic disturbances, and groundwater problems.

BAT Summary
BAT applies to toxic and non-conventional pollutants. Based on the guidance provided by the CWA, the costs of increased storage, along with the non-water quality environmental impacts, are excessive compared to the benefits provided, and this expenditure would be wholly unwarranted under BAT. The current treatment facilities therefore exceed the cost of treatment facilities that would be required under BAT.

1. City and County of San Francisco. *Westside Operation Plan for the Oceanside Water Pollution Control Plant*, January 1990.

2. City and County of San Francisco, 1994 NPDES Permit Program, Attachment 1. Page 7.

3. City and County of San Francisco, Department of Public Works. September 1991. Op Cit.

4. San Francisco Public Works Code, Section 118, Article 4.1, Industrial Waste.

5. City and County of San Francisco, Department of Public Works. *Industrial Waste Pretreatment Program Annual Report*, June 1992.

6. Ibid.

7. San Francisco Clean Water Program. *Westside Water Pollution Control Facility Planning Report*, 1988. Page 5-5.

8. City and County of San Francisco, Department of Public Works. *Westside Transport Performance Evaluation Study, Final Report*, March 1991.

9. James M. Montgomery, Consulting Engineers, Inc. *City and County of San Francisco, Department of Public Works, Best Management Practices Study*, August 1992.

10. 1972 Leg.Hist. at 170, cited in *Chemical Manufacturer's Association v. USEPA*, 870 F.2d 177 (5th Cir. 1989)

11. Lam, Johnson, Area Engineer, to John Wolfenden, Section Leader, *Internal Memo, BOD and TSS Cost Removal Data or EBMUD and CCCSD,* Regional Water Quality Control Board, San Francisco Bay Region, May 19, 1993.

12. City and County of San Francisco, Department of Public Works, *Determination of BCT/BAT for Westside Permits,* September 17, 1993, Appendix A.

13. U.S. Environmental Protection Agency. *Cost Estimates for Select Combined Sewer Overflow Control Technologies*, 1992. Page 1.

14. Ibid. Page 8.

15. EPA Region IX and California Regional Water Quality Control Board. *Fact Sheet, NPDES No. CA 0037681.* Page 12.

16. City and County of San Francisco, Department of Public Works, *Memorandum from Michelle Pla, Planning and Control, to Shirin Tolle, Environmental Engineer, USEPA,* November 12, 1993, pp. 2-4.

17. City and County of San Francisco, September 1991, Op Cit., Page 37.

18. *Chemical Manufacturer's Association v. USEPA,* 870 F.2d 177 (5th Cir. 1989), p. 205 citing Rep. Roberts in 1977 Leg.Hist. at 330.

19. EPA Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program, December 1987, pp.3-55 - 3-58.

20. EPA Region 9, Memo to files from Doug Liden, Engineer, "Calculations of Metals Removal Achievable Through Additional Storage," June 1, 1995.

21. Ibid.

22. City and County of San Francisco. *Control of Westside Storm Flows*, September 1991. Page 31.

23. California Water Resources Control Board. Order No. WQ 79-16. Page 15.

Attachment 3

Memorandum of Agreement

MEMORANDUM OF AGREEMENT

BETWEEN

THE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,

THE
U.S. ENVIRONMENTAL PROTECTION AGENCY,

THE
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

THE
CALIFORNIA STATE WATER RESOURCES CONTROL BOARD,

THE
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD,
CENTRAL COAST REGION,

THE
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD,
SAN FRANCISCO BAY REGION,

THE
CALIFORNIA COASTAL COMMISSION,

AND THE
ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

TABLE OF CONTENTS

I. PURPOSE OF MOA

The purpose of this Memorandum of Agreement (MOA) is to provide an ecosystem based water quality management process that integrates the mandates and expertise of existing coastal and ocean resource managers and protects the nationally significant resources, qualities and compatible uses of the Monterey Bay National Marine Sanctuary (Sanctuary or MBNMS).

II. AUTHORITY

A. NOAA

Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, (MPRSA), 16 U.S.C. §§ 1431 et seq., National Program Regulations at 15 CFR Part 922 and the Monterey Bay National Marine Sanctuary regulations at 15 CFR Part 944 as administered by the National Oceanic and Atmospheric Administration (NOAA).

B. U.S. EPA

The Federal Water Pollution Control Act, as amended, (Federal Water Pollution Control Act or Clean Water Act (CWA)), 33 U.S.C. §§ 1251 et seq., gives the U.S. Environmental Protection Agency (U.S. EPA) authority to regulate both point and non-point (e.g., stormwater) sources of pollution. In addition, title I of the MPRSA (33 U.S.C. §§ 1401 et seq.) section 102 gives U.S. EPA authority to permit non-dredged material for the purpose of dumping into marine waters.

C. State and Regional Boards

The State Water Resources Control Board (State Board or SWRCB) and the California Regional Water Quality Control Boards (Regional Boards or RWQCBs) are established by the Porter-Cologne Water Quality Control Act, Division 7 (commencing with Section 13000) of the California Water Code. The State and Regional Boards are the state agencies with primary respônsibi-lity for water quality control in California. The Act provides a statewide program for water quality control administered regionally within a framework of statewide coordination and policy. The Act contains a complete regulatory framework for the regulation of waste discharges to both surface and ground waters. It also provides for the adoption of water quality control plans and implementation of these plans by adoption of water discharge requirements for the discharges of waste that could impact State waters. Extensive enforcement mechanisms are available to ensure that requirements are met.

The Water Code also provides the necessary authority for the State to operate the National Pollutant Discharge Elimination System (NPDES) permit program in California in lieu of U.S. EPA. The law is codified in Chapter 5.5, Division 7 of the Water Code. As a result, the issuance of a California NPDES permit under State law satisfies the requirements of the Federal Water Pollution Control Act.

The State Board's jurisdiction and responsibilities include but are not limited to: (a) overseeing Regional Board regulation of discharges into State waters under the California Porter-Cologne Water Quality Control Act; (b) developing water quality standards; (c) adopting and approving water quality control plans; (d) overseeing Regional Boards' issuance, compliance monitoring, and enforcement of all NPDES permits in California including NPDES general permits and permits for Federal facilities; (e) overseeing Regional Boards' implementation and enforcement of National Pretreatment Program requirements except for NPDES permits incorporating variances granted under Federal Water Pollution Control Act Sections 301(h) and 301(m) and permits to dischargers for which EPA has assumed direct responsibility; (f) designating "Areas of Special Biological Significance (ASBS):, under State Board Resolution No. 74-28, for the purposes of protecting areas of high biological productivity and ecological sensitivity; (g) adopting standards and regulations for waste disposal sites; (h) implementing Toxic Substances Monitoring (TSM) and State Mussel Watch Programs; (i) administering the State's Water Quality Planning Program pursuant to CWA Section 205(j); (j) issuing or denying Water Quality Certification for any Federally licensed or permitted project which may result in discharges to navigable State waters pursuant to CWA Section 401; (k) developing and implementing the State Nonpoint Source Management Program pursuant to CWA Section 319; and (l) working with the California Coastal Commission (CCC) and the San Francisco Bay Conservation and Development Commission (BCDC) in developing and implementing a Coastal Nonpoint Pollution Control Program pursuant to the Coastal Zone Act Reauthorization Amendments of 1990, Section 6217.

The jurisdictional boundaries of the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board 2), are described in Water Code Section 13200(b). The jurisdictional boundaries of the California Regional Water Quality Control Board, Central Coast Region (Regional Board 3), are described in Water Code section 13200(c).

The Regional Boards have jurisdiction and are responsible for: (a) regulation of waste discharges into State waters; (b) adoption of water quality control plans for the watershed basins within each region; (c) issuance, monitoring, and enforcement of NPDES individual and general permits and other waste discharge requirement orders within each region;

(d) adoption and enforcement of pretreatment standards; (e) issuance, monitoring, and enforcement of requirements for waste disposals to land; and (f) taking all other planning and regulatory action necessary to assure protection of water quality within the regions.

D. California Coastal Commission

Pursuant to the California Coastal Act of 1976 and the Federal Coastal Zone Management Act (CZMA) of 1972, as amended, the California Coastal Commission (CCC) has jurisdiction and is responsible for: (a) administering the California Coastal Management Program (CCMP); (b) receiving grants from the Federal Government in support of the coastal management program; (c) implementing, through the CCMP's broad planning and regulatory framework, a comprehensive set of specific policies for the protection of coastal resources and the management of orderly development throughout the State's coastal zone; and (d) reviewing, for consistency with the CCMP, all activities within or outside of the coastal zone that affect land or water uses or natural resources of the coastal zone and that are conducted, permitted, or funded by the Federal government. In addition, pursuant to Section 6217 of the Coastal Zone Management Act Reauthorization Amendments of 1990, the CCC is responsible for developing, in conjunction with the SWRCB, a coastal Nonpoint Pollution Control Program for submission to the Administrator of U.S. EPA and the Secretary of Commerce for approval.

The Coastal Act grants the CCC authority to issue Coastal Development Permits (CDPs) for any development in the coastal zone until local governments adopt CCC-approved Local Coastal Programs (LCPs). The Commission works with local governments to design LCPs that reflect local coastal issues while meeting the statewide goals and policies of the Coastal Act. Upon certifying a LCP's compliance with Coastal Act requirements, the CCC delegates most permitting and related monitoring and enforcement responsibilities to the local jurisdiction. Several well-defined regulatory responsibilities delineated by the Coastal Act and the CZMA, however, permanently reside with the CCC. Included among these is the aforementioned "Federal consistency" review authority. Distinct sets of State and Federal standards and procedures for determining consistency with the CCMP apply to Federal agency activities, Federally funded activities, and non-Federal activities that require Federal licenses or permits, including oil and gas exploration, development, and production on the Outer Continental Shelf.

E. Association of Monterey Bay Area Governments

The Association of Monterey Bay Area Governments (AMBAG) is a Council of Governments, created as a voluntary agency established by agreement among its members pursuant to a joint powers agreement, and established among its members as an area-wide planning and water quality management organization and is responsible for: (a) serving as the Metropolitan Regional Clearing House to review and comment on Federal grant applications and proposed Federal projects and other environmental documents and plans prepared pursuant to CEQA and NEPA, (b) creating a Non-Point Source Water Quality Management Plan pursuant to its designation by the State in 1975 under Section 208 of the Federal Water Pollution Control Act, (c) managing Federal transportation funds, general transportation, reviewing transportation projects or capital improvements in major urban areas and annually endorsing a Transportation Improvement Program and Regional Transportation Plan pursuant to its designation as a Metropolitan Planning Organization (MPO) by the State of California, (d) preparing an air quality plan to ensure consistency with Federal Clean Air Act, National Air Quality Standards, (e) preparing a regional hazardous waste management plan in accordance with Tanner Legislation (AB 2948, 1986), and (f) preparing a 5-year plan of housing needs for each city and county within its jurisdiction.

III. SCOPE

This agreement shall apply to the following permits, plans, research, and monitoring efforts within all California waters to achieve the purpose of this MOA:

A. National Pollutant Discharge Elimination System (NPDES) permits (which include stormwater associated with industrial activity and stormwater from urban areas) issued under Section 13377 of the California Water Code (Hereafter "NPDES permit"),

B. Waste Discharge Requirements (WDR) issued under Section 13263 of the California Water Code,

C. California Ocean Plan, Enclosed Bays and Estuaries Plan, Inland Surface Water Plan, relevant Basin Plans, and CWA 208 Plans,

D. Non-Point Source (Hereafter "NPS", when abbreviated) Pollution Planning and Control Measures including Management Plans prepared under Sections 319 and 208 of the CWA and under Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, and

E. Research and monitoring toward the development of a Sanctuary Water Quality Protection Program, as outlined in Section VII of this MOA.

IV. POLICY FOR INTERAGENCY COORDINATION

A. NOAA Role:

- Provide its Sanctuary data and reports to the signatory agencies semiannually.

- Ensure holistic, uniform protection is provided to all Sanctuary resources and qualities.

- Provide comprehensive ecosystem perspective.

- Consider cumulative impacts from multitude of projects.

- Consider multiple use and conflict resolution between potentially competing user groups and other Sanctuary activities, e.g., research and education projects and other permitted activities.

- Provide experience and perspective from National System of sanctuaries, e.g., examples and models of approaches and methods to address similar issues from other sites.

- Build up data-base on what is going on in Sanctuary area via tracking and filing of existing permits to see if problems exist. Begin to address potential or perceived problems early on and then work cooperatively to address issues.

- Provide recommendations on conditions or objections to discharge permits based upon potential injury to Sanctuary resources and qualities and compliance with applicable criteria.

- Work with all signatory agencies of this MOA to integrate NOAA criteria, goals, and objectives into water quality plans, i.e., Basin Plans, California Ocean Plan, Enclosed Bays and Estuaries Plan, Inland Surface Water Plan, CWA 208 and 319 Plans, and CZMA NPS management measures.

- Provide comments on impacts on Sanctuary resources and qualities, impacts on compatible uses of the Sanctuary, and impacts on NOAA's management of the Sanctuary.

- Identify, in consultation with U.S. EPA, a specific threat of significant injury or significant injury to the Sanctuary resources or qualities. NOAA provides evidence and informs U.S. EPA, the RWQCB, the discharger (for existing permits), or the permit applicant.

- Work with U.S. EPA, the discharger or applicant, and RWQCB to address the threat of significant injury or significant injury to the Sanctuary.

- Utilize the "Process for Elevation" (see Section VIII of this MOA) when it deems appropriate.

- Provide certifications in accordance with this MOA.

B. U.S. EPA Role:

- Work with the State Board and the Regional Boards to assure that all Section 402 NPDES permits are issued in a timely manner, protective of water quality, and that full compliance is achieved with all the terms contained therein.

C. State Board Role:

- Provide expertise on water quality issues.

- Work with NOAA and Regional Boards to determine if it is necessary to develop criteria in addition to that already promulgated by the State and Regional Boards or to take other specific actions in order to protect Sanctuary resources and qualities.

- Work with NOAA and Regional Boards in developing criteria that are scientifically sound to ensure proposed criteria are acceptable for adoption by the State Board as water quality objectives or standards in the respective water quality control plans.

- Oversee all Regional Boards' NPDES permits and other waste discharge requirements.

- Review and provide responses to all petitions filed by NOAA and recommendations made by the Joint Review Board during the "Referral Process" (See Section VIII.B. of this MOA).

- Work with the California Coastal Commission (CCC) and the San Francisco Bay Conservation and Development Commission (BCDC) in developing and implementing a Coastal Non-Point Pollution Control Program pursuant to the Coastal Zone Act Reauthorization Amendments of 1990, Section 6217.

D. Regional Boards' Roles:

- Issue NPDES and Waste Discharge Requirements permits in accordance with applicable State and Federal laws.

- Coordinate procedure to comment on permits as outlined in Section V of this MOA and fulfill Regional board duties described in Sections V and VIII of this MOA.

- Work with NOAA and State Board to determine if it is necessary to develop criteria in addition to that already promulgated by the State and Regional Boards in order to protect Sanctuary resources and qualities.

- Work with NOAA and State Board in developing criteria that are scientifically sound and to ensure proposed criteria are acceptable for adoption by the State Board as water quality objectives or standards in the respective water quality control plans.

- Provide expertise on water quality issues.

- Coordinate with NOAA and all other appropriate agencies on development and implementation of nonpoint source control activities.

- Provide NOAA with data and reports from Regional Board contracts or activities within the Sanctuary.

- Regional Board 3 work with CCC to provide to NOAA the final report on the Coastal Zone Management Act Morro Bay Nonpoint Source pilot program (including status, accomplishments, and potential applicability to the Sanctuary).

E. <u>California Coastal Commission Role</u>:

- Evaluate effects of proposed activities (including discharges) on coastal land and water uses and natural resources in the coastal zone to determine if the proposed activities are consistent with the CCMP. Such evaluations particularly will be guided by the policies set forth in the Coastal Act, an integral component of the CCMP. These policies include, but are not limited to, the following:

    Public Resources Code Section 30230 which provides that "[m]arine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance..." and that "[u]ses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes...;"

    Public Resources Code Section 30231 which directs that biological productivity and water quality shall be "maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment controlling runoff, preventing depletion of ground water supplies, and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams...;"

Public Resources Code Section 30233(a) which limits dredging and filling in coastal waters to situations where "there is no feasible less environmentally damaging alternative," and where feasible mitigation measures have been provided to minimize adverse environmental effects, and where it is related to specific listed purposes;

Public Resources Code Section 30233(b), which states that "Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems."

Public Resources Code Section 30240 which mandates the protection of environmentally sensitive habitat areas "against any significant disruption of habitat values" and against impacts from adjacent development which would "significantly degrade" the area; and,

Public Resources Code Section 30262 which sets forth specific policies applicable to the Commission's regulation of oil and gas development.

- Cooperate with NOAA, EPA, SWRCB, RWQCBs and other Federal, state, and local agencies to promote timely issuance of permits and plans relevant to the MBNMS.

- Provide coastal zone management experience from a statewide perspective on the development of regulatory, planning, educational, and other programs which will be included in the overall management of the MBNMS.

- Ensure that the goals and objectives for protection of the MBNMS's resources are appropriately incorporated in the Monterey Bay segment of the California Coastal Nonpoint Pollution Control Program to be submitted to NOAA and U.S. EPA for approval.

F. <u>Association of Monterey Bay Area Governments Role</u>:

- Consider publication of a Monterey Bay Sanctuary Newsletter that circulates summaries of, and provides review comments on, proposed activities and developments within the Regional Metropolitan Clearinghouse area of projects, studies, plans, and permits which could impact directly or indirectly the Sanctuary.

- Ensure that the interests of local cities and counties are represented during the discharge permitting and planning review process.

- Ensure that any proposed projects or developments are reviewed, when applicable, for consistency with the 208 nonpoint source water quality management plan.

- Provide all parties to the MOA an opportunity to update the area's 208 plan (now 14 years old) in order to document what has been implemented since the late 1970's, and what nonpoint source water quality problems remain to be resolved particularly as they affect the Sanctuary.

- Participate with other agencies in nonpoint source water quality planning issues pertinent to the Sanctuary, including but not limited to 205(j) planning projects, such as the Elkhorn Slough Uplands Water Quality Management Plan, the Urban Runoff Water Quality Management Plan for the Monterey Bay Region, the Coastal Aquatic and Marine Projects Information Transfer System (CAMPTIS), and other non-point source planning efforts such as the Coastal Nonpoint Pollution Control Program under Section 6217 of the Federal Coastal Zone Act Reauthorization Amendments of 1990.

V. PROCEDURES AT THE INITIAL DECISION-MAKING LEVELS

A. <u>General</u>:

1. Parties agree to work together and review proposed permits and plans in parallel to avoid delays in issuance of the permit or plan.

2. NOAA agrees to provide a reasonable basis for objections or recommended terms and conditions based on evidence of a significant threat of injury to Sanctuary resources, qualities, compliance with applicable criteria, and effects on other compatible uses of the Sanctuary.

3. The Regional Board staff will make every effort to resolve conflicts between NOAA and the Regional Board during the scheduled comment period.

4. If conflicts are not resolved during the comment period, the Regional Board may take action on the permit or plan. The effective date of any new

permit that is not consistent with all of NOAA's comments will be no earlier than 45 days from the date the Regional Board adopts the permit. If NOAA has objections after Regional Board adoption of the permit or plan, NOAA may appeal the decision in accordance with the process for elevation outlined in Section VIII of this MOA.

B. Existing Permits (NPDES/WDR):

Copies of all current permits for discharges originating in:

* all of the counties of Monterey, Santa Cruz and San Benito,

* those portions of San Luis Obispo County which fall within the Salinas River drainage or which drain into the Pacific Ocean northerly of the southern boundary of the Sanctuary,

* those portions of San Mateo County which drain directly into the Pacific Ocean,

* those portions of the City and County of San Francisco which drain directly into the Pacific Ocean, and

* those portions of Marin County southerly of the northern boundary of the Sanctuary which drain into the Pacific Ocean

will be sent within 90 days of the effective date of Sanctuary designation, by the Regional Boards to NOAA with a listing of expiration/review dates, as well as the Regional Boards' schedule for mailing of draft permits for existing dischargers. NOAA will use information obtained pursuant to this paragraph in its efforts to implement a Sanctuary monitoring plan. Regional Boards will also provide copies or summaries of existing monitoring data for the last three years for each discharger.

Discharges outside the Sanctuary shall not be prohibited for failure to notify NOAA within 90 days of sanctuary designation.

NOAA will review existing permits and NOAA will report to the Regional Boards on any conflicts between Sanctuary protection and the quality of discharges as soon as a conflict is documented by NOAA.

NOAA may request a Regional Board review and commensurate hearing to consider permit revision or enforcement action by the Regional Board at any time data warrant such action. The Regional Boards will determine whether data warrant the reopening of a permit subsequent to a hearing. NOAA bears the burden of demonstrating threat of injury which would justify revision of permits by the Regional Boards before a regular five-year review. Such demonstration will be based on State or Federal laws, regulations, and standards. NOAA will make every attempt to minimize requests for "mid-permit life" revisions by evaluating all available data during the regularly scheduled five-year review intervals. Any revisions must be consistent with EPA regulations on reopening permits.

Provided the provisions of this Section V.B are adhered to by the Regional Boards, NOAA will certify within six months of receipt the existing valid permits it receives copies of.

C. Existing Plans

NOAA will review and provide comment on the California Ocean Plan, Enclosed Bays and Estuaries Plan, Inland Surface Water Plan and Regional Board Basin Plans during the regularly scheduled review period.

All parties agree to make every effort to build upon existing regional, local, and State water quality control plans.

D. Non-Point Source Pollution

All parties recognize the significance of nonpoint source (NPS) pollution to the health of the Monterey Bay ecosystem, and whereas there is currently a lack of data and information to adequately control NPS pollution all parties agree to:

Focus pertinent ongoing NPS pollution efforts such as CWA 205(j) studies, municipal and industrial stormwater permitting (Section 402, CWA), 208 plans, 319 programs, and NOAA water quality research efforts to develop adequate prevention and management measures for protection of the Sanctuary. Management of significant contributions to nonpoint source pollution to Monterey Bay shall be addressed through the ongoing development of the State's Coastal Non-Point Source Pollution Control Program under Section 6217, and the Bay Protection and Toxic Cleanup Program.

Work together to incorporate those controls and measures determined necessary to protect the Sanctuary into the California Ocean Plan, Enclosed Bays and Estuaries Plan, Inland Surface Water Plan and appropriate Basin Plans once adequate prevention controls and management measures have been determined.

E. <u>New and Revised Permits</u>

Regional Boards will require applicants for new and revised permits ("revised permits" include renewals) for discharges originating in the geographic areas described in Section V.B of this MOA to submit applications simultaneously to NOAA as well as the Regional Board. Further, if NOAA provides reasonable evidence of a significant threat of injury to Sanctuary resources or qualities from a proposed or on-going discharge originating outside those geographic areas but originating anywhere in San Luis Obispo County, the relevant Regional Board will require the applicant for that new or revised permit to submit an application to NOAA as well. Regional Boards will make every effort to ensure that applicants for revised permits submit applications at least six months before expiration of current permits.

No additional applications will be required by NOAA, however NOAA may seek, through the Board, additional information from the applicants in accordance with State law. Regional Boards will draft permits according to the schedule submitted to NOAA, incorporating all criteria which the Regional Board determines to be applicable (e.g., State Ocean Plan, Enclosed Bays and Estuaries Plan, Inland Surface Water Plan, Basin Plans, Federal regulations) as agreed upon in the 1989 National Pollutant Discharge Elimination System (NPDES) MOA between the U.S. EPA and the SWRCB. Regional Boards will mail draft permits to NOAA and all other concerned agencies for comment 90 days before scheduled adoption of the draft permit by the Regional Board. No permit may be renewed or otherwise issued allowing the discharge of primary-treated sewage within the Sanctuary. However, as the City of Watsonville is in the process of obtaining a CWA 301(h) waiver renewal as the Sanctuary designation is being finalized, the City of Watsonville may be allowed a one time renewal with a timeline for compliance with secondary standards requirements. This one time renewal allows the City of Watsonville until November 1, 1998 to achieve secondary treatment. The signatories of this MOA will cooperate with and where possible assist the City of Watsonville to achieve secondary treatment of sewage.

NOAA will review and comment on any draft new or revised permits and EIRs/EISs during the publicly noticed comment period. NOAA will review draft permits, monitoring summaries, and any other applicable data, and provide comments to the Regional Board no later than 30 days prior to the scheduled date of Regional Board adoption of the permit. Agendas are sent to Regional Board members two weeks before the meeting (one week for Regional Board 2). All comments should be based upon State or Federal laws, regulations, and standards which will be specified in the comments.

The Regional Board shall consider and address all comments and shall modify the proposed permit to incorporate those comments with which the Regional Board agrees and shall prepare a written response to each NOAA comment that is not accommodated. If the Regional Board adopts a revised permit which is not consistent with all of NOAA's comments, the permit will be effective upon expiration of the current permit. If the Regional Board adopts a new permit which is not consistent with all of NOAA's comments, the effective date of the permit will be no earlier than 45 days from the date the Regional Board adopts the permit. However, the permit could be affirmed, amended or overturned in accordance with Section VIII, the Procedures for Referral.

Valid permits that are consistent with all of NOAA's comments will be deemed by NOAA, through notification to the permittee, to have met paragraph (a) of 15 C.F.R. § 944.11. Valid revised permits that are not consistent with all of NOAA's comments will be deemed by NOAA to have met such paragraph (a) on an interim basis as of their effective date and will be deemed by NOAA to have met such paragraph (a) on a final basis upon NOAA notification to the permittee that Sections V.E and VIII of this MOA have been complied with. Valid new permits that are not consistent with all of NOAA's comments will be deemed by NOAA to have met such paragraph (a) upon NOAA notification to the permittee that Sections V.E and VIII of this MOA have been complied with. Such notification shall be sent by NOAA within 10 working days following NOAA receipt of written notice of the action by the RWQCB or SWRCB, as appropriate. If NOAA fails to act within this time period, the subject permit shall be deemed to have met such paragraph (a).

No permit may be issued allowing the disposal of dredge material within the Sanctuary other than at sites designated as of the effective date of Sanctuary designation.

With regard to the combined sewer overflow component of the City and County of San Francisco's sewage treatment program, as approved by the San Francisco RWQCB and U.S. EPA: a buffer zone has been created encompassing the anticipated discharge plume in order to protect Sanctuary resources and qualities from the discharge. The parties to this MOA agree that the MPRSA and its implementing regulations do not apply to the buffer zone. The buffer zone extends from Point San Pedro (37° 35' 39.9577'' N latitude, 122° 31' 11.0433'' W longitude); to 37° 36' 59.4490'' N latitude, 122° 36' 56.2934'' W longitude; to 37° 46' 01.2422'' N latitude, 122° 38' 56.4737'' W longitude; to Point Bonita (37° 49' 05.9481'' N latitude, 122° 31' 42.3981'' W longitude). The shoreward boundary of the buffer zone extends from Point San Pedro north along the coast following the mean high tide line to Point Lobos and thence in a straight line to Point Bonita.

F. Consistency Review Procedures

California Coastal Commission shall conduct its consistency review in accordance with the NOAA-approved CCMP.

VI. INTEGRATION AND COORDINATION OF RESEARCH AND MONITORING EFFORTS

- All parties to this MOA agree that a higher degree of resource protection may be necessary for the Sanctuary.

- All parties to this MOA agree to conduct, coordinate, and integrate any joint research, monitoring, and permit review oversight. The results of these efforts will be used to develop a more specific water quality management plan and to provide a higher degree of resource protection for the Sanctuary.

VII. SANCTUARY WATER QUALITY PROTECTION PROGRAM AND DEVELOPMENT OF SANCTUARY CRITERIA

A. Sanctuary Criteria

- Criteria are proposed values which are intended to provide a nonregulatory, scientific evaluation of the ecological effects of pollutants. EPA has published numerical criteria for priority pollutants under CWA Section 304(a). The Section 304(a) criteria or other proposed values become water quality objectives after adoption by the State Board pursuant to the provisions of the California Porter-Cologne Water Quality Control Act. These objectives, once they are combined with beneficial uses and approved by EPA, become water quality standards pursuant to the CWA.

- NOAA shall consult with the State Board and the Regional Boards to determine if it is necessary to develop criteria in addition to those already promulgated by the

State Board and Regional Boards in order to protect Sanctuary resources and qualities and compatible uses.

- Any necessary specific criteria will be developed for the Sanctuary to implement the purposes of Title III of the MPRSA. These criteria will be developed in a Water Quality Protection Program process (see below under Part B of this Section).

B. Water Quality Protection Program

- All signatory agencies agree to work together to develop a comprehensive water quality protection program for the Sanctuary.

- The purposes of such water quality program shall be to--

(A) recommend priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution to restore and maintain the chemical, physical,and biological integrity of the Sanctuary, including restoration and maintenance of the resources, qualities and compatible uses of the Sanctuary; and
(B) assign responsibilities for the implementation of the program among the Governor, the Secretary of Commerce, and the Administrator of U.S. EPA or designees in accordance with applicable Federal and State laws.

The program shall under applicable Federal and State laws provide for measures to achieve the purposes described above including--

(A) adoption or revision, under applicable Federal and State laws, by the State and the Administrator of applicable water quality standards for the Sanctuary, based on water quality criteria which may utilize biological monitoring or assessment methods, to assure protection and restoration of the resources and qualities of the Sanctuary;
(B) adoption under applicable Federal and State laws of enforceable pollution control measures (including water quality-based effluent limitations and best management practices) and methods to eliminate or reduce pollution from point and nonpoint sources;

(C) establishment of a comprehensive water quality monitoring program to (i) determine the sources of pollution causing or contributing to existing or anticipated pollution problems in the Sanctuary, (ii) evaluate the effectiveness of efforts to reduce or eliminate those sources of pollution, and (iii) evaluate progress toward achieving and maintaining water quality standards and toward protecting and restoring any degraded areas and living marine resources of the Sanctuary;
(D) provision of adequate opportunity for public participation in all aspects of developing and implementing the program;
(E) identification of funding for implementation of the program, including appropriate Federal and State cost sharing arrangements; and
(F) provision to ensure compliance with the program consistent with applicable Federal and State laws.

In the development and implementation of the program appropriate State and local government officials shall be consulted either directly or via AMBAG.

VIII. PROCEDURES FOR REFERRAL

A. General:

1. In the vast majority of cases, the concerns of the different parties to this MOA will be addressed at the Initial Decision-making levels.

2. If concerns have not been resolved at the Initial Decision-making levels, the dispute could be referred to higher level officials within each agency for resolution.

3. If resolution is not reached at Initial Decision-making levels, the following process is available to NOAA.

B. Process for elevation:

1. If the RWQCB permit does not, in the opinion of NOAA, adequately act to relieve the threat of significant injury or significant injury to the Sanctuary, i.e., the threat of significant injury or significant injury is still occurring and there is not underway a NOAA-approved (in consultation with U.S. EPA) action plan to adequately reduce or eliminate the threat of significant injury or significant injury to the Sanctuary, NOAA may file an appeal with the SWRCB within 30 days of the RWQCB action (ref: Section 13320

of the California Water Code). The SWRCB shall act to confirm, amend or overturn the decision of the RWQCB within 45 days of the appeal being filed by NOAA.

2. If, after the SWRCB acts to confirm, amend or overturn the decision of the RWQCB, in the opinion of NOAA, the SWRCB has not adequately acted, i.e, the threat of significant injury or significant injury to the Sanctuary is still occurring and there is not underway a NOAA-approved (in consultation with U.S. EPA) action plan to adequately reduce or eliminate the threat of significant injury or significant injury to the Sanctuary, NOAA may file an appeal with the MBNMS Joint Review Board (JRB) within 30 days of the SWRCB's action. The JRB shall consist of the Administrator of NOAA (or designee) and the Secretary of California EPA (or designee).

3. After considering information received from NOAA, the SWRCB, the RWQCB, other public agencies and the public, the JRB shall recommend to the SWRCB the confirmation, amendment, or overturning of the decision of the SWRCB. The JRB shall make such recommendation within 30 days of receipt of the appeal to it.

4. The SWRCB shall act to confirm, amend or overturn its decision within 60 days of receipt of the JRB's recommendation.

IX. RIGHTS OF APPEAL OR PETITION UNDER FEDERAL OR CALIFORNIA STATUTE OR REGULATION

This MOA is not intended to limit any rights of appeal or petition of any signatory to this MOA existing under Federal or California statute or regulation.

X. MODIFICATION PROVISIONS

This MOA shall become effective upon signature by all parties hereto.

Any amendment to this MOA shall only be in writing and shall become effective only upon the signature of all signatory agencies. Any amendment to this MOA shall be published in the Federal Register.

An individual signatory agency may withdraw from this MOA only if the Procedures for Referral in Section VIII have been exhausted on at least one occasion and the resolution of the subject dispute is not acceptable to the withdrawing party. Upon notice that a party is considering withdrawing, NOAA shall publish a notice in the Federal Register stating the reasons for ultimately decides to withdraw, it shall give the other parties at least 90 days notice of intent to withdraw, and NOAA shall publish a notice in the Federal Register announcing the withdrawal.

This MOA shall become invalid only if NOAA or the SWRCB withdraws in accordance with the above procedures.

Gertrude M. Coxe, Director
Office of Ocean and Coastal Resource Management
National Oceanic and Atmospheric Administration

Harry Seraydarian, Director
Office of Water, Region IX
U.S. Environmental Protection Agency

James Strock, Secretary
California Environmental Protection Agency

Walt Pettit, Executive Director
State Water Resources Control Board

Steven Ritchie, Executive Officer
San Francisco Regional Water Quality Control Board

William Leonard, Executive Officer
Central Coast Regional Water Quality Control Board

Peter Douglas, Executive Director
California Coastal Commission

Nicolas Papadakis, Executive Director
Association of Monterey Bay Area Governments

Appendix C

Comments

Advocates for Wild, Healthy Oceans

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Formerly the Center for Marine Conservation

APR 18 2003

April 17, 2003

Abigail Smith, NPDES Division
San Francisco Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

The Ocean Conservancy

VIA FACSIMILE AND U.S. MAIL

Re: Initial Comments on NPDES Permit No. CA0037681, Oceanside Water Pollution Control Plant and Southwest Ocean Outfall, City and County of San Francisco

Dear Ms. Smith:

The Ocean Conservancy (TOC) welcomes the opportunity to submit the following preliminary comments on NPDES Permit No. CA0037681 for the City and County of San Francisco's Oceanside Water Pollution Control Plan and Southwest Ocean Outfall (Permit). These comments are based on our initial review of documents you supplied to us, specifically the Permit itself, the Self-Monitoring Program, the Fact Sheet, the Memorandum of Agreement relating to the Monterey Bay National Marine Sanctuary, and a September 19, 2002 letter from NOAA regarding potential impacts on endangered species, essential fish habitat, and marine mammals. TOC has several comments on the Permit and the Self-Monitoring Program, which are outlined below.

1. **The Impact of the Removal of a Discharge Site Should Be More Fully Evaluated Prior to Issuing the Permit.**

The discharge system, as described under the old permit, had eight CSO discharge locations. Under the new permit there are seven, because one site was eliminated during construction of the Richmond Transport System. The permit states that the system was designed with a storage and flow capacity to accommodate the historical rainfall in the area. (Permit at 11.) The elimination of one of only a few discharge sites may be a significant change to the system design, but the impact of this change is not discussed. For example, it is impossible to tell whether this has resulted in increased flow of discharge from the remaining seven locations and if so, whether such increased flow results in locally increased concentrations of substances of concern. This change should be addressed in the Permit.

The Ocean Conservancy strives to be the world's foremost advocate for the oceans. Through science-based advocacy, research, and public education, we inform, inspire and empower people to speak and act for the oceans.

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2 **Chronic Toxicity Screening Should Be Conducted Using a Variety of Species.**

Under the 1997 permit, the chronic toxicity bioassay appears to have been conducted on abalone only, based on a determination during screening that this organism was the most sensitive. The new self-monitoring program states that testing on echinoderm development was most sensitive, and that therefore the monthly toxicity assays should be conducted using urchins. The monitoring program documentation acknowledges that the relative sensitivity of species to the assay may vary, stating: "[e]very two years, the Discharger shall re-screen for the most sensitive species, for one month at different times from the prior year and continue to monitor using the most sensitive species." (Self-Monitoring Program at 5.) Given that this kind of variability exists, the Discharger should be required to monitor using a variety of species.

3. **The Effluent Limit for Mercury Should Not Be Removed from the Permit.**

The new permit removes the effluent limit for mercury, based on a determination that there was no reasonable potential that mercury discharge would cause an excursion over the state water quality standard. (Fact Sheet at 27.) However, it is possible that the levels of mercury in the discharges were kept low because of the incentive created by the effluent limit in the permit. In this case, removing the mercury limit would eliminate this incentive and possibly result in exceedances of the water quality standard. On the other hand, it is also possible that the Discharger is effortlessly meeting applicable mercury standards. Under these circumstances, it shouldn't be troublesome to the Discharger to keep the effluent limit in the permit.

4. **The Frequency of Monitoring for Bacteriological Contamination and Acute Toxicity Should Not Be Reduced.**

The new self-monitoring program decreases the frequency of several monitoring requirements. First, monitoring frequency for acute toxicity has been reduced to quarterly from monthly under the rationale that no acute toxicity was detected during the last permit cycle. Similarly, the frequency of shoreline bacteriological monitoring has been decreased to once per week from three times per week based on the rationale that "monitoring over the last permit cycle has satisfactorily characterized the area . . . where bacteriological contamination is routinely found in the absence of a CSO." (Fact Sheet at 34.) Frequent monitoring of both acute toxicity and harmful bacteria is important because of the potential dangers posed to marine life and human health. Reducing the frequency of monitoring for these dangers could vastly slow the response time should an exceedance be detected. Particularly in light of the elimination of the CSO discharge location, monitoring frequency should not be reduced.

Appendix D

Response to Comments

From: "alex lantsberg" <wideye@earthlink.net>
To: "Abigail Smith" <ahs@rb2.swrcb.ca.gov>
Date: 6/2/03 3:48PM
Subject: comments re: SF discharge permit

Hi Abigail.

Thanks for sending me that information and continuing to keep me in the loop on this matter. I expect a number of my colleagues, including Communities for a Better Environment, Surfrider Foundation, and Baykeeper to submit their own comments on the permit application, so I'd like to limit my comments specifically to combined sewage overflows and wet weather facilities.

The Alliance comes to this issue through its several years of work of advocating for the use of more environmentally just and sustainable treatment and management methods for the city's sewage and stromwater. Since persuading the PUC to exclude the Clean Water system from last November's Proposition A capital ilmprovement bond, the Alliance has worked closely with PUC General Manager Pat Martel and SF District 10 Supervisor Sophie Maxwell to craft a process for developing a new Clean Water master plan that can win public support. We'd like to make sure that the Regional Board's regulatory mandates support this effort.

The reform and modernization of the city's stormwater and wet weather management practices must be a fundamental element of this new master plan. The Alliance is particularly interested in comprehensive evaluations of how cutting edge "low impact development" or "soft path" alternatives can be applied within the City's system. This approach is already being used in two areas - the Port of San Francisco's Southern Waterfront and the redevelopment of Hunters Point Shipyard.

A number of the provisions included in the bayside and, i expect, the ocean side permit can help move the City in the right direction. Several of the provisions in the bayside permit call for the development of a number of CSO related studies by a "mutually agreed upon" third parties by various compliance dates. A number of these can and should be folded into the master planning process to ensure their integration with the policy decisions being made in the public planning process. Furthermore, the City's Clean Water Program Technical Review Committee of sewage and stormater management experts, which includes Blair Allen of the Regional Board, should participate in the development of these studies. To that end, the Alliance would like to participate in helping to lay out the scopes of work and consultant selection for these studies.

We would be glad to meet with you in person to discuss how this can occur. In the meantime, please keep us updated on other public participation activities regarding the City's discharge permits.

Sincerely for Alliance for a Clean Waterfront,

Alex Lantsberg

Alex Lantsberg
wideye@earthlink.net

5. **Consultations Required under the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, and the Marine Mammal Protection Act Should Be Completed Prior to Issuance of the Permit.**

The September 19, 2002 letter from Patrick Rutten of NOAA's Protected Resources Division lists a broad array of threatened or endangered species, essential fish habitats, and marine mammals that might be impacted by this action. It is unclear whether U.S. EPA has completed its Endangered Species Act Section 7 consultation responsibilities, although it appears that such consultation has been occurring. Neither the Fact Sheet nor the proposed permit discusses consultation with NOAA regarding essential fish habitat or marine mammals. This permit should not be issued until those responsibilities have been met.

* * *

Thank you for the opportunity to provide these preliminary comments. We look forward to working with you to finalize a Permit that effectively protects both human health and our ocean and coastal resources.

Sincerely,

Linda Sheehan
Director, Pacific Region Office

SFPUC
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
PLANNING BUREAU
1145 Market Street – Suite 401 - San Francisco, CA 94103• Tel. (415) 934-5700 • Fax (415) 934-5750

June 12, 2003

Abigail Smith
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Nancy Yoshikawa
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street, WTR-5
San Francisco, CA 94105

Dear Ms. Smith and Ms. Yoshikawa:

We appreciate the opportunity to review and comment on the final draft NPDES Permit No. CA0037681 and accompanying Fact Sheet and Self-Monitoring Program being issued for the Oceanside Treatment Plant Southwest Ocean Outfall (SWOO) and Westside Wet Weather Facilities. We were asked by the San Francisco Bay Regional Water Quality Control Board to submit comments on issues applicable to the SWOO discharge separate from comments on issues applicable to combined sewer overflows. Where comments do not fall into either category, they are listed separately at the end of the submittal. In preparing these comments, the City has attempted to provide clarification on issues that were not clear or were inaccurate in the documents. When possible, substitute language is also provided.

We hope the attached comments are useful as you prepare the final version of the documents. If you have any questions or would like to meet to discuss these issues please contact Arleen Navarret at (415) 242-2201.

Very truly yours,

Michael P. Carlin, Planning Bureau Manager

c.c. Patricia E. Martel, General Manager, SFPUC
William Keaney, Water Pollution Control Division Manager, SFPUC
Jim Salerno, Environmental Services Manager, SFPUC
Arleen Navarret, Supervising Biologist, SFPUC
John Roddy, Deputy City Attorney
Shin-Roei Lee, RWQCB (with attachments)
Lila Tang, RWQCB (with attachments)

(415) 647-2539

CC: "Jennifer Clary" <jenclary@sbcglobal.net>, "Ruth Gravanis" <gravanis@earthlink.net>, "Jeff Marmer" <jeffmarmer@igc.org>, "Mike Paquet" <earthtoken@lmi.net>, "Cleo Woelfle-Erskine" <heronshead@lejyouth.org>, "Dave McKee" <dmckee@cbecal.org>, "Leo O'Brien" <leo@sfbaykeeper.org>

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

Response to Comments

August 20, 2003

**NPDES Permit Reissuance
for
City and County of San Francisco
Oceanside Water Pollution Control Plant,
Westside Combined Sewer System
NPDES Permit Reissuance**

Three comment letters were received on the draft permit. One is from Linda Sheehan of the Ocean Conservancy, one is from the Alliance for Clean Waterfront, and the other is from City and County of San Francisco (City). The comments are responded to in the order they were received. The comments presented below are excerpts from the comment letters; please refer to the comment letters for the full text. Oral comments were received at the July 16, 2003 Board meetings from representatives of the City and County of San Francisco and the San Francisco Bay Keeper. These comments are summarized and responded to under 4 and 5 below.

1. Response to Linda Sheehan (Ocean Conservancy) letter dated April 17, 2003

A. Removal of CSO Discharge Site

Comment 1: *"The impact of the removal of a discharge site should be more fully evaluated prior to issuing the permit."*

Response 1: The discharge site eliminated from the prior permit is no longer needed now that the Richmond transport structure has been completed. At the time the last permit was being prepared, the Richmond transport structure was just being completed, so the discharge site was included in the permit. The construction of the Richmond transport structure provided additional storage that has reduced the impact on the overall system, eliminating the need for this specific CSO discharge location.

B. Chronic Toxicity Screening

Comment 2: *"Chronic toxicity testing should be conducted (routinely) using a variety of species."*

Response 2: Screening with different species and conducting tests on the most sensitive organisms is recommended in EPA guidance. (See "Region 9&10 Guidance for Implementing Whole Effluent Toxicity Testing Programs," Final. May 31, 1996.) This approach has been found to be effective, and allows the collection of more useful data points by allowing more tests with the most sensitive species to be conducted.

C. Mercury Limitation

Comment 3: *"The effluent limit for mercury should not be removed from the permit."*

Response 3: The prior permit was developed with data collected before "ultra-clean" methods for measuring mercury were being used. Recent data using these new methods indicate that mercury is not found at levels that trigger the need for a limit. While the draft permit does not contain a limit, it still requires monitoring for mercury and continued implementation of pollution prevention measures. We do not expect an increase in mercury levels in the effluent, but if an increase did occur, the Regional Board and U.S. EPA could reopen the permit and add a limitation.

D. Monitoring Frequency

Comment 4: *"The frequency of monitoring for bacteriological contamination and acute toxicity should not be reduced."*

Response 4: Regarding acute toxicity, the last permit contained a provision allowing yearly testing after 12 months of acute testing, if no acute toxicity was detected. Our intention is to maintain this frequency for the upcoming permit cycle, but to consider reducing acute toxicity testing for the next permit cycle. (The permit draft commented on by Sheehan may not have reflected this approach. That change was included in a subsequent draft distributed for public review.) While acute toxicity is important, if the effluent consistently shows no acute toxicity, and we believe chronic toxicity is the more sensitive test, then we may decide to decrease acute toxicity requirements.

Regarding bacteriological monitoring, monitoring requirements in response to a CSO have increased (this draft requires analysis of 3 indicators rather than one as required in the previous permit). Routine weekly monitoring was decreased because we believe that once/week monitoring will be adequate to detect any new dry weather bacteriological issues. If any problems are discovered, the Regional Board and U.S. EPA have the ability to re-open the permit to require additional monitoring/special studies, particularly if these problems appear to be related to San Francisco's wastewater.

E. Endangered Species Act Consultation

Comment 5: *Consultation under ESA and EFH.*

Response 5: NOAA Fisheries and U.S. Fish and Wildlife Service (USFWS) have concurred on our "not likely to adversely affect" determination, and have recommended that San Francisco conduct some limited monitoring. The permit has been amended to reflect this request. While the permit does not require effluent monitoring at this time, the permit requires the City to conduct a study on available monitoring methodologies to detect pathogens of concern to marine mammals in wastewater. Thus, the consultation is now complete. The concurrence letters from NOAA dated May 26, 2003 and USFWS dated June 24, 2003 are included in Attachment J.

2. Response to Alliance for Clean Waterfront E-mail dated June 2, 2003

A. Coordination with City's Master Planning Efforts

Comment 6: *"…the Alliance has worked closely with PUC General Manager Pat Martel and SF District 10 Supervisor Sophie Maxwell to craft a process for developing a new Clean Water master plan that can win public support. We'd like to make sure that the Regional Board's regulatory mandates support this effort."*

Response 6**:** To the extent that the Clean Water Master Plan provisions meet Clean Water Act requirements, the Regional Board and EPA will strive to coordinate our regulatory efforts with the master planning process. If specific issues arise during the planning process that need Regional Board or EPA involvement, the Alliance should feel free to contact agency staff.

Comment 7**:** *"The reform and modernization of the city's stormwater and wet weather management practices must be a fundamental element of this new master plan. The Alliance is particularly interested in comprehensive evaluations of how cutting edge "low impact development" or "soft path" alternatives can be applied within the City's system."*

Response 7: To address the interest that stakeholders have expressed in "soft path" alternatives, the draft permit contains the following language on page 29 under section F.3.b. (Please note that this is revised from the language in the draft permit distributed for comment in response to comments from the City, see #26 below.)

"The Discharger is currently in the process of developing a new comprehensive wastewater master plan. The 'Screening of Feasible Technologies' (SOFT), 2000 draft report should be finalized for use in the master plan process. The Discharger is encouraged to continue to work with interested stakeholders in the development of the master plan."

Comment 8: *"Several of the provisions in the bayside permit call for the development of a number of CSO related studies by "mutually agreed upon" third parties by various compliance dates. A number of these can and should be folded into the master planning process to ensure their integration with the policy decisions being made in the public planning process. Furthermore, the City's Clean Water Program Technical Review Committee of sewage and stormwater management experts, which includes Blair Allen of the Regional Board, should participate in the development of these studies. To that end, the Alliance would like to participate in helping to lay out the scopes of work and consultant selection for these studies."*

Response 8: The Regional Board and EPA will encourage the City to coordinate the development of studies required under the City of San Francisco's permits with the master planning development process. If the Alliance has particular coordination concerns about specific studies, the Regional Board and EPA would be pleased to meet with the Alliance to discuss this further. To address this comment, the permit language at finding 55 has been changed to read "…Board staff will work with the City, and other interested parties to identify the appropriate third party for this effort." The previous language read "…Board staff will work with the City and other POTWs to identify the appropriate third party for this effort."

3. Response to City of San Francisco's (City) - Comment Letter dated June 13, 2003

A. Use of Ocean Plan Objectives and Dilution

Comment 9: *"It is San Francisco's position that Federal marine water quality criteria (Federal Register Vol. 63, No. 237, December 10, 1998) and U.S. EPA's Quality Criteria for Water 1986 (the "Gold Book") are the appropriate guidance to use in evaluating compliance of the SWOO discharge with the Ocean Discharge Criteria regulations. For ammonia, criteria are from U.S. EPA's Ambient Water Quality Criteria for Ammonia (Saltwater)-1989.*

U.S. EPA has stated that it is necessary to use water quality criteria from the California Ocean Plan to determine SWOO compliance in order to ensure that the discharge will not cause unreasonable degradation as stated in 40 CFR 125.122(b). However, additional Federal guidance indicates the use of State criteria is not the only option to ensure against unreasonable degradation."

Response 9: EPA agrees with the City that the use of State water quality objectives is not the only legally available option to meet Federal requirements under 40 CFR 125.122(b). However, as explained in detail in finding 29 of the permit, compliance with numbers borrowed from the Ocean Plan immediately after dilution is required to provide the basis for EPA's determination that the discharge will not cause unreasonable degradation of the marine environment as required by section 403 of the Act.

Comment 10: *"Because the Ocean Plan does not apply to the SWOO discharge (the discharge is in Federal waters), the U.S. EPA can only legally "borrow" the numbers, as is so indicated in the first sentence of Finding 29. However, because the Ocean Plan does not legally apply to the SWOO discharge it is necessary that any reference to the use of Ocean Plan criteria throughout all permit documents be accurately prefaced as being 'borrowed". (Note that the use of Ocean Plan criteria is unnecessary and inappropriate, as Federal criteria exist which can be used.) San Francisco, also, firmly insists that although U.S. EPA is intent on using a guidance option that allows Federal compliance determination based on borrowed State water quality criteria, the Ocean Plan in its entirety does not and cannot be applied to regulate the SWOO discharge."*

Response 10: The Board and EPA have agreed to use the language "water quality objectives borrowed from the Ocean Plan," and have amended the draft permit and fact sheet to include all of the specific changes requested by the City. However, the Board and EPA believe that use of Ocean Plan water quality standards is appropriate to prevent unreasonable degradation of the marine environment (required under the Federal Clean Water Act), and to ensure that State standards will be met in State waters. The Board and EPA agree that the Ocean Plan in its entirety does not automatically apply to the SWOO discharge. However, in preparing this NPDES permit, the Board and EPA have the discretion to borrow Ocean Plan provisions, including, but not limited to, numerical criteria.

Comment 11: *"Because the SWOO discharge is in Federal waters, Federal regulations apply, specifically 40 CFR 125.121(c), which states that discharges to Federal waters are allowed a mixing zone of 100 meters. Therefore, although U.S. EPA is borrowing Ocean Plan numeric standards, the entire Ocean Plan cannot be borrowed, and dilution must be calculated using Federal Regulations. There is no justification for the U.S. EPA to apply "minimum probably initial dilution" from the Ocean Plan in calculating Waste Load Allocation to the SWOO, because the Ocean Plan does not apply to the SWOO discharge."*

Response 11: EPA believes that the use of the minimum probable initial dilution contained in the Ocean Plan is consistent with the Federal regulation at 40 CFR 125.121(c). Although the definition of the term "mixing zone" at 40 CFR 125.121(c) provides that a mixing zone of 100 meters may be used, the definition also provides that a more restrictive mixing zone may also be used when appropriate. Since the discharge is in close proximity to State waters and the Farallon Sanctuary, we believe it is appropriate to use the more conservative minimum probable initial dilution approach set forth in the Ocean Plan. This ensures protection of state waters and waters surrounding the Sanctuary. Additionally, this approach is consistent with the dilution used in the NPDES permits for the other POTW discharges to Federal waters along the coast of California.

Comment 12: *"San Francisco strongly insists that a dilution factor based on the Federal mixing zone be used for compliance purposes for chronic and human health criteria and purposes of any future reasonable potential analysis."*

"San Francisco expects the SWOO dilution factor of 76:1 will be revised prior to re-issuance of the Oceanside permit, or that the inclusion of language that allows such a revision within the current permit cycle, based upon said studies, will be included."

Response 12: In response to these comments and as a result of subsequent discussions with the City, U.S. EPA has agreed to review dilution and provide a determination on appropriate dilution credit(s) for the SWOO discharge by March 1, 2004. EPA has also amended the permit by adding a reopener that will provide for modification of the permit if compliance issues related to the existing dilution arise prior to expiration of the permit.

The City submitted a preliminary dilution study as a response to the public-noticed draft permit, a final dilution study was submitted on July 10 after the close of the Regional Board's public comment period and only several days before the Regional Board hearing. This study is currently under consideration by EPA staff; however, due to the very late submittal, EPA staff has only begun to review the document. Although U.S. EPA and Regional Board staff has worked extensively with the City for a year addressing the City's comments and concerns regarding the permit, staff was not aware that the City was planning to revisit the dilution issue until the close of the public comment period.

Prior to submitting the final dilution study, the City submitted a letter dated July 2, 2003 (several weeks after the close of the public comment period) from the Office of the City Attorney to EPA and the Regional Board asking that the permit adoption be delayed to give the City one to two months to complete the dilution study. U.S. EPA and the Regional Board expressed to the City our reluctance to delay the permit, as the permit expired in May 2002, and agency staff has been working very closely with City staff for over one year to resolve issues. U.S. EPA staff has had further discussions on the issue of dilution with the City. Although U.S. EPA believes the current dilution allowance is appropriate and defensible, U.S. EPA has agreed to address the City's concerns. In addition to adding a permit reopener, U.S. EPA agrees to review the final dilution study submitted by the City on July 10, 2003. By March 1, 2004, U.S. EPA agrees to provide the City with a letter outlining the results of this review. This letter will also provide a determination of the dilution factor or factors the U.S. EPA believes to be appropriate for use in the Oceanside NPDES permit. Unless further information, regulations, or requirements become available prior to reissuance of the permit in the year 2008 that change the determination made by U.S. EPA, U.S. EPA will use the dilution factors as described in this letter to determine permit limitations for the next permit reissuance. This determination will be based on a scientific and technical review of Oceanside's dilution, as well as policy determinations regarding the appropriateness of dilution for bioaccumulative pollutants.

While the majority of NPDES permits within the Boards' jurisdiction contain pollutant-specific limitations, the Oceanside permit contains no pollutant specific limitations. The permit contains only limitations for whole effluent toxicity, and the City has never once violated these limitations over the term of the last permit cycle. As such, even if the dilution factor were to increase as a result of further study, there would be little impact on the permit's effluent limitations or the ability of the City to comply with the permit. Therefore, EPA and the Board are going forward with the adoption of the permit at this time. Specific language changes suggested by the City pertinent to this issue were not made. However, Finding 41 and the Fact Sheet were changed to clarify the relevance of the sentence that the City had found to be confusing in their item "c)".

B. Marine Mammal Report

Comment 13: *"There is no causal link justifying inclusion of this issue as a provision requirement in the Oceanside permit**.** While there has been some speculation by researchers that the recent deaths of sea otters along the central California coast may be due to infection by feline virus associated with storm water runoff this theory has not been corroborated. If those agencies and scientific research groups that are tasked with studying marine mammals along the California coast cannot come to a consensus on the origin of the infection and the transport path of infectious agents to marine mammals,* *then a requirement in the Oceanside permit for the City to develop a study plan and marine mammal report appears to be premature. A coastal watershed approach addressing all storm water and wastewater discharges along the central coast may provide information needed by the research community. A small isolated study by San Francisco would not be money well spent nor would it likely provide information to address this problem."*

Response 13: Subsequent to the release of the public notice draft, NOAA Fisheries and U.S. Fish and Wildlife Service submitted concurrence letters dated May 26, 2003 and June 24, 2003, respectively on EPA's "not likely to adversely affect" determination under the Endangered Species Act consultation. Both NOAA Fisheries and USFWS request that the City conduct effluent monitoring for certain viruses. In response to NOAA Fisheries and USFWS concerns, EPA and the Board have included the following language in the permit:

> "2. **Marine Mammal Report**
>
> NOAA Fisheries (letter dated 5/26/03) and the U.S. Fish and Wildlife Service (letter dated 6/24/03) have expressed concern regarding the potential for stormwater and undisinfected wastewater to transmit pathogens to marine mammals. To begin to address this concern, the Discharger shall submit a report identifying monitoring methodologies to determine the presence in wastewater of pathogens with the potential to affect marine mammals. As appropriate, the Discharger will work with NOAA and other agencies working in this field, to gather appropriate information. This report shall be submitted to EPA and the Board no later than 2 years after the adoption date of this permit."

EPA and the Board believe this language is flexible enough to allow changes to the study if appropriate, yet specific enough to address the concerns of NOAA Fisheries and USFWS. EPA and the Board did not accept the City's language suggested in the comments; while the City's language acknowledges the potential importance of the issue, the language does not commit the City to any action over the life of this permit term.

EPA and the Board do not agree with the City's comment that unless a definite causal link of sea otter deaths with a particular source is shown, that the City should not contribute to needed research. EPA and the Board agree with the City's comment that "those agencies and scientific research groups that are tasked with studying marine mammals along the California coast cannot come to a consensus on the origin of the infection..." However, we do not agree that no action needs to be taken until consensus and certainty is obtained. NOAA Fisheries, one of the prominent agencies whose experts are tasked with studying these issues, has asked that the City to perform a small study to help gather information that NOAA Fisheries believes will be useful. EPA and the Board do not believe the request is unreasonable or burdensome, and therefore is retaining the special study.

C. Bacteria Monitoring

Comment 14: *"However, since total coliform is not a recommended bacteria indicator, there is no justification to require the continued collection of total coliform bacteria data for the life of the permit once the relationship with previous data is established; a period of one year of data collection for all three indicators should be adequate. After one year of data collection using all three indicator organisms, shoreline monitoring should include E. coli (as a surrogate for fecal coliform) and enterococcus as recommended by U. S. EPA guidance. This level of monitoring is recommended by the U.S. EPA and follows the guidance of the State of California Water Resources Control Board in current efforts to coordinate and standardize beach water quality monitoring along the coast of California."*

Response 14: Although Ocean Beach is not legally compelled to comply with AB 411 because it is a CSO system, EPA and the Board would like to maintain consistency with the monitoring requirements contained in AB 411, as many of California's beaches are covered by this State law. Because AB 411 requires total coliform monitoring, EPA and the Board have not changed the permit language per the City's request. Monitoring consistency with AB 411 will provide a more robust data set for interested researchers and agencies. The requirement for total coliform monitoring may be revisited and deleted, if appropriate, during the next permit re-issuance.

Comment 15: *"There is no legal basis for requiring the City to conduct weekly shoreline monitoring for bacteria "regardless of the occurrence of CSO events". This statement is made in Finding 18 of the Tentative Order, and an inference to this monitoring is made in Section II.A of the SMP and in the Fact Sheet under Section XII. Shoreline bacteria monitoring is the responsibility of local county health departments. The only reasonable justification to include shoreline sampling in the City's NPDES permit is to monitor the effects of CSO events which is appropriately required in the SMP under Section II.B. There is no reasonable potential for elevated bacteria counts observed during dry weather or during wet weather in the absence of a CSO event to be attributable to the City's wastewater treatment system. Although the San Francisco PUC may elect to coordinate monitoring with the City Health Department for public health concerns, the NPDES permit for wastewater discharge cannot require it."*

Response 15: Under the previous permit, the City conducted weekly shoreline monitoring 3 times per week, while the draft permit contains once per week monitoring. Continuation of routine monitoring is necessary to ensure that no discharges are occurring from the CSOs during dry weather, and to detect any problems that may occur due to sanitary sewer overflows. The City's argument that there is no "reasonable potential for elevation bacteria counts" during dry weather is not relevant, as reasonable potential analysis applies only to the determination of whether permit limits are needed, not to monitoring requirements. NPDES permits routinely contain monitoring for many parameters of potential concern.

Comment 16: *"The first sentence of this section indicates that shoreline monitoring will occur at a minimum of ten stations whenever a CSO occurs. Sentence 4 of this section indicates that monitoring will be conducted at those stations in closest proximity to the*

CSO discharge. For clarification and consistency the last portion of the first sentence should indicate that the Discharger

> *'…shall conduct shoreline monitoring for those indicators referenced in the previous discussion paragraph of this section at those stations in closest proximity to the CSO discharge (see Station Descriptions below). Shoreline sampling following a CSO discharge will occur at up to ten stations located from Baker Beach along the shoreline perimeter to Fort Funston on Ocean Beach as soon as practicable with regard to safety.'"*

Response 16: EPA and the Board understand that the City has committed to sampling 10 or more stations after a CSO discharge. The language "up to ten stations" does not provide assurance that any monitoring will be conducted. Thus, the City's suggested language changes were not accepted.

D. Maximum Daily Effluent Limits

Comment 17: *"Although it appears that the Board and U.S. EPA interpret less than weekly or monthly averages would be impractical to protect against "acute toxicity impacts", that interpretation is unsubstantiated. Additionally, even if the arguments for daily limits for toxicity are accepted, there is no justification to apply daily maximum limits to technology-based limits for BOD and TSS, which are very clearly supposed to be limited on only a weekly and monthly basis. Consequently, the daily maximum and instantaneous maximum limitations are inappropriate and should be removed from the Dry Weather Effluent Limitations Tables B.1 and B.2 in the Tentative Order and in Section XI.B.1 and B.2 of the Fact Sheet."*

Response 17: Finding 32 explains in detail the agency's position on the application of daily maximum limits for acute toxicity to POTWs. The daily maximum limitations for BOD and TSS have been deleted from the tentative order to be consistent with the secondary treatment standards as defined in the regulations at 40 CFR 133.102.

Comment 18: *"As already noted in above comments, the California Ocean Plan is not applicable to the SWOO discharge, as the discharge occurs in Federal waters. Although the Board and U.S. EPA are ensuring that the discharge meets State water quality standards by requiring compliance in this permit with numbers borrowed from the Ocean Plan, those numbers are inappropriate to use when more recent environmental data are more relevant, and actions to use more recent data are precedent. The copper value (2.0 ug/L) ambient background concentration is not accurate. In a Tentative Decision Document issued on February 8, 2002 by U.S. EPA, Region IX in conjunction with the Ocean Outfall Permit for San Diego (NPDES CA0107409), the U.S. EPA stated, "The assumption in the COP [Ocean Plan] may be overly conservative. Flegal, et al., (1991) reported that background copper concentrations in California coastal water were around 0.1 ug/L" (TDD, page 17).*

Consequently, the RPA for the Oceanside permit should use 0.1 ug/L rather than 2.0 ug/L as the background copper concentration, and this should be reflected in Finding 42."

Response 18: EPA understands that the value reported by Flegal, et al., (1991), is specific to the geographic area near San Diego, and should not be applied to the entire California coast. As stated in previous comments, while EPA agrees that the Ocean Plan does not automatically apply to Federal waters, Ocean Plan provisions are State water quality standards developed to protect beneficial uses for waters off the coast of California. EPA believes that borrowing the background number for Copper from the Ocean Plan for the purposes of the reasonable potential analysis for this permit is appropriate. Finally, the use of the 0.1 ug/L does not make any difference in the provisions of this permit—no reasonable potential for exceedance of water quality standards was determined using either number.

E. Reporting and Submittal Dates

Comment 19: *" The City suggests changes to the submittal dates for the monthly and annual Self Monitoring Reports, Wet weather and Offshore annual reports, and Pre-treatment annual reports."*

Response 19: The City requested change to their wet weather and offshore monitoring reports have been incorporated into the draft permit. The other changes have not because the dates are standard for nearly all dischargers in this Region. Maintaining standard dates are necessary to ease the administrative burden for the board.

F. Document Clarifications

Comment 20:
"*1) Tentative Order, Finding 29, paragraph 1, sentence 1: The location of the SWOO discharge should be described as "0.3 to 1.5 miles beyond State waters" as is indicated in the Fact Sheet.*
2) Fact Sheet (page 33 of 33), Whole Effluent Toxicity Testing: The last sentence I Paragraph 1 of this item indicates that acute toxicity testing has been decreased from monthly to quarterly. The SMP, Section B.1.b. indicates that acute testing will be conducted monthly for the first year and then if no toxicity is observed, annually thereafter. The information in these two documents must be made consistent."

Response 20: The City's suggestions were accepted.

G. Combined Sewer Overflows

Comment 21: *"The third sentence of Finding 15 of the Permit should be deleted as it is unclear and misleading. Sentences 1 and 2 should be combined to read:*

> *'In 1979, the San Francisco Bay Regional Water Quality Control Board "Board" issue Order No. 79-12 (See Attachment I) and the State Water Resources Control Board "State Board" issued Order 79-16 (See Attachment H) for the wet weather facilities; State Board Order No. 79-16 and Regional Board Order No. 79-12 found that a long term average of 8 overflows per year would provide adequate overall protection of beneficial uses.'"*

Response 21: The City's suggestions were accepted, and permit was changed accordingly.

Comment 22: *"The following sentence should be added just prior to the last sentence in paragraph 1 of Finding 15:*

> *'The State Board Order No. 79-16 defined an overflow…from the combined sewer collection system. When an overflow occurs, there may be discharges from multiple structures simultaneously. To be considered a discrete overflow event...'"*

Response 22: The City's suggestion was not accepted. The City has not provided adequate evidence in its comment on whether multiple structure overflows should be counted as one CSO event or more than one CSO event; nor did the Board's review of the record reveal that this issue has been determined previously. The Board is willing to work with the City outside the NPDES permit issuance process to resolve this concern.

Comment 23: *"The reference to State Board Order No. 79-16 in Finding 30 of the Tentative Order, Applicable Water Quality Objectives – State Waters implies that Order No. 79-16 granted an exception to only bacterial water contact and shellfish harvesting standards in the California Ocean Plan to shoreline CSOs. State Board Order No. 79-16 in fact granted an exception to standards contained in Chapters II through V of the California Ocean Plan to the City's CSO discharges. The Order states under "Section III. Exception Subject to Conditions: Subject to the following conditions, this Order excepts the proposed by-passes from the terms of the Ocean Plan." The conditions include performance of a self-monitoring plan; posting of beaches following a CSO event; warning signs where shellfish may be harvested following a CSO event; to the greatest extent practical, design, construction and operation of facilities that conform with standards in Chapters II and III of the Ocean Plan; containment of all storm water excepting an average of eight overflows per year; implementation of a pretreatment and pollution prevention program. The City has complied with all conditions of the exception order."*

Response 23: No further changes were made to the draft permit. We believe Finding 15 and 30 accurately reflect this situation.

Comment 24: *"The last sentence in Finding 20 of the Tentative Order requires the Discharger "to continue the implementation of the nine minimum controls, properly operate and maintain the completed CSO controls in accordance with the operational plan, and implement the post-construction monitoring program. The City completed construction of CSO controls in January 1997 and to date has completed six years of post-construction monitoring. The last phrase of this sentence should be changed to read: "…to continue the implementation of the nine minimum controls, properly operate and maintain the completed CSO controls in accordance with the operational plan, and continue to implement the post-construction monitoring program, e.g., CSO monitoring"*

Response 24: The City's changes were accepted, and the permit was changed to reflect this editorial comment.

H. "Nuisance" Discharge Prohibitions

Comment 25: *"This prohibition states that "The discharge of waste shall not create a condition of pollution or nuisance as defined in the California Water Code." The City requests that this prohibition be limited to dry weather conditions. Combined sewer overflow discharges during wet weather periods may be perceived by the general public as the creation of nuisance conditions. Such discharges are a result of the system capacity exceeded by the volume of storm water flow. The City has no control over the volume of storm water that enters the system and has already implemented engineering strategies that comply with the Federal CSO Policy to control the release of floatable materials during a CSO event, e.g., baffles."*

Response 25: The "nuisance" prohibition is required by the California Water Code and is a standard NPDES permit provision that allows agencies to enforce against problems that may arise that are not regulated by other more specific provisions contained in a permit. This prohibition was also in the City's previous permit. The Board or EPA will make a determination about whether such a nuisance condition exists; this determination will not be made by the general public. CSOs as a result of storm events are specifically acknowledged in the permit, and would not be deemed a "nuisance," unless it resulted from some failure by the City.

I. "SOFT" Special Studies

Comment 26: *"There is no legally justifiable basis for requiring the City to address the SOFT report under the Oceanside NPDES Permit process. As written, this provision requires the City to develop a new master plan that incorporates priorities determined by the input of 'interested stakeholders,' regardless of their expertise on the issues. The City is responsible to all citizens of San Francisco, whether or not they consider themselves interested stakeholders. Because the City is in the process of developing a comprehensive wastewater master plan, any reference to this program should ensure that no single entity is the controlling factor in the outcome. The following language can be used to replace Provision 3.b.*

> *'The Discharger is currently in the process of developing a new comprehensive wastewater master plan. The "Screening of Feasible Technologies" (SOFT), 2000 draft report should be finalized for use in the master plan process. The Discharger is encouraged to continue to work with interested stakeholders in the development of the master plan.'"*

Response 26: The City's suggested changes were accepted, and the permit has been changed to reflect the suggested language.

J. CSO Study

Comment 27:
"Tentative Order, CSO Study Section P.4.i.. Some of the language in this section is unclear. The City understands that one of the purposes of the CSO study is to evaluate historical CSO monitoring data as well as CSO monitoring data collected under this permit cycle to establish

trends and better characterize CSO discharges, as discussed in Task B, items 1 and 2. The action discussed in Task B, item 3 is written circuitously and should be deleted after the parenthetical.

An additional component to the CSO study is to include monitoring to address recreational use observations. The second sentence in Task A is unnecessarily prescriptive and indicates that recreational use monitoring "will serve to track changes in uses over time". The general patterns of recreational use or changes in the general patterns of recreational use over time do not provide pertinent information on CSO impacts and should not be included as a task of this permit. Recreational use observations during or following a CSO event will provide information on the number of recreational users exposed to CSO discharges. The second sentence should be written:

> *"The study shall propose monitoring, including follow-up monitoring to the Recreational Use Survey, to aid in the evaluation of CSO controls."*

Response 27: Regarding Section P.4.i.B.3, the permit has been changed to delete the language after the parenthetical, as the City requested. However, the language in P.4.i.A was not changed. The City conducted an extensive recreational use study, which has been very useful in determining expected impacts to recreational users. The purpose of monitoring in order to "track changes in use over time" is to determine if shifts in uses have occurred. Because CSOs occur so infrequently, some baseline recreational use monitoring is necessary to predict possible impacts of CSOs. The goal of this provision is to require the City to continue to follow up on the good work it completed with its recreational use study.

K. Document Clarifications

Comment 28: *The City requests 3 editorial changes under Issue 7, and a website address change under Issue 5.*

Response 28: The City's suggestions have been accepted, and the permit changed.

L. Other

Comment 29: *The City suggested a language change to reflect that the City currently reuses all biosolids generated at the Oceanside plant.*

Response 29: The City's suggestions have been accepted, and the permit changed.

Comment 30: *"The Tentative Order currently reads on page 37 of 39:*

> *'The Discharger shall submit the Operation Plan by July 1, 2003, for approval by the Executive Officer.'*

Since the new Oceanside NPDES Permit will not be adopted until sometime after July 1, 2003, the designated date is incorrect. The Oceanside wastewater treatment plant Operations staff is currently using an approved Operations Plan that was submitted to the Board during the permit re-issuance process. Changes to the existing Operations Plan are submitted to the Board and Executive Officer at the time they are implemented. A complete Operations Plan is submitted prior to permit renewal for evaluation for the next permit cycle. In following with that process, this section should indicate the

Operation Plan should be submitted by July 1, 2007, one year prior to permit expiration (assuming approval in July 2003).”

Response 30: As the Board does have the City’s current Operations Plan, we have changed the provision to require that the City review the Plan at least annually and provide changes to the Executive Officer. The provision now reads as follows:

> “The Discharger shall review and update, as necessary, the Operation Plan at least annually. The Discharger shall submit a letter report to the Executive Officer, by July 1st of each year after the effective date of this permit. The report shall indicate that the review was completed, and describe what changes were made to the Operations Plan in the previous 12 months, or what changes are planned to be made.”

Comment 31: *The Discharger suggested editorial changes in table headings and numbering.*

Response 31: The City’s suggestions have been accepted, and the permit changed.

4. John Roddy, City and County of San Francisco, oral comments 7/16/03

A. Existing Dilution Allowance Inappropriate

Comment 32: *The 76:1 dilution allowance factor is outdated, and should be revised based on newly available modeling methods. The City is concerned that as analytical techniques continue to detect constituents at lower levels, pollutants such as dioxin may be triggered under a new reasonable potential analysis, and U.S. EPA and the Board may add limitations to the permit that may cause compliance problems for the City. The City requests that permit reissuance be delayed until dilution can be re-evaluated, and a new dilution allowance be placed in the permit.*

The City received the U.S. EPA’s proposal to review dilution outside of the permit reissuance process, but the City has not yet made a decision as to whether this approach is acceptable. However, the City may decide to request a 3-month review timeframe, with a permit reopener in 2 years or less.

Response 32: Because the City’s request for a review of dilution came at the end of the public comment period, the U.S. EPA has not had time to conduct the necessary thorough review of the scientific, technical, and policy issues associated with this dilution allowance. Because the permit expired more than a year ago, delay of permit reissuance is not acceptable to U.S. EPA. However, further discussions subsequent to this hearing between the City and the U.S. EPA have resulted in an agreement that is acceptable to both parties. The City has agreed to support the adoption of the Board’s Tentative Order on August 20, 2003, and EPA has agreed to review dilution over the next months and to provide a determination of the appropriate dilution credit(s) by March 1, 2004. In addition, a reopener has been added to the permit that would be triggered in the event that compliance issues arise that would be resolved by using the dilution factors contained in the U.S. EPA's March 1, 2004 determination.

5. Sara Hilbrich, San Francisco Bay Keeper, oral comments 7/16/03

A. Precautionary Principle is Reflected in Staff Approach to Dilution and Marine Mammal Issue

Comment 33: *The City of San Francisco has recently adopted a precautionary principle policy statement via a City ordinance. The precautionary principle includes the concept of placing the burden of proof that an activity will not cause environmental harm on the proponent of an activity. Regional Board and U.S. EPA staff should be commended for taking the precautionary principle approach in both the approach to dilution and the marine mammal study requirement contained in the permit.*

On the dilution issue, San Francisco Bay Keeper does not want the U.S. EPA to make a hurried decision on dilution, given that the decision may have implications for other permits in California. The California Ocean Plan takes a conservation, precautionary approach to dilution, and is specifically tailored to meet California's needs. The San Francisco Bay Keeper supports the California Ocean Plan approach to dilution.

On the marine mammal pathogen issue, the City should be required to conduct the study as contained in the draft permit. The City should agree to the study, as it implements the precautionary principle. Further, San Francisco Bay Keeper encourages the U.S. EPA and the Regional Board to require the City to conduct effluent monitoring for pathogens that may affect marine mammals.

Response 33: The U.S. EPA agrees that a precautionary approach to preventing environmental harm is necessary and appropriate. As the City is requesting a greater (less conservative) dilution credit, a thorough review of San Francisco's dilution credit is important. U.S. EPA has agreed to provide the City with a dilution determination in March 2004. The U.S. EPA's review will be thorough, and will take into consideration the applicability of the Ocean Plan to the City's SWOO discharge. During the U.S. EPA's review of dilution, we will keep the San Francisco Bay Keeper's comments regarding the Ocean Plan in mind.

Regarding the marine mammal pathogen issue, the permit requires the City to complete a study identifying monitoring methodologies to determine the presence in wastewaters of pathogens with the potential to affect marine mammals. The U.S. EPA will use the results of this study along with other updated information to determine whether to require effluent monitoring for pathogens in the future.

Environmental Protection Agency Region 9 (WTR-5) 75 Hawthorne Street San Francisco, CA 94105 Permit No. CA0037681 (Major) NPDES Requirements	California Regional Water Quality Control Board San Francisco Bay Region 2101 Webster Street, Suite 500 Oakland, CA 94612 Order No. 97-044 Waste Discharge Requirements

FOR

CITY AND COUNTY OF SAN FRANCISCO'S OCEANSIDE WATER POLLUTION CONTROL PLANT AND THE WESTSIDE WET WEATHER COMBINED SEWER SYSTEM

Table of Contents

Findings:

The U.S. Environmental Protection Agency, Region 9 (hereinafter called "EPA") and the California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called "the Board"), find that:

1. **Permit Coverage:** The City and County of San Francisco (hereinafter called the "Discharger" or "Permittee," or "the City") is the owner and operator of the Oceanside Water Pollution Control Plant (Oceanside WPCP), a wastewater collection and disposal system which serves the Oceanside of San Francisco. This NPDES permit is considered a "major" permit. It covers all discharges from the Discharger's Westside wastewater system to the Pacific Ocean. These flows originate from the western one third of the City (Richmond and Sunset Districts). The Southwest Ocean Outfall (SWOO) carries most of the Westside waste water and discharges to federal waters. Federal waters are those which lie beyond the three mile limit of the territorial sea. The wet weather combined sewer discharge points are at the shoreline and are in State waters. The City collects the wastewater in a combined sewer system. Domestic sewage, industrial wastewater, and storm water runoff are all collected in the same pipes (combined sewer). This is similar to most older cities in the U.S. Newer cities have a dual system: one set of pipes for domestic sewage and industrial wastes and another set for storm water.

2. **Oceanside WPCP:** At Oceanside WPCP, flows up to the design capacity of 43 MGD receive secondary treatment via a pure oxygen activated sludge process (average dry - weather flow is 18 MGD). During wet weather, the Discharger provides additional treatment capacity for flows in excess of 43 MGD up to 65 MGD. These excess wet weather flows receive primary treatment using clarifiers prior to discharge into the ocean outfall. Primary and secondary sludges are blended and then processed via anaerobic digestion. Prior to blending and digestion, the secondary sludge is thickened using gravity thickeners. The digested sludge receives chemical conditioning prior to dewatering through belt presses. The dewatered sludge is then hauled to a landfill or to reuse sites. The design capacity of the solids handling facility is 24 MGD.

3. **West Side Wet Weather Facilities:** During wet weather, the City collects storm water runoff mixed with domestic and industrial waste water in Storage/Transports. The Westside system (See Figure A) includes three large Storage/Transports: Westside Transport, Richmond Transport, and Lake Merced Transport. The Westside Storage/Transport is a 2.5-mile long box-like structure which is located beneath the Great Highway. The combined storage capacity in all three transports (including 2.2 MG of sewers) is 69.5 million gallons. During larger storms, when the Oceanside WPCP reaches maximum treatment capacity, storm flows that cannot be stored in the Westside transport system will pass over a weir and under a baffle into a second box, called the decant structure; settleable solids and floatables remain in the first box, and are flushed to

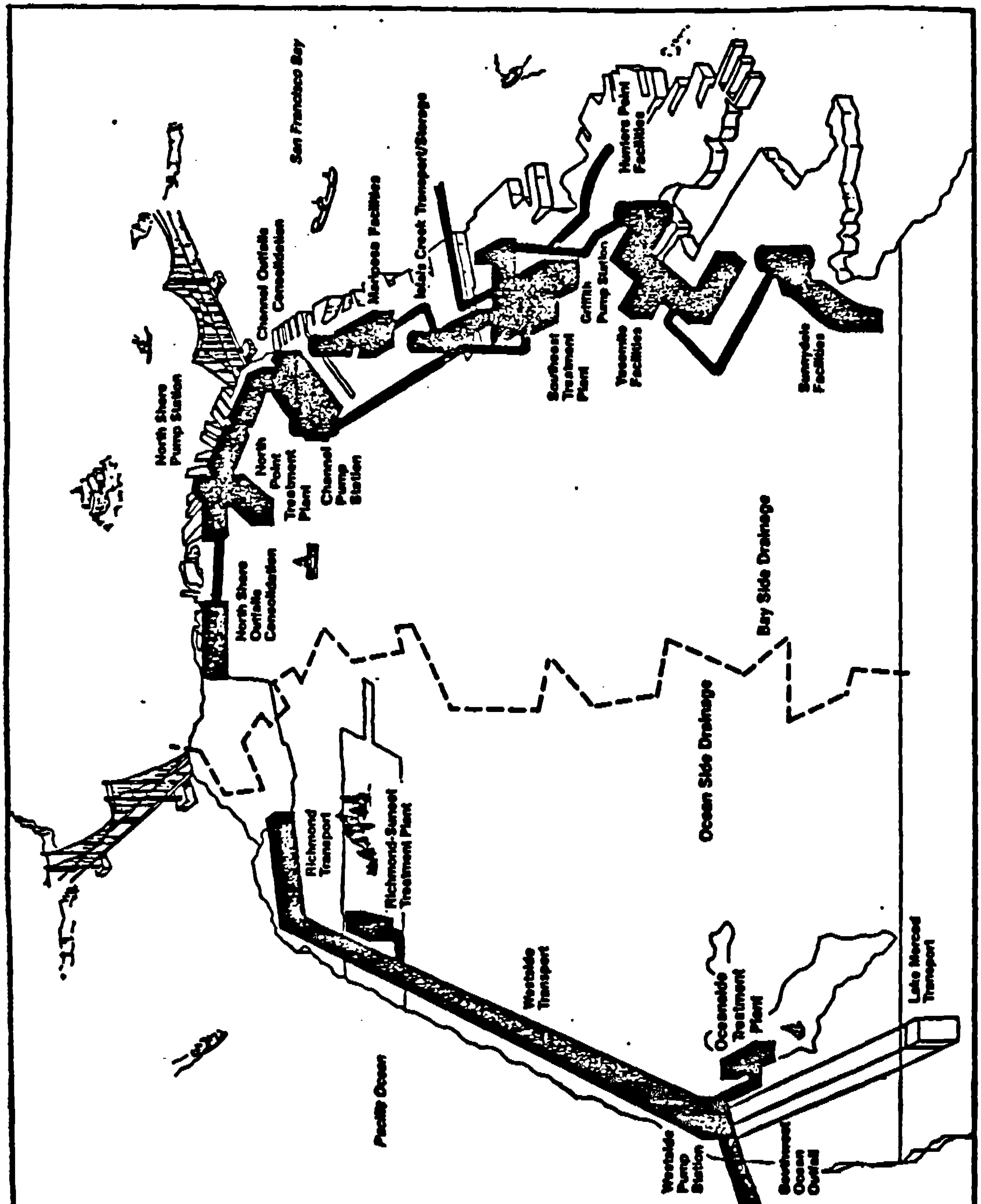

Figure A Overview of San Francisco's Water Pollution Control Facilities the treatment plant after the storm subsides. The excess effluent is "decanted" from the East box to the West box and then pumped via the Westside Pump Station to the SWOO. Flows exceeding the discharge capacity of the SWOO is discharged to the shoreline. This decanted effluent has received flow-through treatment which includes screening (at pump stations), removal of settleable solid and floatable pollutants.

4. **Definition of a Combined Sewer Overflow:** EPA's 1994 Combined Sewer Overflow (CSO) Policy defines Combined Sewer Overflows as the following: "A CSO is the discharge from a Combined Sewer System (CSS) at a point prior to the POTW Treatment Plant." A combined sewer system is previously defined as a "wastewater collection system owned by a State or municipality...which conveys sanitary wastewater and storm water through a single-pipe system to a POTW. (FR, Vol 59, No. 75/Tuesday, April 19, 1994, 18689, I.A). According to this definition, discharges described in the Finding above are considered "CSOs." Since the term "CSO" has often been applied to untreated discharges from a CSS, these discharges will be referred to as "treated CSOs" because of the flow-through treatment they receive.

5. **Wet Weather CSO Points:** During the wet weather, the Discharger presently discharges domestic and industrial wastewater mixed with storm water runoff, all containing pollutants, into Pacific Ocean, a water of the State and the United States through any of eight (7) wet weather Combined Sewer Overflow Points in the Westside sewerage zone: The wet weather Combined Sewer Overflow Points are list in Table I.

Table I: Westside Sewerage Zone Wet Weather CSO Points

Structure No.	Name	Outfall Size (feet)	Weir Elevation	Discharge Location
1.	Lake Merced	10x11.3	+7.7 MLLW	Ft. Funston Beach
2.	Vicente	2@ 5 dia	+17.7 MLLW	Ocean Beach
3.	Lincoln Way	3@ 6 dia	+17.7 MLLW	Ocean Beach
4.	Mile Rock	9x11	-1.3 MLLW	Mile Rock Bluff
5.	Sea Cliff PS1	1.5 dia	+66.7 MLLW	Phelan Beach
6.	Sea Cliff	6 dia	+17.3 MLLW	Baker Beach
7.	Sea Cliff PS2	1 dia	+46.2 MLLW	Baker Beach

6. **Combination of Permits:** The combined sewer overflows through any of eight CSS overflow points in the Oceanside Sewerage zone which is presently governed by NPDES Permit No. CA0038415. Because the Westside wastewater control system was planned, constructed, and is operated as an integrated system, it is most practical to prepare a single NPDES Permit and Fact Sheet for the whole system. Previously, a Federal/State joint National Pollutant Discharge Elimination System (NPDES) Permit (referred to by the Board as "Order") was issued for the SWOO discharge and a separate State permit/order was issued for the shoreline combined sewer discharges. EPA and the Board have combined the waste discharge requirements of Permit No. CA 0038415 into this permit.

Wastewater from the east side of the City is discharged to the Bay and is covered by separate permits.

7. **Level of treatment of wet weather flows:** All wet weather flows including storm water runoff are captured and receive a specified level of treatment depending on the size of the storm. All solids which settle out in the storage/transports are flushed to the treatment plant after the rainstorm subsides. In summary, during dry weather all wastewater receives secondary level treatment. During wet weather the combined sewer flows receive the following level of treatment on an annual basis:
   - Approximately 50% of the combined flows receives secondary treatment and is discharged to the Ocean Outfall.
   - Approximately 37% of the combined flow receives "flow-through" treatment and is discharged to the Ocean Outfall.
   - Approximately 13% of the combined flow receives "flow-through" treatment and is discharged to the shoreline.

   (Prior to the construction program over 80% of these flows were discharged untreated at the shoreline as combined sewer overflows.)

8. **Facility design to achieve 8 overflows per year:** Treated CSOs to the shoreline will occur only when the storm flow exceeds the combined storage capacity of the storage/transports and the capacity of the pumping facilities to transfer flows to the Oceanside WPCP or the SWOO. The Westside combined sewage control facilities have been designed so that on average these shoreline discharges will occur 8 times per year. The Board has defined an overflow as the shoreline discharge from the combined sewer collection system. To be considered a discrete "overflow event," the overflow must be separated by six hours in time from any other overflow. (This criterion was established by SWRCB Order 79-16). The long-term average of 8 overflows per year was established as the Westside design goal by the Board after an evaluation of costs and benefits. This overflow frequency was the criterion used to size the transport/storage and treatment facilities. The combined sewer flows discharged during these 8 occurrences will have received flow-through treatment for the removal of settleable solids and floatables.

Historical Data for Overflows at Controlled and Uncontrolled Portions of the Westside

Calendar year	**Untreated overflows** (uncontrolled areas)	**Controlled overflows** (facilities in place)	**Annual Rainfall** (West-side)	**Comments**
				Westside Transport on-line (Ocean Beach)
89	36	2	14.2	
90	29	0	9.8	
91	36	0	17.6	
92	47	4	16.5	
93	50	7	21.9	Lake Merced Transport on-line
94	59	2	16	
95	64	6	25.5	
96	-	-	-	All facilities on-line (fall)
97	*0*	*8*	-	*Expected performance based on design*

Note: The Westside Transport was operational in 1987 and therefore Ocean Beach has been in the controlled overflow category for the years listed above. The Richmond Storage/Transport was the last facility to come on-line (1996).

9. **Reassessment of treated overflows:** All facilities became operational in early 1997. In the period following the establishment of the original criteria, several proposals have been made to further reduce overflows. Consistent with the Section IV.B.2.e. of the CSO Policy, the Permittee will complete a preliminary engineering assessment of a range of options for additional overflow reductions. These options include methods for reducing hydraulic loading on the combined sewer system and methods for increasing the decant rate (Westside Storage/Transport flows discharged direct to the Outfall) in order to reduce the number of overflows. The study will identify options, assess feasibility, and estimate costs.

10. **Beach Postings and Bacteria Monitoring:** When these shoreline overflows occur, the beach is posted and the shoreline waters are sampled for total coliform bacteria until these levels drop below the Basin Plan objective for contact recreation. The beach is posted for

a minimum of three days. Prior sampling indicates that elevated bacteria levels tend be located only in the vicinity of the outfalls and tend to decrease rapidly, typically within 15 to 40 hours. Furthermore, since beach postings are based on total coliform counts, the Permittee is only required to monitor for total coliform. EPA is currently involved in a study to determine the best pathogen indicators for protection of beach uses and may revise this requirement based on these results.

11. **1974 Master Plan:** The highest priority of the Westside Wet Weather Control Facilities is to eliminate all untreated shoreline discharges and to minimize the frequency of treated discharges that do occur. This is because the discharges contribute to elevated bacteria levels in nearshore waters which must be subsequently posted for up to three days following the discharges. Public use of nearshore waters is one of the beneficial uses protected by this permit. In response to objectives set forth by the City's 1974 Master Plan Environmental Impact Statement and Report, the City has substantially completed the wastewater projects needed to control combined sewer overflows and to reduce water quality impact from the combined sewer system. Construction projects are expected to be completed in 1997. Consequently, the City's program qualifies for the CSO Control Policy's classification under Section I.C. as being substantially complete and exempt from the planning and construction requirements. The following table summarizes the current status of Master Plan projects.

Master Plan Projects
Cost Estimates and Expenditures

Current Projects	Estimated Costs	% Completed in August 1996
Bayside Core (completed)	$ 409,000,000	100
Westside Core (completed)	$ 345,000,000	100
Oceanside Plant	$ 254,000,000	100
Southeast Facilities	$ 376,000,000	86
Southeast Facilities - Future	$7,500,000	0
Richmond & Lake Merced Transport	$ 80,586,000	97
TOTAL MASTER PLAN PROJECTS	$1,411,000,000	

Source: City and County of San Francisco Department of Public Works.

12. **Regulatory Status of a CSO:** An opinion by the U.S. EPA's Office of General Counsel has classified facilities that treat combined sewer overflows as point sources subject to section 301(b)(1)(A), 301(b)(1)(C), and 301(b)(2) of the Clean Water Act (hereinafter

referred to as "the Act". Thus, they are not Publicly Owned Treatment Works (POTWs) and are not subject to the secondary treatment regulations of 40 CFR 133. This opinion is supported by subsequent case law (646 F.2d 568(1980)); Montgomery Environmental Coalition v. Costle.

13. **Technology-Based Requirements for a CSO:** The Clean Water Act (CWA) established the NPDES permit program to regulate all point source discharges to the nation's waters. All Dischargers must comply with three sets of requirements: (1) technology-based minimum requirements that apply to all Dischargers of a specified class or (2) more stringent effluent limits, if necessary, to meet local Water Quality Standards (WQSs). (CWA, Section 301 (b)(1)(C)) and (3) for marine discharges, the Ocean Discharge Criteria (CWA section 403 (c)). The wet weather combined sewer flows have a more complicated regulatory status. On San Francisco's Westside, there are two types of treated combined sewer overflows (CSOs): the flows decanted from the Westside Storage/transport direct to the SWOO and the flows decanted from the storage/Transports to the shoreline combined sewer overflow (CSO) points. Both these Treated CSOs must meet the following technology-based requirement of the Act as follows:
   a. **Best Practicable Control Technology currently Available (BPT)**: The basic control level that all discharges (other than POTWs) must attain. BPT was the initial technology-based control level required by the CWA. This treatment level is determined first and then used in calculating the following two control levels, which may be more stringent.
   b. **Best Conventional Pollutant Control Technology (BCT)**: Effluent limitations applied to suspended solids, BOD, oil and grease, pH, and coliform bacteria.
   c. **Best Available Technology economically Achievable (BAT)**:Treatment applied to toxic pollutants and other non-toxic, non-conventional pollutants such as floatables.

14. **BPJ Determination**: EPA establishes some technology-based requirements by issuing industry-wide effluent guidelines. For CSOs, no effluent guidelines have been promulgated for BPT, BCT, or BAT. The permit writer must therefore use Best Professional Judgement (BPJ) to determine the level of treatment that BPT, BCT, and BAT represent. EPA performed a BPJ analysis (see Fact Sheet : Attachment 2). The Board concurs with the findings of the BPJ analysis. These findings are as follows:
   a. The completed Westside facilities will provide effluent reduction at cost in excess of that which would be required by BPT/BCT/BAT; and
   b. No additional treatment facilities can be justified on a BPT/BCT/BAT cost basis; and
   c. By including requirements in the NPDES permit to ensure the continued implementation of the nine minimum control technologies outlined in the CSO

Policy, EPA and the Board have established the technology-based requirements mandated by the Clean Water Act and the State Water Code.

15. **Combined Sewer Overflow Policy:** On April 11, 1994, EPA adopted the CSO Control Policy (50 FR 18688). This Policy establishes a consistent national approach for controlling wet weather discharges from combined sewer systems to the Nation's waters through the National Pollutant Discharge Elimination System (NPDES) permit program. Combined Sewer overflows are the discharge from the Combined Sewer System at a point prior to the POTW Treatment Plant (see Federal Register, Vol 59 No. 75, Tuesday, April 19, 1994 Section I.A.). The Discharger is served almost 100% by combined sewers and thus is directly affected by the Policy. EPA and Board staff have reviewed this Policy together with documentation submitted by the Discharger and have made the following determinations:
    a. The Discharger has demonstrated implementation of the nine minimum control technologies as specified in the Policy.
    b. San Francisco has substantially completed its CSO control program as demonstrated by Table 2. Master Plan Projects and has otherwise demonstrated compliance with section I.C.1 of the CSO Control Policy. Therefore, the Discharger is not required to complete a (new) CSO long-term plan.
    c. San Francisco has demonstrated compliance with the "Presumption" Approach for compliance during wet weather with water quality standards. (See Fact Sheet for a discussion of the "Presumption" Approach.)
    d. San Francisco's implementation of it's wastewater master plan appropriately considered sensitive areas as required in the CSO Control Policy.
    e. During wet weather, San Francisco operates its Oceanside WPCP at the maximum capacity compatible with safe operation and thus is in compliance with the Policy provisions which allow for the discharge during wet weather of combined sewer flows which have received primary-only treatment.

    In summary, the Board and EPA have determined that Discharger's integrated approach to controlling storm flows is consistent with the Policy.

16. **Water quality requirements for shoreline treated CSOs**: In Order WQ79-16, the Board granted an exception to all water quality standards in the California Ocean Plan for the shoreline CSOs. This includes an exception to the water-contact standards. This exception was granted by the State Board and approved by EPA because of the impracticability of shoreline discharges from a combined sewer system meeting these requirements. The Order states: "the exception will not compromise protection of ocean waters for beneficial uses, and the public interest will be served." Because the City has exceeded the minimum level of treatment outlined under Section II.C.4.A of the 1994 CSO Policy ("Presumption" approach), the wet weather facilities are "presumed to provide an adequate level of control to meet the water quality-based requirements of the CWA." Therefore, there are no numerical effluent limits applied to the treated shoreline

CSOs. The City, however, is required to operate the facilities to achieve this level of treatment. (See discussion of "presumption" approach in Fact Sheet).

17. **Items for re-proposal and item remanded:** In 1990, EPA and the Board adopted a joint permit for Oceanside Treatment Facility and the Southwest Ocean Outfall, NPDES # CA0037681, Order No. 90-093 (it did not cover shoreline CSOs). On January 31, 1992, EPA's Regional Administrator denied a request by the Sierra Club, Surfrider Foundation and the Central Coast Conservation Center for an evidentiary hearing on this NPDES permit pending the re-proposal of three specific items in the permit. The specific items for re-proposal are listed as follows and are addressed in the new draft permit and the Fact Sheet:

a. Whether BAT or BCT requires effluent limitations that reflect the additional amount of pollutant removal achievable through expansion of the Transport's existing capacity to store combined flows for later treatment at the new Oceanside Plant, thus reducing the amount of decant discharged to the SWOO.

b. Whether the new Oceanside Plant should be exempted in whole or in part under 40 CFR 133.103(a) from complying with the monthly 85% removal rate for BOD and TSS when its hydraulic capacity is exceeded for more than three days during wet weather.

c. Whether a wet weather flow limit for the effluent from the Oceanside Plant is appropriated and, if so, what the appropriate limit should be.

Subsequent to the decision by the EPA administrator to deny the request for an evidentiary hearing, the Sierra Club and Coastal Advocates petitioned the Environmental Appeals Board to review EPA's decision. The Appeals Board decision, dated March 24, 1993, denied review in part and remanded in part. As result of the decision, the permit has remained in effect with the exception the following remanded item:

> *The permit fails to establish enforceable mass limitations during a specific three-month period of the year. This portion of the permit is remanded to the Region to establish appropriate mass limitations as required by EPA regulations.*

EPA and the Board have established appropriate mass limitations (see Fact Sheet).

18. **Richmond-Sunset WPCP**: On July 18, 1984, the Board adopted Order No. 84-45, NPDES Permit No. CA 0037681, prescribing waste discharge requirements for the Richmond-Sunset Water Pollution Control Plant (WPCP). At that time, the plant discharged to state waters near Mile Rock. The Discharger completed its ocean outfall in 1986 and began discharging Richmond-Sunset plant effluent to federal water via the new outfall in September, 1986.

19. **Oceanside WPCP:** The Oceanside WPCP replaced the older Richmond/Sunset Plant in September 1993 and began discharging "secondary" effluent to federal waters via the ocean outfall diffuser located 3.7 miles offshore. The Oceanside WPCP provides both a higher level of treatment (full secondary treatment) and a larger primary treatment

capacity (total of 65 MGD) than the old Richmond-Sunset WPCP which provided only 45 MGD of primary treatment.

20. **Deletion of Disinfection Requirements:** On May 17, 1989, the Board adopted Order No. 89-71, amending Order No. 88-106 (NPDES # CA0037681) to delete the disinfection requirements from the Order. The Board action was based on the final technical report dated April 3, 1989 submitted by the Discharger entitled "Wastefield Transport and Bacteriological Compliance Studies of The San Francisco Ocean Outfall". The studies were conducted in 1987 and 1988. The findings indicate that the present non-disinfected wastewater discharge from the Southwest Ocean Outfall does not and will not in the future violate the California Ocean Plan bacteriological body-contact standards. Monitoring since 1986 supports this conclusion.

21. **Beneficial Uses:** The Ocean Plan protects the following beneficial uses of State ocean waters: industrial water supply, recreation, aesthetic enjoyment, navigation, and preservation and enhancement of fish, wildlife, and other marine resources or preserves. The Basin Plan identifies the following beneficial uses of the Pacific Ocean in the vicinity of the San Francisco Bay Region:
    - Commercial and sport fishing
    - Fish migration and spawning
    - Marine habitat
    - Mariculture
    - Navigation
    - Non-contact recreation
    - Preservation of Areas of Special Biological Significance
    - Preservation of rare and endangered species
    - Shellfish harvesting
    - Water contact recreation

22. **Basis for water quality standards applied to discharge from SWOO:** Though the discharge is located 0.3 miles beyond State Waters, compliance with parameters borrowed from the Ocean Plan is required immediately after initial dilution. This requirement will assure that under worst-case conditions the receiving waters are protected. In addition state standards will be met within state waters. In addition, compliance with the Ocean Plan immediately after initial dilution is required to provide the basis for EPA's determination that the discharge will not cause unreasonable degradation of the marine environment as required by section 403 of the Act. Section 403(a) of the Act prohibits discharge to Ocean Waters except in compliance with guidelines established under section 403(c) of the Act. Section 403(c) of the Act requires that guidelines be promulgated for determining the degradation of marine waters. Federal Regulations at 40 CFR 125.122(b) (Determination of unreasonable degradation of the marine environment) state:

    Discharges in compliance...with state water quality standards shall be presumed *not to cause unreasonable degradation of the marine environment, for any specific pollutants or conditions specified in the... standard.*

The Ocean Plan is not directly applicable to the discharge from the SWOO at the point of discharge because the discharge occurs outside of state waters. However, because the discharge is in compliance with standards promulgated for ocean discharges within state waters (i.e. the 1990 California Ocean Plan) and because these standards address the criteria listed under 403(c)(1)of the Act, EPA concludes that compliance with the Ocean Plan provides a reasonable basis for concluding that the discharge from the SWOO is entitled to the presumption that it does not cause unreasonable degradation for the pollutants and conditions provided for in the Ocean Plan. EPA's review of the application and monitoring data supplied by the City of San Francisco provides no basis for rebutting this presumption. Therefore, EPA determines that the discharge is permitted under section 403 of the Act.

23. **Dilution calculation:** The Ocean Plan requires water quality criteria to be met immediately following initial dilution. (See Fact Sheet for more detailed discussion.) This is an extremely conservative assumption because initial dilution is calculated via a model based on the following conditions: 1. Monthly average flow rates which give the lowest dilution; and 2. No ambient current. The UDKHDEN model calculates an initial dilution of 76:1. (April 13, 1990 Memorandum from Dave Jones, CCSF, to Steve Hill and Johnson Lam, RWQCB) This is the number used to calculate water quality-based effluent limits. The measured initial dilution based on dye studies appears to be closer to 200:1 (Wastefield Transport and Bacteriological Compliance Studies of the San Francisco Ocean Outfall, CH2MHill, March, 1989). Future permits may use appropriate dilution ratios for the type of parameter regulated (acute, chronic, human life) as provided for in EPA's Technical Support Document for Water Quality-based Toxics Control.

24. **"Reasonable potential" determination:** 40 CFR 122.44(d)(1)(I) requires the permit to include limits for all pollutants "which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause or contribute to an excursion above any State water quality standard." Based on a "reasonable potential" analysis submitted by the City and reviewed and approved by EPA and the Board, all water quality-based numerical effluent limitations (Table B of Ocean Plan) have been removed from this draft permit with the exception of Mercury and Chronic Toxicity. (See Fact Sheet for complete discussion). A reopener provision is included in this permit that allows numeric limits to be added to the permit for any constituent in Table B of the Ocean Plan that in the future exhibits reasonable potential to cause or contribute to an exceedance of a water quality standard. This determination will be made by EPA and the Board based on monitoring results.

25. **Water Pollution Prevention Program:** As required by the permit, in September 1990, San Francisco submitted to the Board a program plan which described the implementation of its Water Pollution Prevention Program. This ongoing program is intended to prevent the disposal of toxic substances to the sewer system.

26. **Recreational Use Study:** Recreational use of Ocean Beach has increased significantly. Over the course of this permit, the City will be undertaking a recreational use study of Ocean Beach in order to asses the current levels of recreational use of the shoreline and near shore waters. The City intends to develop the workplan, but will be conferring with the GGNRA, NOAA Marine Sanctuary Program, the Surfrider Foundation, and other interested parties. The City expects that two full wet weather seasons will be necessary to get adequate winter use data. The City expects to complete the study by mid-1999.

27. **Pretreatment program:** The Discharger has implemented and is maintaining an EPA-approved pretreatment program in accordance with Federal pretreatment regulations (40 CFR 403).

28. **Operations and Maintenance Manual:** An Operations and Maintenance Manual is maintained by the Discharger for purposes of providing plant and regulatory personnel with a source of information describing all equipment, recommended operation strategies, process control monitoring, and maintenance activities. In order to remain a useful and relevant document, the manual shall be kept updated to reflect significant changes in treatment facility equipment and operation practices.

29. **Endangered Species Consultation:** EPA consulted with the U.S. National Marine Fishery Service as mandated by Section 7(a)(2) of the Endangered Species Act. Under the informal consultation process, EPA requested:
    1) a clarification of whether and what listed, proposed, and candidate species or designated or proposed critical habitats may be in the action area;
    2) a determination of the effects the action may have on these species or critical habitats; and
    3) a concurrence that formal consultation is not necessary because adverse effects are not likely to occur, or a determination of the need to enter into formal consultation for listed species or designated critical habitats.

    USNMFS responded in a letter dated May 7, 1996 and identified the possibility of the Sacramento River winter-run chinook salmon in the area of the discharge (though there is no designated critical habitat in the project area). USNMFS, however, feels the draft monitoring plan is sufficient to identify any effects of discharge on the chinook salmon, and stated that the issuance of the proposed NPDES permit will not likely to adversely affect the chinook salmon.

30. **Order/NPDES Permit:** This Order serves as an NPDES Permit, adoption of which is exempt from the provisions of Chapter 3 (commencing with Section 21000) of Division 13 of the Public Resources Code [California Environmental Quality Act (CEQA)] pursuant to Section 13389 of the California Water Code. The Order may also be referred to as a "Permit" herein.

31. **Opportunity to comment:** The Discharger and interested agencies and persons have been notified of the EPA and Board's intent to reissue requirements for the existing discharge and have been provided an opportunity to submit their written views and recommendations.

32. **Public Meeting:** At time of permit adoption, the Board and EPA, in a public meeting, will have heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to the provisions of Division 7 of the California Water Code and regulations adopted thereunder, and to the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, that the Discharger shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastewater is prohibited unless discharged through the Ocean Outfall Diffuser at 37° 42' 18" North latitude, 122° 34' 39" West longitude (start of diffuser), except wet weather discharges (as defined in note 1 below).

2. Bypass (as defined in note 2 below) of the secondary treatment facilities at Oceanside WPCP is prohibited, except during wet weather discharges.

3. Discharge of effluent from the Oceanside WPCP which does not receive an initial dilution of at least 76:1 is prohibited.

4. Wet weather discharges (as defined in note 1 below) are allowed only in accordance with Sections C and D below.

NOTES:

(1) "Wet weather discharge" is any discharge occurring (from either the SWOO or any shoreline CSO discharge point) when one of the following conditions exists as result of rainfall:
  a. The instantaneous influent flow to the Oceanside WPCP is exceeding 43 MGD; or
  b. The average daily influent (to the Oceanside WPCP) concentration of TSS is less than 100 mg/l on the day discharge occurs.

(2) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. Bypass is prohibited unless the following conditions are met during wet weather discharges:

a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

b. There were no feasible alternatives to the bypass, such as the auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime.

B. Dry weather Effluent Limitations for SWOO:

Representative samples of combined effluent discharged through the SWOO from sampling station E-001 (see"Monitoring and Reporting Program"), shall not exceed the following limits during dry weather discharges:
(These limits are derived partly from the California Ocean Plan and are incorporated herein based on EPA's determination that compliance with said provisions provides the basis for EPA's determination that the discharge will not cause unreasonable degradation as required by Section 403 of the Act.)

1. Technology-Based Limits derived using Table A of the 1990 California Ocean Plan and Secondary Treatment Regulation at 40 CFR 133.102:

Constituent	Units	Monthly Average	Weekly Average	Daily Max.	Instan-taneous Max.
Biochemical Oxygen	mg/l	30	45	60	---
Demand (BOD_5)(1)	lb/day	6,005	9,007	12,010	---
Total Suspended	mg/l	30	45	60	---
Solids (TSS)(1)	lb/day	6,005	9,007	12,010	---
Grease and Oil	mg/l	25	40	---	75
	lb/day	5,004	8,006	---	15,012
Settleable Matter	ml/l-hr	1.0	1.5	---	3.0
Turbidity	NTU	75	100	225	---
Acute Toxicity(2)	TUa	1.5	2.0	---	2.5

(1) The arithmetic mean of the biochemical oxygen demand (five-day, 20°C) (BOD_5) and suspended solids value by weight, for effluent samples collected in a calendar month shall not exceed 15 percent of the arithmetic mean of the respective values, by weight, for influent samples collected at approximately the same times during the same period (85 percent removal, 40 CFR 133.103(a)). Measurements taken on wet weather days shall not be included in calculating percent removal .

(2) Acute Toxicity shall be measured in accordance with Section II of the monitoring program.

2. Water Quality-Based Limits derived using Table B of the 1990 California Ocean Plan and a Reasonable Potential Analysis:

Constituent	Units	6 Monthly Median	Daily Max.	Instantaneous Max.
Mercury	mg/l	0.003	0.012	0.031
	lb/day	0.6	2.4	6.2
Chronic Toxicity [1]	TUc	---	77	---

(1) Chronic Toxicity shall be measured in accordance with Section II of the monitoring plan.

C. **Technology-Based Wet Weather Discharge Requirements**
The Discharger shall continue to comply with the following technology-based requirements for the Westside Wet Weather Control Facilities (these include, but are not limited to, the nine-minimum control technologies established in the 1994 CSO Policy):

1. Conduct proper operations and regular maintenance programs. The Discharger shall implement the Operations and Maintenance Plan for the combined sewer system that will include the elements listed below. The Permittee also shall update the plan to incorporate any changes to the system and shall operate and maintain the system according to the plan. The Permittee shall keep records to document the implementation of the plan.
   a. Designation of a Manager for Treated Combined Sewer Overflows.
   The Discharger shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding the combined sewer system. The Permittee shall notify the permitting authority within 90 days of designation of a new contact person.
   b. Inspection and Maintenance of CSS.
   The Discharger shall inspect and maintain all overflow structures and pumping stations, to ensure that they are in good working condition and adjusted to minimize overflows at least once per year. The decant facilities, and the storage/transports shall be inspected and receive maintenance as needed periodically throughout the year. The SWOO shall be inspected at least once every five years. The Permittee shall record in a maintenance log book the results of the inspections. For overflow outfalls that are inaccessible, the Permittee may perform a visual check of the overflow pipe to determine whether or not the overflow is occurring during dry weather flow conditions.
   c. Provision for Trained Staff.
   The Discharger shall provide an adequate number of full-time equivalents to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. Each member of the staff shall receive appropriate training.
   d. Allocation of Funds for Operation and Maintenance.

The Discharger shall allocate adequate funds specifically for operation and maintenance activities. The Permittee shall submit a certification of assurance that the necessary funds, equipment, and personnel have been or will be committed to carry out the O&M plan.

2. Maximize use of the collection system for storage.
The Discharger shall continue to maximize the inline storage capacity. (Note: This provisions refers to using the sewers for storage to the maximum extent possible. It does not refer to the storage/transports.)

3. Review and modify pretreatment program.
The Discharger shall continue to implement selected controls to minimize the impact of non- domestic discharges. The Permittee shall re-evaluate every 5 years whether additional modifications to its pretreatment program are feasible or of practical value. The Permittee shall keep records to document this evaluation and to document implementation of the selected controls to minimize non-domestic discharges.

4. Maximize flow to POTW treatment plant (Oceanside WPCP).
The Discharger shall operate the POTW treatment plant at a maximum treatable flow during wet weather flow conditions/events (consistent with engineering considerations) and deliver all flows to the treatment plant within the constraints of the capacity of the treatment plant and the goal of minimizing shoreline discharges. It is understood that the capacity of the secondary treatment facilities must be increased at set rate in order to maintain the viability of the biological treatment organisms. Therefore, the wet weather treatment capacity varies with the height of the stored wastewater in the Westside Transport. The Discharger shall keep records to document these actions.

5. Prohibit combined sewer overflows during dry weather. Dry weather overflows from overflow outfalls are prohibited. (see Prohibition No.1.) All dry weather overflows must be reported to EPA and the Board within 24 hours of when the Permittee becomes aware of a dry weather overflow. Dry weather overflows through the SWOO shall also be reported to the Monterey Bay National Marine Sanctuary.

When the Discharger detects a dry weather overflow, the Permittee shall begin corrective action immediately. The Discharger shall inspect the dry weather overflow each subsequent day until the overflow has been eliminated. The Discharger shall record in the inspection log book dry weather overflows, as well as the cause, corrective measures taken, the dates and times of the beginning and cessation of overflow, an estimate of flow volumes, and a summary of all beach postings.

6. <u>Control solid and floatable materials in treated CSOs</u>. The Discharger shall continue to implement measures to control solid and floatable materials in its overflows.
These measures shall include:
(a) Ensure that all overflows from the diversion structures are baffled or that other means are used to reduce the volume of floatables.
(b) Remove solid or floatable materials captured in the storage/transport in an acceptable manner prior to discharge to the receiving water (by physical removal or discharge to the Oceanside treatment plant).

7. <u>Develop and implement pollution prevention program.</u>
The Discharger shall continue to implement a pollution prevention program focused on reducing the impact of overflows on receiving waters. The Permittee shall keep records to document pollution prevention implementation activities. This program shall include pollution prevention efforts which include developing and implementing a public education outreach program, a technical assistance program, and an increased permitting program focused on the following sources:
a. Storm Water - keeping toxicants off street surfaces and away from rain water to reduce the toxicants washed into sewers during storms.
b. Industrial and Commercial Wastewater - both mandatory discharge limits and implementation of the waste minimization programs to help reduce toxicants from this source.
c. Residential Wastewater - City residents can unknowingly contribute to pollution problems by dumping toxicants in their toilets, sinks, and other drains. Pollution prevention measures include education and providing alternative disposal methods.

Annually, the Discharger will reassess the pollutants of concern for the pollution prevention program to insure that the program efforts are being directed toward those constituents which have the highest potential to impair beneficial uses. Results of the program shall be summarized and submitted to EPA and the Board annually. At a minimum, such a program should include the following measures:
Educational Control Measures:
E1. Educate residents regarding the impacts that result when oil, antifreeze, pesticides, herbicides, paints, solvents, or other potentially harmful chemicals are dumped into sewers.
E2. Educate residents regarding the proper use (e.g., application methods, frequencies, and precautions) and proper management of fertilizers, pesticides, herbicides, and other potentially harmful chemicals.

E3. Educate residents regarding the effective use of "housekeeping" practices, including the use of adsorbents, cleaning compounds, and oil/grease traps for controlling oil and grease in gas stations, automotive repair shops, parking areas, commercial/industrial facilities, and food service facilities.

E4. Educate residents regarding the need to keep rainfall and runoff from contacting potential contaminants. Describe typical examples of the problem and practical solutions.

Regulatory Control Measures:

R1. Research, strengthen (if necessary), and enforce regulations which give the Discharger the legal authority to control the improper disposal of potentially harmful wastes.

R2. Research, strengthen (if necessary), and enforce regulations which give the Discharger the legal authority to prevent the improper disposal of soil, debris, refuse, or other pollutants into storm drains, sewers and catch basins.

R3. Research, strengthen (if necessary), and enforce regulations which give the Discharger the authority to require oil and grease controls in areas which are significant sources (e.g., gas stations, automotive shops, wrecking yards, machine shops, commercial/industrial facilities, parking areas, and food service establishments).

R4. Develop and implement regulations which require landowners and/or tenants to provide covers (e.g., roofs, tarps) to keep rain off of areas which contain contaminants (e.g., chemical storage areas, waste storage areas, contaminated industrial areas); and to keep runoff from draining through areas which contain contaminants.

Public Agency Control Measures:

P1. Label storm drain inlets and provide signs along the banks of storm drains, sewers, catch basins and creeks explaining the environmental impacts of dumping wastes.

P2. Develop and implement programs which provide convenient means for people to properly dispose of oil, antifreeze, pesticides, herbicides, paints, solvents, and other potentially harmful chemicals (recycle if possible).

P3. Conduct a study to determine sources of Dioxin and Tributyltin (TBT) in wastewater/stormwater and efficacy of treatment plant in removing Dioxin and Tributyltin. This study shall include, at a minimum:

1. Monitoring of TCDD equivalents (Dioxin) and Tributyltin in both influent and effluent during dry weather.
2. Monitoring of TCDD equivalents (Dioxin) and Tributyltin in both influent and effluent during storm events.
3. Research to determine sources of Dioxin and Tributyltin if data indicates that discharge has a reasonable potential for exceeding the water quality criterion.
4. Assessment of whether controls are feasible or warranted based on known sources of dioxins, the relative concentration in the wastewater, and the available control methods.

The study plan shall be submitted to EPA and the Board within 150 days of the effective date of the permit. Within 180 days, the study plan shall be implemented, unless rejected by EPA or the Board. The study shall be completed and submitted within two years of the effective date of the permit.

8. Notify the public of treated overflows.

a. The Discharger shall continue to implement a public notification plan to inform citizens of when and where treated CSOs occur. The process must include:
-Mechanisms to alert persons using all receiving water bodies affected by overflows.
- A system to determine the nature and duration of conditions that are potentially harmful to users of these receiving water bodies due to treated overflows.
Specifically, warning signs shall be posted at sites when water contact recreation is enjoyed by the public whenever there is a discharge from the diversion structures. Such warning signs should be posted on the same days as the overflow unless the overflow occurs after 5:00 pm, in which case the signs should be posted by 9:00 am the next day. The warning signs should remain up until receiving water analyses indicate that Basin Plan objectives for contact recreation are being met.

b. Annually, the Discharger shall submit all changes to its public notification plan to EPA and the Board. The Discharger shall also consult with the Surfrider Foundation, GGNRA, and other interested parties as appropriate in its continuing effort to enhance the efficacy of this plan.

c. Where possible, clearly label overflow outfalls.

d. The Discharger shall keep records documenting public notification.

e. If EPA or the Board determine that the public notification procedures are insufficient to protect human health, the permit may be reopened for the inclusion of specific notification requirements.

9. Monitor to effectively characterize overflow impacts and the efficacy of CSO controls.

The Discharger shall monitor overflows in accordance with the attached monitoring program. In addition, the Discharger shall submit to EPA and the Board an annual report including the following information:

a. Summary of existing data in order to show status and trends;

b. Evaluation of results in order to effectively characterize overflow impacts and efficacy of CSO controls (including pollution prevention efforts);

c. Analysis of shoreline monitoring program in order to determine any improvements in sampling procedures, constituents sampled, frequency of sampling, location of sampling points, etc.;

d. Study to determine efficacy of transport's baffling system to remove toxicants; and

e. Evaluation of models and flow-measurement devices to gauge volume of treated CSOs discharged to the shoreline during overflow events.

The appropriate portions of the attached self-monitoring program may be revised to implement suggested changes.

D. Wet Weather Water Quality-Based Limits (Operation requirements for wet weather facilities)

1. The Discharger shall operate combined sewer storm flow control and treatment facilities (which have been designed to achieve a long-term average of eight treated shoreline overflows per year) in order to:
   a. Minimize the frequency of CSOs to the shoreline.
   b. Maximize the volume of wastewater treated at the Oceanside WPCP and discharged via the ocean Outfall, consistent with the hydraulic and treatment capacities of the Discharger's storage, transport and treatment facilities, and
   c. Assure that all discharges from the shoreline discharge points (Table 1) are first baffled to reduce floatables volume.

   The operation plan may be used by Board and EPA staff to assess conformance with the requirements above. The Discharger may propose amendments, which are also subject to EPA and Board Executive Officer review and approval. The operation plan may be part of the Discharger's operation and Maintenance Manual. The Discharger's conformance to the operation plan will constitute compliance with these receiving water limitations. Conversely, failure to comply with the plan will consist of non-compliance with these limitations.

2. The Discharger shall capture for treatment, or storage and subsequent treatment, 100% of the Westside combined sewage volume collected in the combined sewage system during precipitation events under design conditions. Captured combined sewage shall be directed either to the Oceanside WPCP, or to the storage/transports.

   All combined sewage captured shall receive a minimum of the following treatment:

   a. Flow-through treatment (storage/transports)
   b. Primary treatment (Oceanside WPCP)
   c. Secondary treatment (Oceanside WPCP)

3. Reassessment of treated CSOs to sensitive areas:

   The Permittee will complete a preliminary engineering assessment of a range of options for additional overflow reductions. The study will identify options to eliminate or relocate overflows, assess feasibility and costs, and review impacts to sensitive areas. This report will be submitted to USEPA and the RWQCB prior to permit expiration.

4. The Board and EPA may establish wet weather performance-based limitations in the future for the Oceanside WPCP after reviewing wet weather discharge data. This Order/Permit may be reopened for the inclusion of such limits.

E. Receiving Water Limitations for SWOO Discharges:

The discharge from the Southwest Ocean Outfall shall not cause the following water quality objectives to be violated in ocean waters upon completion of initial dilution (These limits are derived from the California Ocean Plan and are incorporated herein based on EPA's determination that compliance with said provisions provides the basis for EPA's determination that the discharge will not cause unreasonable degradation as required by Section 403 of the Act):

1. Physical Characteristics
   a. Floating particulates and grease and oil shall not be visible.
   b. The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.
   c. Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.
   d. The rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.

2. Chemical Characteristics
   a. The dissolved oxygen concentration shall not at any time be depressed more than ten percent from that which occurs naturally as a result of the discharge of oxygen demanding waste materials.
   b. the pH shall not be changed at any time more than 0.2 units from that which occurs naturally.
   c. The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions.
   d. The concentration of organic materials in marine sediments shall not be increased to levels which would degrade marine life.
   e. Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota.

3. Biological Characteristics
   a. Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.

b. The natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption shall not be altered.

c. The concentration of organic materials in fish, shellfish or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health.

4. Reopener
If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board and EPA will revise and modify this Order in accordance with such more stringent standards.

5. Receiving water monitoring shall be conducted in accordance with the attached Self-Monitoring Program, Parts A and B.

F. Sludge Requirements

1. All sludge generated by the Permittee shall be reused or disposed of in compliance with the applicable portions of:
   a) 40 CFR 258: for sludge disposed of in Municipal Solid Waste landfills;
   b) 40 CFR 503: for sludge reused by land application, incinerated, or disposed of in sludge-only surface disposal sites (dedicated land disposal sites or sludge-only landfills;
   c) 40 CFR 257: for all sludge disposal practices not covered under 40 CFR 258 or 503.

2. The Permittee is responsible for informing subsequent preparers, appliers, or disposers of the sludge of the requirements they must meet under 40 CFR 257, 258, and 503. The Permittee is responsible for assuring that its sludge is disposed or reused at a site which is permitted by the State of California.

3. Duty to mitigate: The Permittee shall take all reasonable steps to prevent or minimize any sludge use or disposal which has a likelihood of adversely affecting human health or the environment.

4. No sludge shall be allowed to enter waters of the United States, or to contaminate an underground drinking water source.

5. Sludge treatment, storage, and disposal or reuse shall not create a nuisance, such as objectionable odors or flies, or result in groundwater contamination.

6. The Permittee shall assure that haulers who ship non-Class A sludge off-site for additional treatment/reuse/disposal take all necessary measures to keep sludge contained.

7. Sludge that is stored for over two years from the time it is generated will be considered to be surface disposal, and must meet all the requirements of a surface disposal site under 40 CFR 503 Subpart C. If a Permittee wants to store sludge for longer periods of time prior to final disposal, a written request shall be submitted to EPA with the information in 503.20 (b).

8. Sludge containing more than 50 mg/kg PCB's shall be disposed of in accordance with 40 CFR 761.

9. The Discharger shall provide written notification to the Board and EPA at least 90 days prior to making any significant changes in sludge disposal practices.

10. The treatment, disposal, storage, or processing of sludge shall not create a condition of pollution or nuisance as defined in Section 13050 (l) and (m) of the California Water Code.

11. Any sludge treatment, disposal, storage, processing site shall have facilities adequate to divert surface runoff from adjacent area, to protect boundaries of the site from erosion, and to prevent any conditions that would cause drainage from the materials in the disposal site to escape from the site. Adequate protection is defined as protected from at least a 100-year storm and from the highest tidal stage that may occur.

12. Monitoring shall be conducted as follows:
    a. The sludge shall be tested annually using the Toxicity Characteristic Leaching Procedure (TCLP) at least once per year or more frequently if necessary to determine hazardousness. This permit may be modified to allow Whole Effluent Toxicity (WET) testing to be substituted for TCLP testing at the Discharger's request.
    b. For any sludge to be land applied:
        i) The sludge shall be tested for the metals required in Section 503.16 at the frequencies specified in 503.16, using the methods in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"(SW-846), as required in 503.8(4). The Permittee shall develop a representative sampling plan, including number and location of sampling points. Result of these tests shall be expressed in mg pollutant per kg sludge on a 100% dry weight bases.

ii) The sludge shall be tested for TKN, ammonium-N, and nitrate-N at the frequencies required in I) above for metals.

iii) The permittee shall demonstrate that the sludge meets Class A or Class B pathogen reduction levels as required in 503.32.

iv) The permittee shall demonstrate that the sludge meets one of the Vector Attraction Reduction requirements in 503.33 requirements 1-8, unless the applier meets requirement 9 or 10.

c. For any sludge to be placed on a surface disposal site:

i) If the site is unlined, the sludge shall be tested for the metals required in Section 503.26, using the methods in SW-846, as required in 503.8(4). The Permittee shall develop a representative sampling plan, including number and location of sampling points. Results of these tests shall be expressed in my pollutant per kg sludge on a 100% dry weight basis.

ii) The Permittee shall demonstrate that the sludge meets Class A or Class B pathogen reduction levels as required in 503.32 unless the VAR requirement 11 (sludge covered at end of each operating day) is met.

iii) A qualified groundwater scientist must develop a groundwater monitoring program for the site, or must certify that the placement of sludge on the site will not contaminate an aquifer.

d. For any sludge shall be tested by the Paint Filter Test (method 9095) as frequently as needed to demonstrate that there are no free liquids.

13. The Permittee shall comply with the following notification requirements:

a) Notification of non-compliance: The Permittee shall notify EPA Region 9 and the Board of any non-compliance within 24 hours if the non-compliance may seriously endanger health or the environment. For other instances of non-compliance, the Permittee shall notify EPA Region 9 and the Board of the non-compliance in writing within 5 working days of becoming aware of the non-compliance.

b) If sludge is shipped to another State or to Indian Lands, the Permittee must send 60 days prior notice of the shipment to the permitting authorities in the receiving State or Indian Land (the EPA Regional Office for that area and the State/Indian authorities).

c) For sludge that is land applied, the Permittee shall notify the applier in writing of the nitrogen content of the sludge, and of the applier's requirements to certify that the sludge was applied in accordance with the management practices, site restrictions, and any applicable vector attraction reduction requirements required in 40 CFR 503 Subpart B, and of the applier's requirement in 503. 12 (j) to pre-notify the EPA Regional Office of the application of any sludge which exceeds the metals concentrations in 503.13 Table 3.

14. The Permittee shall submit an annual sludge report to EPA and the Board by February 19 of each year for the period covering the previous calendar year. The report shall include:
    a) the amount of sludge generated that year, in dry metric tons;
    b) the amount, in dry metric tons, that was I) disposed of in landfills, ii) land applied, iii) placed in surface disposal sites, iv) amount that was stored on-site and off-site, v) sent to other sludge treaters for further treatment, and vi) amount disposed of by other means.
    c) results of all pollutant monitoring required in the Sludge Monitoring Section above.
    d) Certifications and descriptions of pathogen reduction methods, vector attraction reduction methods, site and harvesting restrictions, and management practices as required in 503.17 and 503.27.
    e) Results of groundwater monitoring or certification by groundwater scientist that the sludge will not contaminate an aquifer.
    f) Names and mailing addresses of land appliers or surface disposal site operators, location of sites (lat. and long.); size of parcels, crops grown, and actual loading rates used.
    g) Names, mailing addresses, and street addresses of persons who received sludge for storage, further treatment, disposal in a municipal waste landfill, or for other reuse/disposal methods not covered above.

    Reports shall be submitted to:

    Regional Sludge Coordinator (WTR-7)
    U.S. EPA Region 9
    75 Hawthorne St.
    San Francisco, CA 94105-3901

    San Francisco Regional Water Quality Control Board
    2101 Webster Street, Suite 500
    Oakland, CA 94612
    Attn: South Bay Watershed Management Division

G. Provisions

1. Requirements prescribed by this Order supersede the requirements prescribed by Orders Nos. 90-093 and No. 89-71. Order Nos. 89-71 and 90-093 (NPDES Permit No. CA 0038415) are hereby rescinded.

2. The discharge of pollutants shall not create a nuisance as defined in the California Water Code.

3. If the EPA or the Board finds that the operation of the wet weather facilities results in unacceptable adverse impacts on beneficial uses, the long-term average overflow frequency may be modified. Such action could require the modification of constructed facilities, the modification of the operation of constructed facilities, or the construction of additional facilities.

4. This Order may be reopened for the imposition of additional requirements should monitoring indicate that the current controls fail to meet water quality standards and/or not protect designated uses.

5. The Discharger shall comply with all sections of this Order/NPDES Permit immediately upon adoption.

6. The Discharger shall comply with all applicable items of the attached "Standard Provisions and Reporting Requirements" dated December, 1986.

7. The Discharger shall review and update its Operations and Maintenance Manual annually, or in the event of significant facility changes, immediately after such changes have occurred. Annual revisions, or letters stating that no changes are needed, shall be submitted to EPA and the Board by July 15 of each year. Documentation of operator input and review shall accompany each annual update.

8. The Discharger shall submit all required reports by July 15 of each year unless otherwise noted in the permit or monitoring plan.

9. The Discharger shall comply with the attached Self-Monitoring Program. EPA or the Board may make minor amendments to it pursuant to federal regulations (40 CFR 122.63).

10. The Discharger shall comply with all items of the attached "Standard Provisions and Reporting Requirements, and Definitions," dated August 1993, with the exception of items A.18, B.2, C.8, C.10(b), C.ll, and D.5.

11. This Order expires on March 19, 2002. The Discharger must file a Report of Waste Discharge in accordance with Title 23, Chapter 3, Subchapter 9 of the California Administrative Code not later than 180 days in advance of such expiration date as application for issuance of new waste discharge requirements.

12. This Order shall serve as a National Pollutant Discharge Elimination System Permit pursuant to Section 402 of the Clean Water Act or amendments thereto.

We do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 19, 1997 and of an NPDES permit signed by the Director of the Water Management Division, U.S. Environmental Protection Agency, Region 9, on April 9, 1997.

Alexis Strauss
Acting Director
Water Division
U.S. Environmental Protection Agency
Region 9
for the Regional Administrator

Loretta K. Barsamian
Executive Officer
Regional Water Quality Control Board
San Francisco Bay Region

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 9
AND
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

CITY AND COUNTY OF SAN FRANCISCO
OCEANSIDE TREATMENT PLANT,
SOUTHWEST OCEAN OUTFALL,
AND
WESTSIDE WET WEATHER FACILITIES

NPDES PERMIT NO. CA 0037681

CONSISTS OF
PART A, dated August 1993

AND

PART B

PART B

CITY AND COUNTY OF SAN FRANCISCO OCEANSIDE TREATMENT PLANT AND SOUTHWEST OCEAN OUTFALL

I. Influent and Effluent Monitoring Stations

Discussion:

Effluent monitoring is conducted to determine compliance with effluent limitations in the permit. Influent monitoring is necessary to determine compliance with percent-removal requirements for BOD and suspended solid and to assess overall plant performance.

Requirements:

Description of Sampling Stations

1. Influent

Station	Description
A-001	At any point in the treatment facilities headworks at which all waste tributary to the system is present and preceding any phase of treatment, and exclusive of any return flows or process side streams

2. Effluent

Station	Description
E-001	At any point after all sewage treatment units and before mixing with any effluent from the Westside Transport.

Sampling Schedule

The schedule of sample, analysis, and observations shall be that given in Table 1 and its footnotes, and as stated below.

II. Whole Effluent Toxicity (WET) Testing

Discussion:
Sections 308(a) and 402 of the Clean Water Act provide authority to EPA or the State to

require that NPDES permittees/applicants use biological monitoring methods and provide chemical toxicity and instream biological data when necessary for the establishment of effluent limits, the detection of violations, or the assurance of compliance with water quality standards. Further rationale regarding test protocols is provided in the document *Regions 9 &10 Guidance for Implementing Whole Effluent Toxicity Testing Programs*, May 31, 1996.

Requirement:
The permittee shall perform WET testing in accordance with the following:
A. Acute Toxicity
1. Definition:
   a. TUa = 100 / 96-hour LC 50.
   b. LC50 (percent waste giving 50% survival of test organisms) shall be determined by continuous flow bioassay techniques using standard test species. If specific identifiable substances in wastewater can be demonstrated by the discharger as being rapidly rendered harmless upon discharge to the marine environment, but not as a result of dilution, the LC50 may be determined after the test samples are adjusted to remove the influence of those substances.
2. Test Species and Methods:
   Bioassays shall be performed using two test species in parallel tests: Rainbow Trout, *Oncorhynchus mykiss*, and Topsmelt, *Atherinops affinis*. (*Menidia beryllinia* may be substituted in *Atherinops affinis* is not available). These tests should be 96-hour static renewal tests conducted in accordance with EPA's *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, EPA/600/4-90/027F, August 1993. Testing will be conducted monthly. If after twelve months of testing, no acute toxicity is observed, the permittee may cease monthly acute toxicity testing. However, annual rescreening of both species must be conducted (alternating seasons within the life of the permit), and the requirement for monthly testing will be reinstated if acute toxicity is detected.

B. Chronic Toxicity
1. Definition:
   a. Chronic toxicity measures a sublethal effect (e.g,. reduced growth, reproduction) to experimental test organisms exposed to an effluent or ambient water compared to that of the control organisms.
   b. Results shall be reported in TUc, where TUc = 100/NOEC (in percent effluent). The no observed effect concentration (NOEC) is the highest concentration of toxicant to which organisms are exposed in a chronic test, that causes no observable adverse effect on the test organisms (e.g. the highest concentration of toxicant to which the values for the observed

responses are not statistically significant different from the controls).

2. Test Species and Methods:

a. The discharger shall conduct tests on a monthly basis with a vertebrate, an invertebrate, and a plant, as follows for the first three suites of tests. After the screening period, monitoring shall be conducted monthly using the most sensitive species.

Plant: Giant kelp, *Macrocystis pyrifera*, germination and germ-tube length test.

Vertebrate: Topsmelt, *Atherinops affinis*, survival and growth test. (*Menidia beryllinia* may be substituted in *Atherinops affinis* is not available).

Invertebrate: Red abalone, *Haliotis rufescens*, larval development test.

b. Every year, the Discharger shall re-screen with the three species listed above, for one month at different times from the prior year and continue to monitor with the most sensitive species.

c. the presence of chronic toxicity shall be estimated as specified in EPA's *Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms*, EPA/600/R-95-136, August, 1995, Chapman, Denton and Lazorchak.

C. Whole Effluent Toxicity QA, TRE, TIE and Reporting

1. Quality Assurance

a. The instream waste concentration (IWC), four concentrations bracketing the IWC and a control will be tested for each species. The IWC is the concentration of effluent at the edge of the mixing zone.

b. Concurrent testing with reference toxicants shall be conducted.

c. If either of the reference toxicant tests or the effluent tests do not meet all test acceptability criteria as specified in the test methods manual, then the Discharger must re-sample and re-test as soon as possible.

d. If the effluent test is statistically significant and the minimum significant difference (%MSD) is less than 5%, then the City at its option may exclude this result and repeat the test. Also, the effluent test must meet the upper limit of 20 % MSD which is the same as the reference toxicant. (In the future, EPA may use the excluded test results from for bioequivalence testing.)

e. Control and dilution water should be receiving water as described in the manual. If the dilution water used is different from the culture water, a second control, using culture water shall also be used.

2. Preparation of TRE Workplan

The Discharger shall submit to EPA and Regional Water Quality Control Board a copy of the Discharger's TRE workplan (1-2 pages) within 90 days of the effective date of this permit. This plan shall describe the steps the Discharger intends to follow if toxicity is detected, and should include provisions for, at minimum:

a. Information gathering phase to: investigate and evaluate information for potential causes/sources of toxicity, effluent variability, treatment system efficiency;
b. Steps for maximizing in-house treatment efficiency and good housekeeping; and
c. If a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e., is there in-house expertise, or will the study be sent out to contractor?).

3. Toxicity Reduction Evaluation (TRE):
   a. If chronic toxicity as defined [i.e., the permit limit] is detected then, in accordance with the Discharger's TRE workplan and EPA manuals EPA/600/4-89/001A (municipal), the Discharger shall initiate a TRE within fifteen (15) days of the exceedance to reduce the cause(s) of toxicity.
   b. If chronic toxicity as defined [i.e., the permit limit] is detected, then the Discharger shall conduct six more tests, bi-weekly (every two weeks), over a twelve-week period.

4. Toxicity Identification Evaluation (TIE)
   a. If chronic toxicity is detected in any of the six bi-weekly tests, then the discharger shall in accordance with EPA acute and chronic manuals EPA/600/6-91/005F(Phase I), EPA/600/R-96/054 (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III), initiate a TIE to identify the causes of toxicity.
   b. If none of the six tests indicates toxicity, then the Discharger may return to the normal testing frequency.

5. Reporting
   a. The Discharger shall submit the results of the toxicity tests, including any accelerated testing conducted during the month, in TUs with the discharge monitoring reports (DMR) for the month in which the tests are conducted.
   b. The full report shall be submitted by the end of the month in which the DMR is submitted.
   c. The full report shall consist of: (1) the toxicity test results; (2) the dates of sample collection and initiation of each toxicity test; (3) the source water; (4) the flow rate at the time of sample collection; and (5) the results of the effluent analyses for chemical/physical parameters required for the outfall as defined in Part B of the Self-Monitoring Program.
   d. Test results for chronic tests shall be reported according to the chronic manual chapter on Report Preparation, and shall be attached to the DMR.

It is also suggested that the Discharger submit the data on an electronic disk in the Toxicity Standardized Electronic Reporting Form (TSERF).

e. The Discharger shall notify EPA and the State in writing within thirty (30) days of exceedance of the limit trigger of
   (1) Any findings of the TRE/TIE or other investigation to identify the cause(s) of toxicity;
   (2) Actions the Discharger has taken or will take to mitigate the impact of the discharge, to correct the noncompliance and to prevent the recurrence of toxicity;
   (3) Where corrective actions including a TRE/TIE have not been completed, an expeditious schedule under which corrective actions will be implemented; and
   (4) If no actions have been taken, the reason for not taking action.

6. Reopener
This permit may be modified in accordance with the requirements set forth at 40 CFR Parts 122 and 124, to include appropriate conditions or limits to address demonstrated effluent toxicity based on newly available information, or to implement any EPA-approved new State or Federal water quality standards applicable to effluent toxicity.

III. <u>Shoreline Monitoring (Surf Zone Sampling)</u>

Discussion:
Shoreline monitoring is conducted to assess bacteriological conditions in areas used for water contact recreation (e.g. swimming, surfing). Nine years of previous monitoring data included the analysis of total and fecal coliform and enterococcus bacteria as indicator species. The analysis of these data show that total coliform bacteria more often indicates a potential public health hazard than fecal coliform bacteria. Because of this analysis, and the fact that total coliform bacteria standards are used in the notification of the public to situations when water quality does not meet public health standards (beach posting), total coliform bacteria will be the indicator species used in this permit's shoreline bacteriological monitoring.

Requirements:

Shoreline monitoring will be conducted at nine nearshore stations located from Baker Beach along the shoreline perimeter to Fort Funston three days per week (Monday through Friday, excluding holidays). Samples shall be collected in the surf and sampled for total coliform bacteria. Also, water temperature (°C) shall be taken and standard observations including debris, floatables, weather, and public use.

Location of Shoreline Stations

Station	Description
15	In the surf at the terminus of Lobos Creek along Baker Beach
16	In the surf opposite the Sea Cliff 2 pump station
17	In the surf along China Beach
18	In the surf along Ocean Beach at the foot of Balboa St.
19	In the surf along Ocean Beach at the foot of Lincoln Ave., opposite the Lincoln overflow structure
20	In the surf along Ocean Beach at the foot of Pacheco St.
21	In the surf along Ocean Beach at the foot of Vicente St., opposite the Vicente overflow structure
21A	In the surf along Ocean Beach at the foot of Sloat Blvd.
22	In the surf along Ocean Beach at Fort Funston, opposite the Lake Merced overflow structure:

IV. Westside Treated Combined Sewer Overflow (CSO) monitoring

Discussion:
The purpose of this program is to effectively characterize overflow events and impacts.

Requirements:
The discharger shall provide the following non-sampling information during CSOs:

a. Date and time that CSO discharge started;
b. Frequency, duration, and (if possible) volume of discharge;
c. Rainfall intensity and amount (hourly data, aggregated);
d. Summary data to support estimate of discharge volume; and
e. Summary data to document conformance with operation plan for wet weather facilities.

The discharger shall establish a representative station for the Westside CSO Control System. The Station shall be located at a point prior to discharge where all waste tributary to the diversion structure is present and all treatment (i.e. baffling) is complete. Effluent sampling will be required only during discharge events, which may last from less than an hour to over a day. Composite sampling shall commence within 1 hour after a discharge begins and continue until the discharge ceases, but not to exceed 24 hours. Samples shall be taken according to the following schedule :

Parameter	Sample Type	Sample Frequency
Flow (mgd)[5]	Continuous	Continuous during discharge
BOD (mg/l)	C-X[1] (X<24)	1/month
Suspended Solids(mg/l)	C-X[1] (X<24)	1/month

Ammonia as N (mg/l)	C-X[1] (X<24)	1/month
Oil and Grease (mg/l)	C-X[3] (X<24)	1/month
pH	C-X[3] (X<24)	1/month
Pesticides and PCBs[2]	C-X[1] (X<24)	1/month
Trace Metals[3]	C-X[1] (X<24)	1/month
PAHs[4]	C-X[1] (X<24)	1/month

Notes:

1. Composite sample (1/hour) over X hours (the duration of the discharge), not to exceed 24 hours.
2. Pesticides as identified in EPA Method 608
3. Measure concentrations of ten metals: arsenic cadmium, chromium (total), copper, lead, mercury, nickel, silver, zinc, and selenium.
4. Polynuclear aromatic hydrocarbons, as identified in the California Ocean Plan.
5. Models may be used to estimate flow.

V. Offshore Monitoring

Discussion:

The proposed Ocean Outfall Monitoring Program is designed to determine environmental effects from the discharged secondary treated effluent (18 MGD, dry weather flow) from the City and County of San Francisco's, Oceanside Water Pollution Control Plant. The previous monitoring studies used a traditional sampling design of seasonal station occupation and replicate sampling in the vicinity of the discharge pipe. Nine years of post discharge monitoring data have shown negligible effects due to the presence of the effluent discharge, and overwhelming effects due to seasonality. This monitoring program is being modified to answer new questions that were not addressed in the previous program.

The study plan characterizes the area outside San Francisco Bay between Rocky Point in Marin County and Point San Pedro in San Mateo County. Randomized sampling locations have been determined using the EPA's EMAP grid system within specified depth strata (see figures I and II). The purpose of this effort is to: 1) to evaluate gradient effects near the discharge pipe and gradient effects from San Francisco Bay; 2) to characterize non-affected areas that can be combined to define reference conditions; and 3) to provide information on sediment and infaunal characteristics in the area between the discharge pipe and the Monterey National Marine Sanctuary boundary.

Sampling will be conducted annually in the fall during the period when sediments are least disturbed and may show the highest concentrations of contaminants. By focussing the sampling effort on a single index period (fall), we eliminate the need to account for seasonal variability in the analysis of the data. This savings in effort is used to increase the number of sample locations to better evaluate any spatial patterns in the data that might be attributed to the outfall and to provide information on reference conditions which can be used to evaluate any outfall-related effects.

This program will be implemented dynamically to maximize the amount of relevant and useful data that can be gathered within the five-year permit life by allowing the EPA, the Regional Board, and the City and County of San Francisco to agree to program corrections in response to ongoing analyses of monitoring data. The level of effort defined in the original program will not be exceeded in subsequent years. All data will be analyzed and reported to EPA and the Board by July of the following year to allow time to make modifications in the program for the following year. Data will also be transferred electronically in a standardized data transfer format.

V.(1) Benthic Monitoring (Sediment and Infauna)

Discussion:

Benthic monitoring is conducted to assess the accumulation of pollutants in sediments, to evaluate the physical and chemical characteristics of the sediments, and to evaluate the effects of the outfall on the benthic infaunal community. Analyses will be conducted to determine those factors which may affect a balanced indigenous population of infauna and to define appropriate reference sites.

Requirements:

Approximately 47 benthic samples will be collected in the first year. This includes 7 fixed stations to maintain time series at existing stations and a target of 40 random stations. Depending upon the results of the first year's analysis, that number may increase or decrease as needed.

All benthic samples will be collected using a 0.1 m^2 Smith McIntyre grab sampler. One sample shall be collected from each location for sediment analysis. The top 2-5 centimeters of sediment shall be removed from the surface of the grab, and analyzed for:

1. total volatile solids;
2. total organic carbon;
3. Kjeldahl nitrogen;
4. grain size including fractions of silt and clay;
5. Inorganic priority pollutant analysis[2];

The first year of the study will also include analysis of the DDT, PCB congeners and PAHs from sediments at a subset of 16 stations. The purpose of these organic analyses will be to compare contaminant concentrations around the outfall to concentrations in sediments that may be influence by the Bay. The exact location of these stations will be determined by the discharger in consultation with EPA and the Regional Board. Based on these findings, EPA, the Board, and the City may increase or decrease this number of stations as appropriate for the analysis of DDT, PCB congeners and PAHs.

[2]Inorganic priority pollutant analysis includes: Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Zn.

One sample shall be collected from each location for infaunal analysis. Each sample shall be passed through 1.0 mm and 0.5 mm sieves. The organisms retained on each sieve shall be relaxed and preserved for later taxonomic determination to the lowest taxon. Organisms from each taxon will be counted.

Stations:

Fixed Sampling Locations

Station	Latitude	Longitude
1	37 42 12.00	-122 34 31.20
2	37 42 37.80	-122 34 30.00
4	37 42 42.00	-122 35 42.00
6	37 40 00.00	-122 32 15.00
25	37 42 13.80	-122 34 30.00
28	37 41 54.00	-122 34 28.80
31	37 43 28.80	-122 34 01.80

Randomized Sampling Locations

Station	Latitude	Longitude
R1	37 52 04.77	-122 38 28.60
R2	37 51 06.14	-122 36 00.87
R3	37 51 04.65	-122 38 50.77
R4	37 50 53.96	-122 40 45.11
R5	37 50 15.84	-122 37 12.27
R6	37 50 11.61	-122 35 41.45
R7	37 49 40.86	-122 39 18.05
R8	37 49 19.20	-122 41 25.50
R9	37 48 31.68	-122 37 29.76
R10	37 47 48.31	-122 29 57.44
R11	37 47 10.02	-122 30 46.18
R12	37 47 07.88	-122 36 57.88
R13	37 46 39.77	-122 34 22.04
R14	37 46 29.37	-122 38 38.38
R15	37 46 23.73	-122 32 08.26
R16	37 45 39.83	-122 37 04.52
R17	37 45 33.87	-122 38 55.98
R18	37 45 24.69	-122 33 44.13
R19	37 45 00.01	-122 39 56.01
R20	37 44 46.38	-122 35 55.51
R21	37 43 43.07	-122 31 11.61
R22	37 43 04.34	-122 38 42.51
R23	37 42 59.44	-122 32 47.41
R24	37 42 56.50	-122 34 15.08
R25	37 42 41.24	-122 36 28.29
R26	37 42 33.84	-122 31 08.82
R27	37 42 15.49	-122 34 55.24
R28	37 41 35.66	-122 32 11.82
R29	37 41 20.89	-122 36 06.47
R30	37 40 55.35	-122 33 29.05
R31	37 40 56.18	-122 37 43.15
R32	37 39 31.65	-122 33 41.41
R33	37 39 14.63	-122 32 04.75
R34	37 38 02.91	-122 32 27.99
R35	37 37 42.23	-122 36 40.08
R36	37 37 34.73	-122 33 53.51
R37	37 37 00.97	-122 36 55.75
R38	37 36 52.15	-122 35 28.81
R39	37 36 32.16	-122 32 01.35
R40	37 36 16.73	-122 33 03.03

V.(2) Trawls

Discussion:

Trawls shall be conducted to assess the presence or absence of a balanced indigenous population of demersal fish and epibenthic invertebrates, and to determine the bioaccumulation of priority pollutants in these organisms.

Requirements:

The first year the monitoring study will include trawl sampling at one site in the vicinity of the discharge pipe, two far field sites, and one reference site. Analysis of the first year of sediment and infauna data will help determine overall characteristics of a large study area. Subsequent to year one, trawl sampling will include one trawl collected from approximately eight appropriate locations near the outfall and within the reference zone. Fish and invertebrates collected in each trawl will be identified to species. Abnormalities and disease symptoms shall be recorded and itemized (e.g. fin erosion, lesions, tumors). Standard length of all fish specimens will be measured, disk width will be measured for skates and rays, and the carapace length of shrimp and carapace width of crabs will be measured. All shrimp will be separated as gravid females and unsexed individuals, and crabs will be sexed.

To assess bioaccumulation effects, one fish and one macroinvertebrate species will be collected at a discharge site and at a reference location. The preferred species for use in the bioaccumulation studies are English sole (*Pleuronectes vetulus*) and the dungeness crab (*Cancer magister*). Muscle tissue will be analyzed to provide information on human health concerns; liver or hepatopancreas tissue will be analyzed to provide information on ecological health. Three composites of 10 or more organisms of similar size from each station will be collected for priority pollutant analysis. Tissues will be analyzed for metals (As, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn), DDT, PCB congeners, PAHs and lipids.

VI. Reporting Requirements

A. Self-Monitoring Reports for each calendar month shall be submitted monthly, to be received no later than the 20th day of the following month. The required contents of these reports are specified in section G.4. of Part A of the Self Monitoring Program.

B. An annual report covering the previous calendar year shall be submitted to the Regional Board by January 30 each year. The annual summary of wet weather activities and receiving water results will be submitted by July 31. The required contents of the annual report are specified in section G.5 of Part A of the Self Monitoring Programs.

C. Any overflow, bypass or other significant non-compliance incident that may endanger health or the environment shall be reported according to sections G.1 and G.2 of Part A of the Self Monitoring Program.

We do hereby certify that the foregoing is a full, true, and correct copy of a Self-Monitoring Program adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on March 19, 1997 and of an NPDES permit signed by the Director of the Water Management Division, U.S. Environmental Protection Agency, Region 9, on April 9, 1997.

Alexis Strauss
Acting Director
Water Division
U.S. Environmental Protection Agency
Region 9
for the Regional Administrator

Loretta K. Barsamian
Executive Officer
Regional Water Quality Control Board
San Francisco Bay Region

Effective Date: May 9, 1997

Attachments: Part A, dated August 1993
Figures I & II
Table 1

Table 1
INFLUENT AND EFFLUENT MONITORING SCHEDULES FOR
OCEANSIDE WATER POLLUTION CONTROL PLANT

Parameter		Influent A- 001			Effluent E-001	
(In ug/l unless otherwise noted)	C-24	Grab	Cont.	C-24[6]	Grab	Cont.
Flow Rate (MGD)[1]			D			D
BOD (5-day) (mg/l)	1/W (11)			1/W (11)		
Settleable Solids (ml/l-hr)					5/W	
Total Suspended Solids (mg/l)	5/W			5/W		
Grease & Oil (mg/l) [2]	M			M		
Turbidity (NTU)				W		
pH (units)		5/W			5/W	
Acute Toxicity (TUa)[3]				M		
Chronic Toxicity (TUC)[4]				M		
Arsenic (ug/l)				M		
Cadmium (ug/l)				M		
Chromium (ug/l) [5]				M		
Copper (ug/l)				M		
Lead (ug/l)				M		
Mercury (ug/l)				M		
Nickel (ug/l)				M		
Selenium (ug/l)				M		
Silver (ug/l)				M		
Zinc (ug/l)				M		
Cyanide (ug/l) [10]				M		
Ammonia as Nitrogen				Q		
Phenolic Compounds (total)				Q		
Endosufan (ng/l)				Q		
Endrin (ng/l)				Q		

HCH (ng/l) [9]				Q		
Radioactivity (pci/l)				Q		
Standard Observations[7]				3/W		
Acrolein				Q		
Antimony				Q		
Bis(2-chloroethoxy) methane				Q		
Bis(2-chloroisopropyl) ether				Q		
Chlorobenzene				Q		
Chromium III				Q		
Di-n-butyl phthalate				Q		
Dichlorobenzes [9]				Q		
1,1 dichloroethylene				Q		
Diethyl phthalate				Q		
Dimethyl phthalate				Q		
4,6, dinitro-2 methylphenol				Q		
2,4 dinitrophenol				Q		
Ethylbenzene				Q		
Flouranthene				Q		
Hexachlorocyclopentadiene				Q		
Isophorone				Q		
Nitrobenzene				Q		
Thallium				Q		
Toluene (Methylbenzene)				Q		
1,1,2,2 tetrachloroethane				Q		
Tributyltin [8]	Q			Q		
1,1,1 trichloroethene				Q		
1,1,2 trichlorethane				Q		
Acrylonitrile				Q		
Aldrin				Q		

Benzene				Q		
Benzidine				Q		
Beryllium				Q		
Bis(2-chloroethyl) ether				Q		
Bis(2-ethylhexyl) phathalate				Q		
Carbon tetrachloride				Q		
Chlordane [9]				Q		
Chloroform				Q		
DDT [9]				Q		
1,4, dichlorobenzene				Q		
3,3 dichlorbenzidine				Q		
1,2 dichloroethane				Q		
dichloromethane				Q		
1,3 dichlorpropene				Q		
Dieldrin				Q		
2, 4, dinitrotoluene				Q		
1,2 diphenyhydrazine				Q		
Halomethanes [9]				Q		
Halomethanes (All)				Q		
Heptachlor [9]				Q		
Hexachlorobenzene				Q		
Hexachlorobutadiene				Q		
Hexachloroethane				Q		
N-nitrosodimethylamine				Q		
N-nitrosodiphenylamine				Q		
PAHs [9]				Q		
PCBs [9]				Q		
TCDD equivalents (Dioxin) [8]	Q			Q		
Tetrachloroethylene (PERC)				Q		
Toxaphene				Q		
Trichloroethylene				Q		

2,4,6 trichlorophenol				Q		
Vinyl chloride				Q		
Proposed Additions to Ocean Plan:						
1,1, dichloroethylene				Q		
Isophorone				Q		
1,1,2,2 tetrachloroethane				Q		
1,1,2 trichloroethane				Q		

LEGEND FOR TABLE

Types of Samples

- C-24 Flow-weighted composite sample (24 hours)
- Grab Grab Sample
- Cont. Continuous sample

Sampling Frequency

- D Once per day
- W Once per calendar week
- M Once per calendar month
- 2/W Two days per calendar week
- 5/W Five days per calendar week
- 2/M Two days per
- A Annual
- Q Quarterly

TABLE NOTES:

1. Effluent flows from the Westside Transport (decant) shall also be measured and reported.

2. Grease and oil sampling shall consist of 3 grab sample taken at 8 hour intervals during the sampling day, with each grab being collected in glass container and analyzed separately. Results shall be expressed as a weighted average of the three results, based on the instantaneous flow rates at the time each grab sample was collected.

3. Bioassay samples shall be collected on days coincident with effluent composite sampling. The discharger may use the static renewal method for the 96-hour bioassay (renewal with 24-hour composite sample at 24-hour intervals during the test). Un-ionized ammonia concentrations shall be determined whenever bioassay results violate effluent limits. Refer to Section II for Testing Procedures.

4. Bioassay sample shall be collected on days coincident with effluent composite sampling. Refer to Section II for testing procedures.

5. The discharger shall specify whether total or hexavalent chromium concentrations are analyzed.

6. A minimum of four grab samples, one every six hours over a 24-hour period, must be used for volatile organic compounds (EPA Method 624), Cyanide and Phenolic Compounds. These samples shall be composited at the laboratory just prior to analysis.

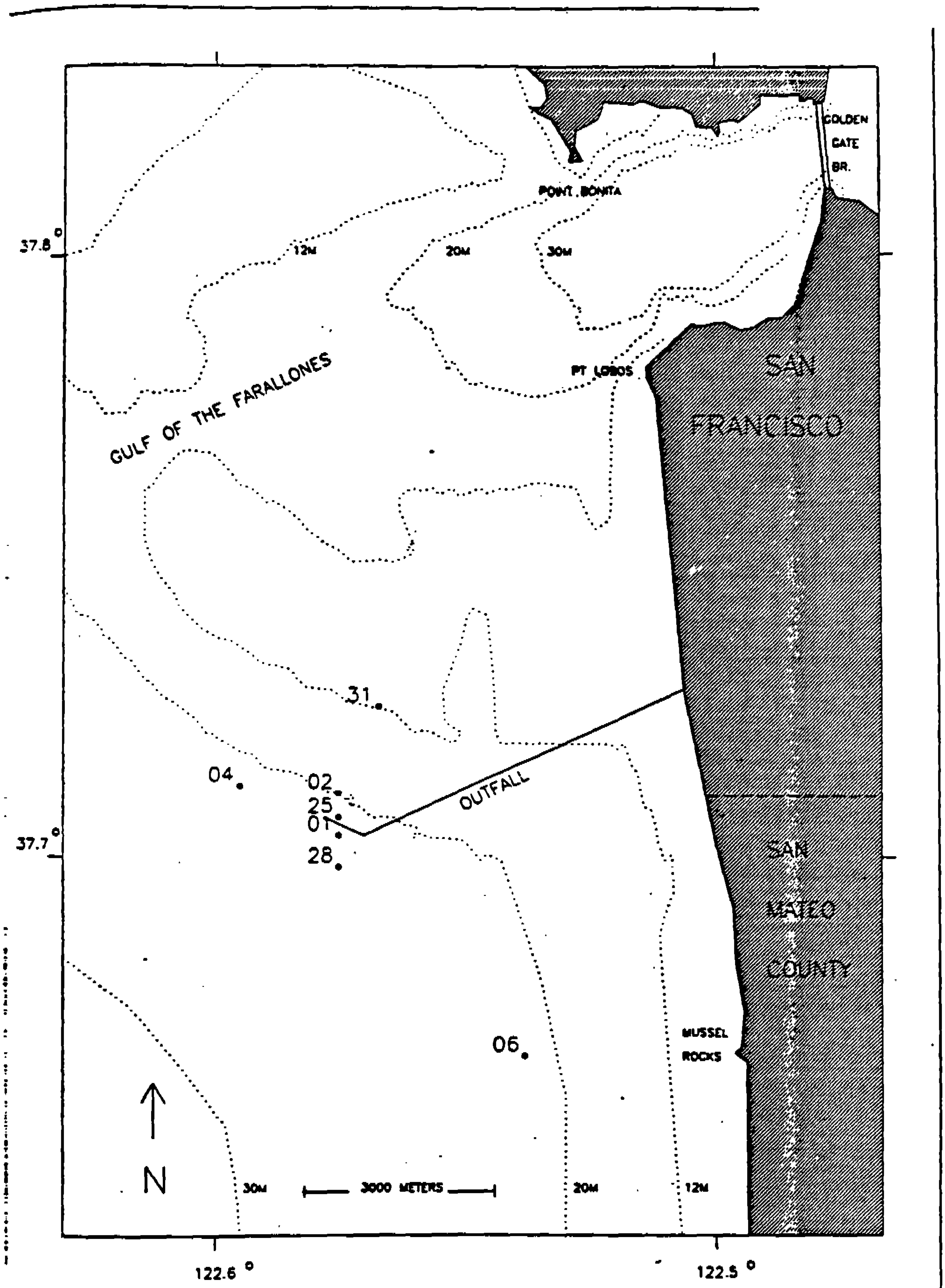

Figure 1
Fixed Benthic Sampling Locations

Figure 2
Randomized Benthic Sampling Locations

ANALYSIS OF THE ADEQUACY OF SAN FRANCISCO'S COMBINED SEWER OVERFLOW CONTROL EFFORTS

Prepared for:

U.S. EPA, Region IX
San Francisco, CA

Prepared by:

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Calistoga, CA

August 26, 1994

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LIST OF ACRONYMS

BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BERM	San Francisco's Bureau of Environmental Regulation and Management
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BPJ	Best Professional Judgement
BPT	Best Practicable Control Technology Currently Available
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
LMT	Lake Merced Transport
MG	Million Gallons
MGD	Million Gallons per Day
NPDES	National Pollutant Discharge Elimination System
OWPCP	Oceanside Water Pollution Control Plant
PAH	Polynuclear Aromatic Hydrocarbon
POTW	Publicly Owned Treatment Works
RSWPCP	Richmond-Sunset Water Pollution Control Plant
RT	Richmond Transport
RWQCB	California Regional Water Quality Control Board
SWRCB	California State Water Resources Control Board
SWOO	Southwest Ocean Outfall
TSS	Total Suspended Solids
WPPP	San Francisco's Water Pollution Prevention Program
WQS	Water Quality Standard
WST	Westside Transport

EXECUTIVE SUMMARY

The City of San Francisco has undergone a 20-year, $1.4-billion planning and construction effort to address the water quality degradation caused by uncontrolled overflows from the City's combined sewer system (CSS). The control effort has gone beyond the technology-based guidelines of the Clean Water Act (CWA) to meet local water quality standards (WQSs) in the San Francisco Bay and Pacific Ocean. The City's system is also in accordance with the recently finalized Combined Sewer Overflow (CSO) Control Policy.

The CWA established technology-based effluent limits for non-POTW point-source discharges. These effluent limits represent Best Conventional Pollutant Control Technology (BCT), which apply to conventional pollutants, or Best Available Technology Economically Achievable (BAT), which applies to toxicants and other non-toxic, non-conventional pollutants. The CSO Control Policy defines "nine minimum control technologies" that can be equated with BAT/BCT requirements for CSO control efforts. These nine minimum control technologies have been implemented by the City of San Francisco in its water pollution control efforts, and therefore the City is in compliance with the BAT/BCT requirements of the CWA. Construction of additional facilities beyond those envisioned in the City's Wastewater Master Plan, such as providing "full containment," cannot be justified, based on existing law and policy.

SECTION 1
INTRODUCTION

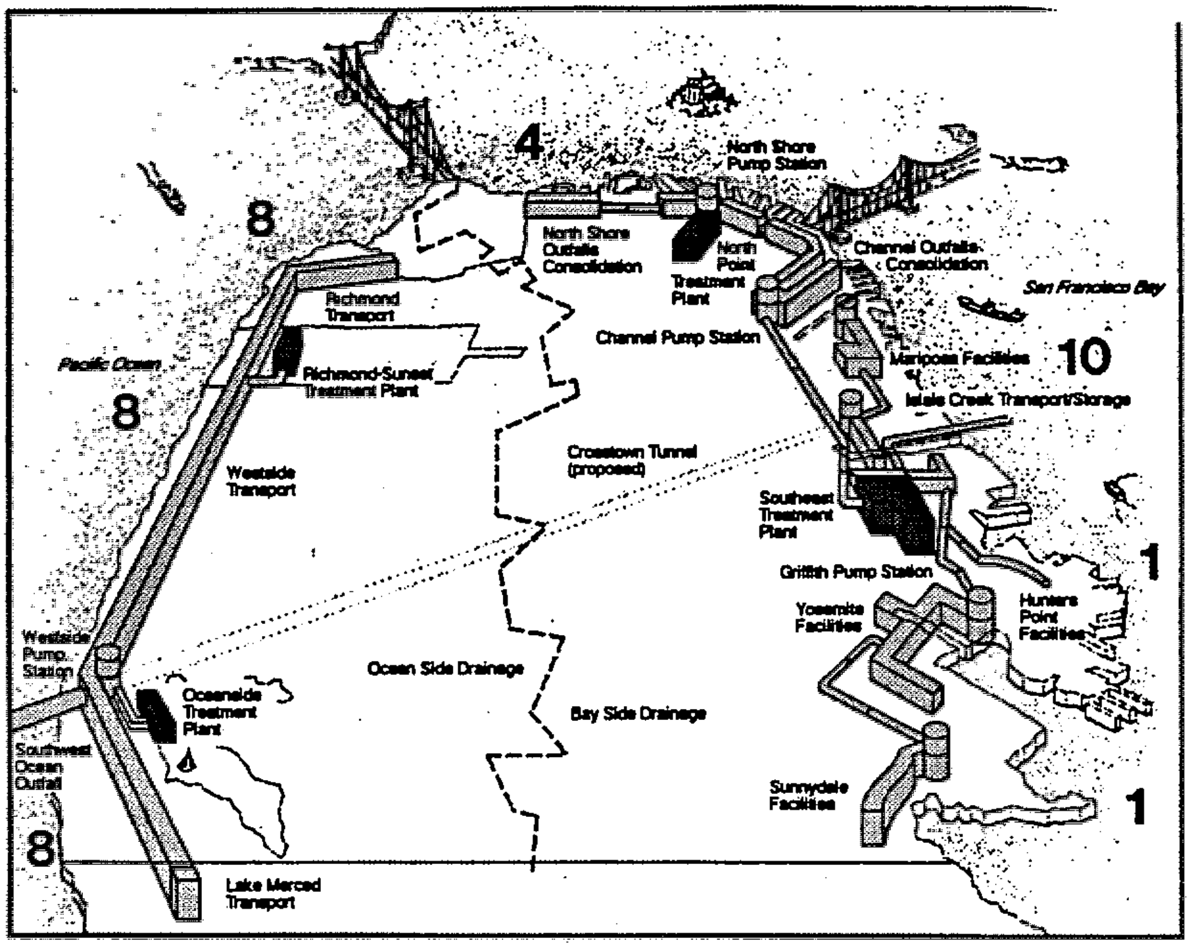
1.1 Purpose and Objectives

The primary purpose of this analysis is to determine whether the City of San Francisco's controls to remediate water quality degradation caused by uncontrolled overflows from the City's CSS comply with technology-based requirements established by the CWA; the City's conformance with the recently finalized CSO Control Policy is also evaluated. Under the CWA, technology-based treatment requirements for point source discharges represent either Best Conventional Pollutant Control Technology (BCT) for conventional water quality parameters, such as biochemical oxygen demand (BOD) and total suspended solids (TSSs), or Best Available Technology Economically Achievable (BAT), an incremental level of treatment for toxicants and other non-conventional pollutants. The CSO Control Policy, finalized by EPA in April 1994, defines several measures to evaluate compliance with water quality standards (WQSs), including nine minimum control technologies that represent BAT/BCT treatment requirements for CSOs. This analysis also provides information to EPA Region IX and the California Regional Water Quality Control Board in support of their permitting authority for the City's NPDES permit for the discharge of treated wastewater effluent.

1.2 Overview of San Francisco's CSO Control System

The City of San Francisco has a CSS that collects both sanitary sewage and stormwater, and transports this flow to wastewater treatment plants. Prior to the City's Master Planning process, rainfall caused these combined sewers to overflow at points around the City's shoreline and contributed to pollution in the Bay and Ocean. In the mid-1970s, the City initiated a wastewater facility construction effort that will be completed in 1996 at a capital cost of approximately $1.4 billion to control CSOs and provide a higher overall level of wastewater treatment.

Key components of the City's efforts include the construction and upgrade of large treatment plants on both the East and West sides of the City to provide full secondary treatment for all dry-weather flow and the construction of massive storage/transport structures to control excess storm flows during rainy periods by containing the combined flows for later treatment. These wastewater treatment plants and storage/transport structures ensure that all combined flows receive treatment, through either treatment plants or, during periods of heavy rainfall, flow-through (primary equivalent) treatment within the storage/transport structures. Figure 1–1 presents an overview of the City's water pollution control facilities.



Figures indicate the number of overflows allowed per zone annually

Figure 1–1. Overview of San Francisco's Water Pollution Control Facilities

1.3 Agency Involvement in the San Francisco Wastewater Program

The construction program for San Francisco's wastewater facilities is one of the largest public works programs in California. Several federal, state, and local regulatory agencies have been involved in planning, design, and construction. This section provides a brief overview of involved agencies and their respective roles.

1.3.1 U.S. Environmental Protection Agency, Region IX

EPA Region IX issued the Wastewater Master Plan Final Environmental Impact Report and Statement (EIR/EIS) in 1974, which established basic planning goals and identified major technical options that have guided the program to date. During initial program phases, Region IX staff had a major role in the program, including overseeing the planning and construction effort; providing general guidance and interpretation of applicable laws and regulations, funding, and technical assistance; permitting; negotiating and coordinating with other agencies; and performing audits.

A key decision point for the project occurred in 1982, at which time Region IX staff established the San Francisco Review Group, which included outside experts in the fields of wastewater treatment, marine discharges and impacts, the ecology of San Francisco Bay, and public health. This group completed a thorough review of the program and made recommendations that directed continuation of the program. Region IX's continued involvement includes (1) permitting for the Ocean Outfall, which discharges to federal waters, and (2) reviewing and approving NPDES permits issued to the City for Bay and shoreline discharges.

1.3.2 California Regional Water Quality Control Board, San Francisco Bay Region

The RWQCB developed the City's specific permit requirements, which determined the nature and size of the wastewater control and treatment facilities. The RWQCB is also responsible for preparing a "Basin Plan" that establishes WQSs throughout the region. Wastewater discharge permits must require compliance with WQSs set forth in the Basin Plan. The board's requirements, particularly those relating to the allowable number of shoreline discharges and removal of floatable materials, ultimately determined how the facilities would be designed. The RWQCB continues to revise the Basin Plan periodically and reissue discharge permits.

1.3.3 California State Water Resources Control Board

EPA delegated the wastewater facility construction grant program to the California State Water Resources Control Board (SWRCB). The SWRCB administered federal and state funding, which provided approximately 50 percent of the money needed and ensured that funds were spent appropriately. The SWRCB also issues the Ocean Plan, which specifies WQSs for the Pacific Ocean, which governed the design of the Westside facilities.

1.3.4 U.S. Environmental Protection Agency, Headquarters

As one of the largest wastewater facility construction programs in the country, the San Francisco program received substantial oversight from EPA Headquarters, which issued regulations and guidance documents on which the City's wastewater planning was based. San Francisco received EPA wastewater facility construction grants and Marine CSO control grants, which are issued only for approved facility plans that meet federal requirements.

1.3.5 California Coastal Commission

The Westside Storage/Transport and the Oceanside Water Pollution Control Plant are within the jurisdiction of the California Coastal Commission. The Commission was interested in a number of issues related to the project, including the area and impact of the disturbance caused by construction of the Storage/Transport and undergrounding of the Oceanside facility.

1.3.6 National Park Service

A portion of the wastewater facilities are located on National Park Service land, so this agency has been closely involved in the planning and decision-making regarding the construction program.

1.3.7 Other Agencies

A number of other agencies were involved in the planning, design, and construction of the City's wastewater facilities, including

- U.S. Army Corps of Engineers,
- U.S. Government Accounting Office,
- California Department of Fish and Game,
- State Lands Commission,
- California Department of Health Services,
- San Francisco Bay Conservation and Development Commission,
- U.S. Fish and Wildlife Service, and
- National Marine Fisheries Service.

SECTION 2

ESTABLISHMENT OF WATER QUALITY-BASED PERMIT

2.1 SUMMARY OF THE ORIGINAL SYSTEM AND MASTER PLAN IMPROVEMENTS

2.1.1 Description of the Original System

San Francisco's earliest wastewater facilities were built in the 1850s and consisted of brick sewers to transport the City's sanitary waste and street washings to the San Francisco Bay, the nearest waterbody. The City's first sewer facility plan, adopted in 1899, called for the continued use and development of combined sanitary-storm water sewers, with disposal of untreated wastewater through outfalls into San Francisco Bay and the Pacific Ocean.

The City's first sewage treatment plant, the Richmond-Sunset Wastewater Treatment Facility, commenced operation in 1938; the North Point Wastewater Treatment Plant began operation in 1951, followed by the Southeast Wastewater Treatment Plant in 1952. All three plants provided primary treatment and disinfection of wastes from their respective service areas. Only the Southeast plant had a deep-water outfall to provide good dispersion of its effluent. The North Point plant discharged effluent under Piers 35 and 37, and the Richmond-Sunset plant discharged to the shoreline near Mile Rock.

San Francisco is one of only two cities in California with combined sewers, in which the same set of pipes carry storm runoff and sanitary sewage. San Francisco has a mild, "Mediterranean" climate with dry summers and cool, rainy winters; the majority of rainfall occurs between November and April. During dry weather, the City generates about 100 MGD of sewage; during intense storm events, instantaneous combined flow rates may rise as high as 8,000 MGD, i.e., 80 times the dry-weather rate[1]. The original capacity of sewers and treatment plants was exceeded during storm events, and a mixture of raw sewage and storm runoff could be discharged at up to 39 locations along the City's shoreline. Prior to construction of wastewater system improvements, CSOs occurred in San Francisco up to 82 times per year, or whenever rainfall exceeded about 0.02 inches per hour (a heavy drizzle). Composition of CSOs ranged from approximately equal parts sanitary sewage and stormwater runoff to greater than 50 parts runoff to one part sanitary flow, and the duration of overflow events ranged from a few minutes to a few days[2].

The main environmental impacts associated with these discharges were frequent beach postings due to high coliform levels and the deposition of unaesthetic floatables on beaches. Shoreline surveys prior to construction of Master Plan facilities indicated no obvious adverse effects on intertidal communities near any of the Westside CSO structures because of the low acute toxicity of the overflows, their transitory nature, and the excellent dispersion at all Westside CSO structures[3].

2.1.2 Summary of Master Plan Improvements to the City's System

San Francisco began planning for wastewater facilities improvement in 1972, with the preparation of the first Wastewater Master Plan. Implementation of the Master Plan will be complete in 1996, with an expenditure of approximately $1.4 billion. This per capita expenditure of nearly $1,900 per City resident for water pollution control is among the highest of any medium- or large-sized city in the United States[4]. Most program funding, nearly $1 billion, was spent to control CSOs, while the remainder was spent to improve dry-weather treatment capabilities. On the Westside, San Francisco has already spent approximately $300 million on wet-weather control facilities.

The Master Plan evaluated three basic options for wastewater control: (1) constructing high-capacity wastewater treatment plants, (2) storing excess flows for later treatment, and (3) separating sewers. The City selected a combination of increased treatment capacity and large volume storage as the most cost-effective means of controlling water quality. Sewer separation was rejected because of high costs, the need to excavate every street in the City, and the failure to address pollution caused by stormwater runoff.

On the City's Westside, key facilities are the Oceanside Water Pollution Control Plant (OWPCP), the Southwest Ocean Outfall (SWOO), and the Westside Storage/Transport facilities (see Figure 1–1). The OWPCP came on-line in spring 1994, replacing the Richmond-Sunset treatment plant. The OWPCP provides both a higher level of treatment (full secondary treatment) and a larger treatment capacity (total of 65 MGD) than the former treatment facility. The Westside Storage/Transport facilities capture combined sewage and stormwater runoff and hold as much as possible for later treatment at the OWPCP. The SWOO was completed in 1986, and discharges treated wastewater effluent approximately 4.5 miles from shore, and provides effective initial dilution of the effluent. The Westside Storage/Transport, a 2.5–mile long, box-like structure located beneath the Great Highway, is one of the largest wastewater storage structures in the nation. Storm flows that cannot be stored pass over a weir and under a baffle into a second box, called the decant structure; settleable solids and floatables remain in the first box, and are flushed to the treatment plant after the storm subsides (Figure 2–1). Overflow from the decant box passes over another weir and under a baffle, and is routed to the SWOO. If SWOO's capacity is exceeded, effluent is discharged to the shoreline. Thus, any combined flows

Operation of the Westside Storage/Transport Box

The Storage/Transport holds the combined sewage and storm water for later treatment at the wastewater treatment plant. The Storage/Transport provides treatment, itself, by settling out solids and skimming off floatables. It is only used for storage during and after storms.

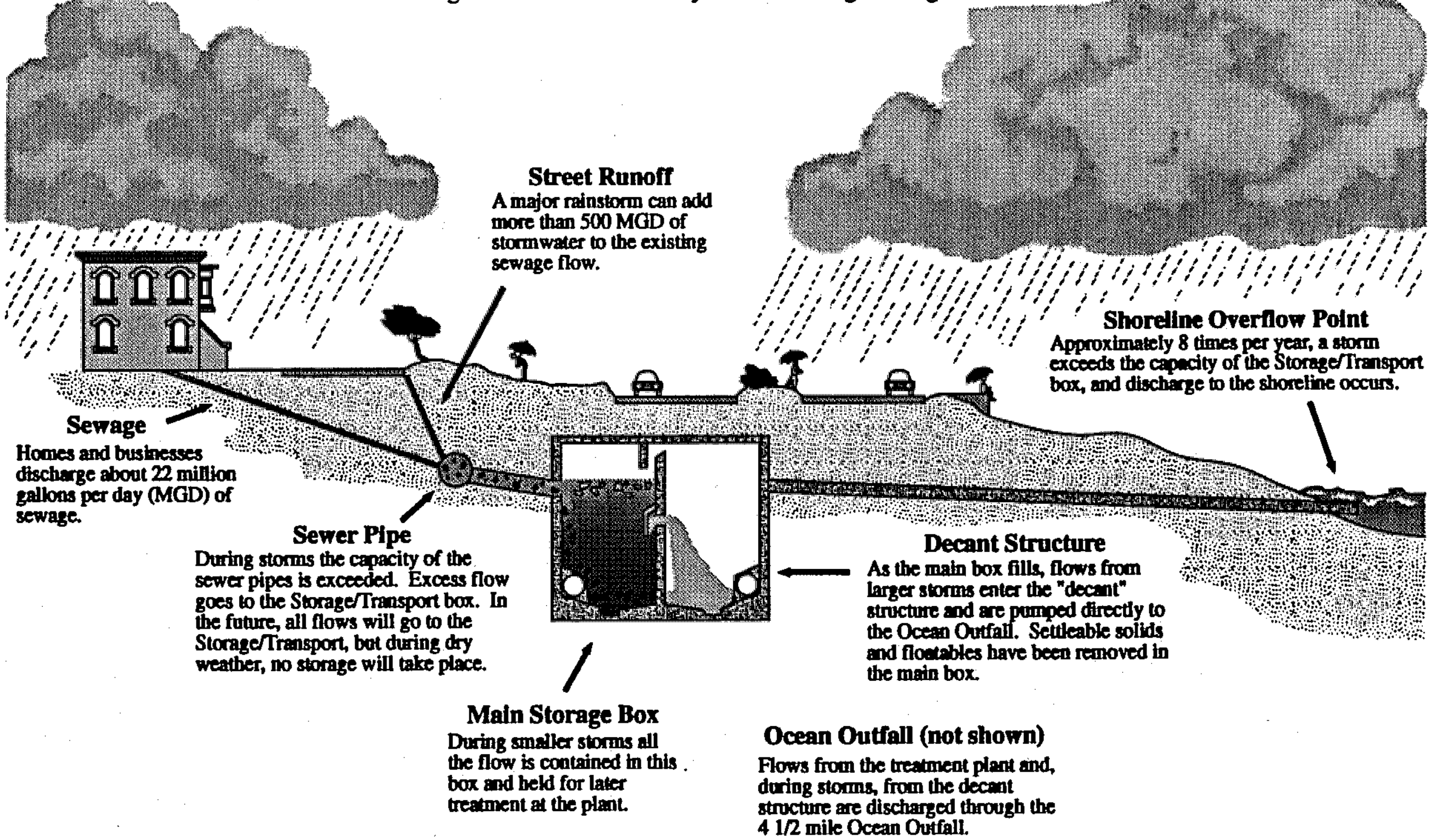


Figure 2–1. Cross-Section of a Storage/Transport Box

discharged from the storage/transport structures receive primary-equivalent treatment, which removes essentially all macroscopic floatables and most settleable solids. Once a storm subsides, stored flows are routed to the treatment plant. Storage/transport structures are subsequently drained to the treatment facilities. Figure 2–2 depicts the wet weather operations of the City's Westside facilities.

All untreated combined sewage formerly discharged to the shoreline will be captured and treated as a result of the Westside construction program. During rainy weather, approximately 50 percent of the flows are held for treatment at the OWPCP; the remaining 50 percent receive flow-through treatment within the storage/transport structures. On average, approximately 87 percent of the combined flows are discharged through the SWOO, and 13 percent are discharged to the shoreline. These percentages are long-term averages that may not reflect the system's performance for a particular year because of the dynamic nature of the interaction between the system and the characteristics and sequence of storm events. For example, the system might capture all flows during a relatively intense rainfall of short duration with no overflow, especially when the transport/storage structures are empty at the start of the storm; a storm event of similar intensity and duration, however, might result in an overflow if previous rainfall had partially filled the transports.

2.2 Modeling and Cost Considerations Used in Selection of Eight Overflows per Year

Two basic approaches to controlling CSOs in the City were examined: (1) construction of large-capacity treatment plants and (2) construction of huge storage facilities. The most operationally viable, and probably most cost-effective, solution was judged to be a combination of both approaches. Numerous storage-treatment combinations could achieve the same CSO standard; a broad array of combinations were analyzed using mathematical models to simulate hydrologic, hydraulic, and operational characteristics of each combination.

A model was designed that used as input 70 years of hourly rainfall data, converted to runoff volumes, then superimposed dry-weather flow data to simulate combined flow volumes[5]. By specifying a treatment capacity and storage volume, the model calculated an annual average number of overflows for each specified system. This iterative approach was used to generate trade-off curves for treatment capacity versus storage volume for a given number of overflows. The end result was a matrix of treatment capacity versus storage volume combinations, all of which would accomplish the same level of CSO control. Costs were then estimated for each scenario for cost-to-benefit comparisons; benefits were quantified as the increased number of recreational user-days associated with a decreased frequency of CSO events.

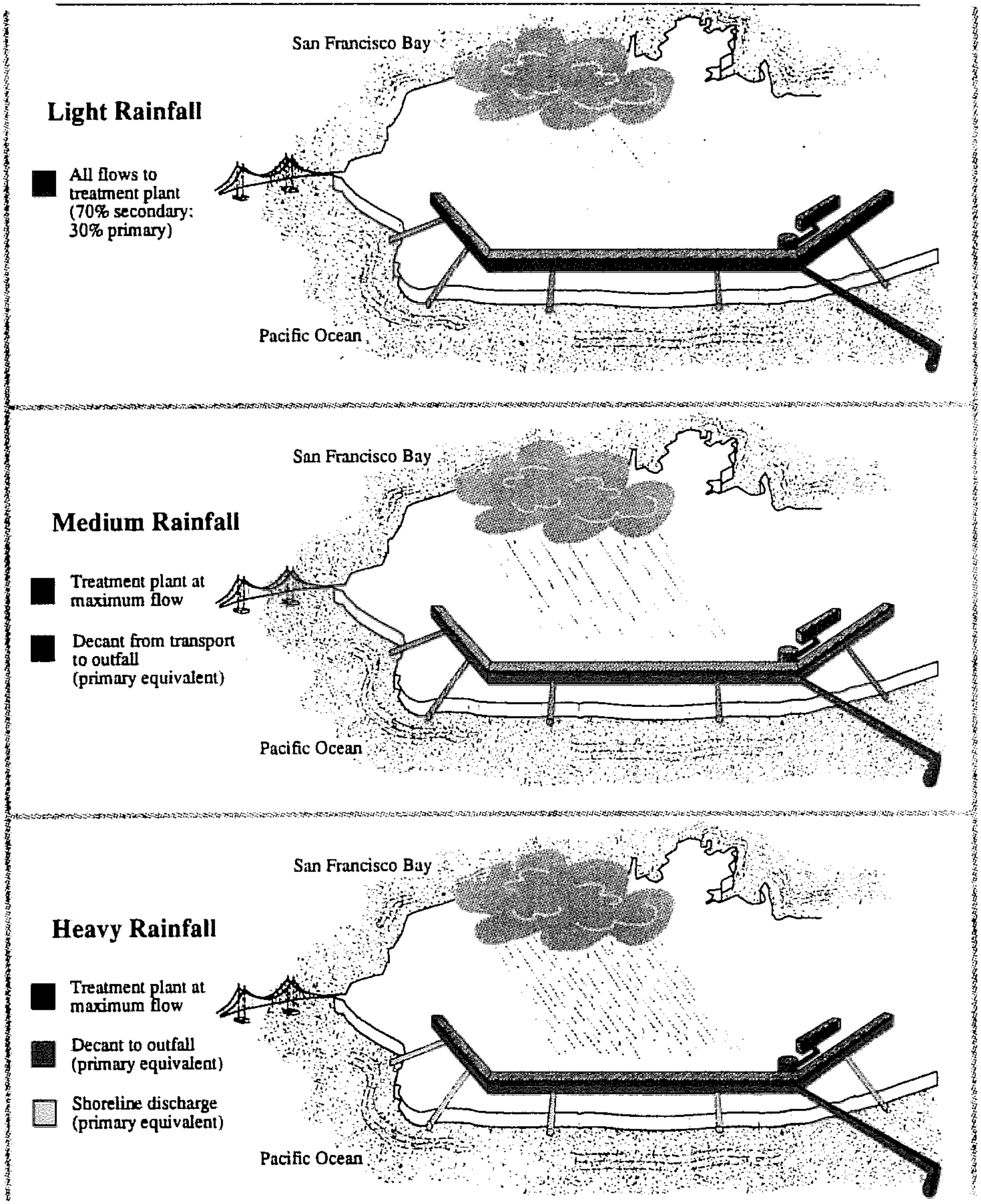


Figure 2–2. Westside Wet-Weather Operations

The key decision that determined the size and nature of the Westside facilities was made in 1979 when the RWQCB, with SWRCB and EPA concurrence, issued the permit establishing the Westside shoreline discharge frequency at eight overflows per year.

In 1976, the RWQCB adopted Order No. 76–23, requiring the City to reduce the frequency of overflows from an average of 54 events per year to an average of one event per year and to undertake a study to better define the costs and benefits of these facilities[6]. The City prepared this study, concluding that the differences in costs between one overflow per year and eight overflows per year were out of proportion to the benefits that would be derived[7]. The higher degree of control (an average of one overflow per year) would result in 21 additional days of water contact recreation per year (assuming 3 days of bacteriological exceedances per overflow event), at an additional annual cost of approximately $10 million per day. Therefore, the City requested that the RWQCB consider an increase in the allowable overflow frequency from an average of one per year to an average of eight per year.

In 1979, the SWRCB adopted Order No. 79–12, amending Order No. 76–23, to allow an average of eight overflows per year, a limit that required an exemption to the 1978 Water Quality Control Plan for Ocean Waters of California (Ocean Plan)[8]. The SWRCB determined that granting an exemption to the Ocean Plan would serve the public interest, especially considering that the City proposed to baffle the overflows to remove floatables that had previously been deposited on City beaches after a CSO event. EPA reviewed the board's decision to grant an exemption to the City and conditionally approved the decision[9]. All subsequent planning, design, and construction of Westside facilities (including the storage/transport structures, pump stations, the SWOO, and the OWPCP) have been conducted to achieve this permit limit.

2.3 Design of System Based on Eight Overflows per Year

2.3.1 Southwest Ocean Outfall (SWOO)

The SWOO, completed in 1986, is a 4.5-mile long outfall designed to accept the City's entire dry- and wet-weather flow (450 MGD), but at present receives only effluent discharge from the OWPCP and decant discharge from the WST. Recent dye studies indicate that the minimum dilution from the SWOO is on the order of 100:1 (i.e., 100 parts ocean water to one part effluent), with dilution generally exceeding 200:1[10].

2.3.2 Oceanside Water Pollution Control Plant (OWPCP)

A key component of the Westside facilities is the OWPCP, which became operational in spring 1994. This plant was designed in accordance with the criterion of eight overflows per year and provides for full secondary treatment of dry-weather flows (24 MGD). The OWPCP has a wet-weather treatment capacity of 65 MGD, consisting of 43 MGD secondary treatment capacity and an additional 22 MGD of primary treatment capacity. The two effluent streams are blended prior to discharge via the SWOO.

2.3.3 Westside Storage/Transport (WST)

The Westside Storage/Transport facilities (including the Westside Storage/Transport and the Richmond and Lake Merced Transports) provide approximately 70 MG of storage for combined flows. The structures were designed and constructed to provide full containment of light rainfall, with subsequent pumping of combined flow to the OWPCP for treatment. During a medium rainfall, flows entering the transport in excess of capacity flow from the east box to the west box; decanted flow is then pumped to the SWOO for discharge. Excess flows occur an average of 26 times per year. During a heavy rainfall, combined flows in excess of the capacity that can be stored or routed to the SWOO are discharged to the near-shore waters of the Pacific Ocean at five locations (see Figure 2–2). These overflows have been effectively decanted twice: once upon exiting the east box and then upon exiting the west box, prior to discharge. The Westside Storage/Transport has been designed and constructed in accordance with the criterion of eight overflows per year, and all near-shore discharges have received primary-equivalent treatment.

2.4 Assessment of Systems's Impact to Water Quality

According to the California Ocean Plan, beneficial uses that have been identified for the Pacific Ocean include industrial water supply, water contact recreation, non-contact water recreation (e.g., aesthetic enjoyment), navigation, commercial and sport fishing, mariculture, preservation and enhancement of Areas of Special Biological Significance, wildlife habitat, preservation of rare and endangered species, marine habitat, fish migration and spawning, and shellfish harvesting[11]. Existing uses in the beach area of the City include fishing and boating in offshore waters, swimming, windsurfing, and diving in near-shore waters and fishing, wading, and picnicking along the shoreline. Shellfishing in offshore, near-shore, and shoreline areas appears to be limited due to a lack of suitable habitat; mussels are taken along rocky shorelines, where accessible.

A literature search and field reconnaissance suggest that natural conditions have left sandy areas along the beaches relatively barren ecologically, as few species are adapted to the high-energy intertidal zones[12]. In fact, the sandy surf zone (the area most affected by overflows) is a hostile environment for organisms, characterized by an unstable substratum and variations in hydraulic pressure. Rocky areas (Lands End, Mussel Rocks, and Fort Point) contain more biodiversity, typical of northern California intertidal rocky areas, consisting of algae, barnacles, mussels, anemones, worm tubes, tunicates, and other hard-stratum organisms.

From 1972 to 1982, the City collected several grab samples of CSOs from the "first flush" of each storm and conducted 96-hour static bioassay tests on these undiluted samples using three spine stickleback[13]. Tests indicated 100 percent survival in over half of the 61 samples tested. Although the stickleback is considered a pollutant-tolerant species, no organisms in their natural setting would be exposed to undiluted overflow for anywhere near 96 hours. Because no adverse effects have been documented to occur to the marine environment as a result of CSO discharges to the beaches, beneficial uses that would potentially be adversely affected by CSO discharges are limited to contact and non-contact water recreation and shellfish harvesting.

Prior to construction of the Westside facilities, overflows of untreated combined sewage flows to the City's beaches were routine during wet-weather periods. These CSO discharges contained extremely high bacteria concentrations and caused shoreline waters to exceed bacteriological objectives for swimming and shellfishing. Uncontrolled CSO discharges made San Francisco's near-shore waters unsuitable for swimming for an average of 119 days per year. The construction of the Westside facilities have resulted in a substantial reduction in pollutant loading from uncontrolled CSOs. Table 2–1 provides an estimate of water quality parameters from the pre-program conditions (uncontrolled overflows averaging 54 per year) and current conditions (controlled overflows averaging eight per year); an estimated percentage reduction compared to pre-program conditions is also presented.

Recently constructed facilities have provided substantial improvement in the attainment of designated beneficial uses in comparison to pre-program conditions. Previously, uncontrolled CSO events would substantially degrade the aesthetic enjoyment (and other non-contact uses) of the beach areas through the deposition of floatables on the beaches; degradation has been largely eliminated by the construction of the Westside facilities. Restrictions on water contact recreation have decreased 79 percent, from an average of 119 days per year to an average of 25 days per year. Shellfish harvesting conditions have similarly improved.

The City maintains an extensive monitoring program of water and sediment quality in the Bay and Ocean. Monitoring data are submitted annually to the RWQCB. After an overflow to the near-shore waters occurs, monitoring indicates that bacteria levels are elevated in the vicinity of the overflow, but return to background levels within one to two tidal cycles. Monitoring water, sediments, and aquatic life in the vicinity of the SWOO indicates that the marine environment

Table 2–1. Comparison of Pre-Program and Master Plan Overflow Data (Westside Only)

Parameter	Pre-Program	Master Plan	Percentage Reduction
Average Number of Beach Overflows (Range)	114[a] 54 (26–193)	8 (1–18)	93
Average Annual Volume of Wastewater Discharged, MG (Range)	2,870 (926–5,030)	449 (15–1,070)	84
Average Percentage of Sanitary Flow	12	6.5	46
Average Number of Days Recreational Uses Impaired (Range)	119 (67–147)	25 (6–51)	79
Average BOD, lbs/yr x 10^3 (Range)	1,220 (394–2,140)	191 (6–460)	84
Average TSS, lbs/yr x 10^3 (Range)	12,100 (3,890–21,200)	1,890 (63–4,550)	84

(Source: City and County of San Francisco, Revised Overflow Control Study, 1978, plate 8)

[a]Subsequent to the publication of the 1978 study, the SWRCB changed the definition of an overflow event. Under the current definition, the Westside facilities overflowed an average of 54 times per year.

is healthy. Thus, the only adverse impact identified from the City's water pollution control system is the temporary elevation in bacteria levels immediately following an overflow event.

SECTION 3
BAT/BCT ANALYSIS OF FULL CONTAINMENT

3.1 Establishment of Statutory Compliance

The CWA established the NPDES permit program to regulate all point source discharges to the nation's waters and also the criteria that EPA and States apply for issuing discharge permits. All dischargers must comply with one of two sets of requirements: (1) technology-based minimum requirements that apply to all dischargers of a specified class or (2) more stringent effluent limits, if necessary, to meet local WQSs[14]. Thus, effluent discharge permits are generally either technology-based or water quality based. The CWA requires that permits for non-POTW discharges (such as CSOs) contain effluent limitations that represent:

1. *Best Practicable Control Technology Currently Available (BPT)*: The basic control level that all discharges (other than POTWs) must attain. BPT was the initial technology-based control level required by the CWA. This treatment level is determined first and then used in calculating the following two control levels, which may be more stringent.

2. *Best Conventional Pollutant Control Technology (BCT)*: Effluent limitations applied to suspended solids, BOD, oil and grease, pH, and coliform bacteria.

3. *Best Available Technology Economically Achievable (BAT)*: Treatment applied to toxicants and other non-toxic, non-conventional pollutants.

BCT and BAT are technology-based and constitute the minimum effluent limits allowed in wastewater discharge permits. Compliance with BAT/BCT requirements of the City's water pollution control facilities should be examined as an integrated whole, rather than as isolated components. If the system complies with BAT/BCT requirements, then each component must also comply.

3.1.1 Compliance with BCT

The following CWA regulations for BCT specify factors are used by the permit writer (40 CFR 125.3(d)(2)):

(i) The reasonableness of the relationship between the costs of attaining a reduction in effluent and the effluent reduction benefits derived;

(ii) The comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class of industrial sources;

(iii) The age of equipment and facilities involved;

(iv) The process employed;

(v) The engineering aspects of the application of various types of control techniques;

(vi) Process changes; and

(vii) Non-water quality environmental impacts (including energy requirements).

In this case, the key issue is Item ii, the comparison of costs and level of pollutant reduction. BCT is intended as an incremental level of control beyond BPT and imposes additional controls only if the additional removal of conventional pollutants is comparable to removal costs at POTWs. A comparison of CSO treatment costs with local POTW secondary treatment costs is presented in Table 3–1. Because pollutant removal costs are significantly higher for CSOs than for conventional treatment at POTWs, incremental pollutant removal would not be justified based on BCT requirements alone and are necessary only when WQSs are not being attained.

Table 3–1. Comparison of CSO Control and Conventional Treatment Costs

Control Technology		TSS Reduction (percent)	TSS Removal Cost ($/lb)
CSO Control	Rotary Screening	5	46
	Swirl Concentrators	15	21
	High-Rate Filtration	20	17
	Sedimentation	33	6
Local POTWs	East Bay Municipal Utilities District	85	0.26[a]
	Central Contra Costa County Sanitation Dist.	85	0.51[a]
San Francisco	Westside Facilities	60	10.78[a]

(Source: RWQCB San Francisco Bay Region and the City of San Francisco)

[a] Note that San Francisco's high treatment costs result from its combined sewer system; other POTWs have separate systems and therefore do not treat stormwater runoff.

In considering Item iii, the City's facilities are recently completed or still under construction; thus, older facilities in need of upgrade have been, or are being, replaced. All new facilities are being designed, constructed, and operated in accordance with the City's approved Master Plan. With respect to Item iv, the processes employed are essentially state-of-the-art combined sewage treatment technologies. Items v and vii are discussed in subsequent sections.

3.1.2 Compliance with BAT

BAT requirements are incremental requirements that go beyond BCT by specifying controls for two groups of pollutants: (1) toxicants (e.g., copper, lead, zinc, polynuclear aromatic hydrocarbons [PAHs], pesticides, and other organics) and (2) non-toxic, non-conventional pollutants such as floatables. The following CWA regulations for BAT specify factors are used by the permit writer (40 CFR 125.3(d)(3)):

(i) The age of equipment and facilities involved;
(ii) The process employed;
(iii) The engineering aspects of the application of various types of control techniques;
(iv) Process changes;
(v) The cost of achieving such effluent reduction; and
(vi) Non-water quality environmental impacts (including energy requirements).

In practice, BAT has often been based on reductions achieved by other dischargers in the same category.

Again, the key issue is the cost of effluent reduction (Item v). The high cost of CSO control has prevented many U.S. cities from providing treatment, even when WQSs are being violated. The City's capital investment for water pollution control has been about $1,900 per person and would be substantially higher in current dollars. Few municipalities with combined sewers have implemented comprehensive control programs. The City's facilities are new and state-of-the-art. Therefore, BAT control technology for other cities' control efforts and their high costs of CSO control would be established at a level below that achieved by San Francisco.

3.2 ENGINEERING ASPECTS OF VARIOUS CONTROL TECHNOLOGIES

The range of available CSO control technologies in use or planned is essentially limited to four core technologies: storage basins, deep tunnels, swirl concentrators, and screening facilities[15]. These four technologies fall into two groups. The first group of CSO control measures, storage basins and deep tunnels, are implemented where receiving water quality impacts are of the greatest concern, and required levels of CSO control are consequently high. These technologies rely on the storage of excess CSO, with subsequent treatment at existing water pollution control plants, to achieve high pollutant removal rates and effective disinfection levels. The second group of CSO controls, swirl concentrators and screening facilities, are implemented to reduce settleable solids and floatables. These technologies are typically applied where receiving water quality conditions do not warrant high BOD/TSS removal. Sewer separation, a third type of CSO control strategy, is typically used by municipalities that have only a relatively small area served by combined sewers.

3.2.1 Storage Basins

Storage basins are typically concrete tanks located at overflow points or near treatment plants. This structurally intensive technology involves the capture and storage of CSOs, with subsequent treatment of captured flows. Combined flows that exceed the storage capacity of the basin may receive coarse screening, primary settling, floatable removal, and/or disinfection prior to discharge. Once flow capacity is available at the treatment plant, the stored volume is treated and discharged. This technology is very flexible because extremely variable CSO flows can be stored and treated, and high removal of BOD and TSSs can be achieved[16].

3.2.2 Deep Tunnels

Deep tunnels provide consolidated storage in underground tunnels, from which the CSO is pumped to an existing treatment plant when capacity becomes available. Pollutant removal effectiveness is limited by the volume of the tunnel; CSO discharges that exceed the storage capacity of the tunnel typically do not receive treatment. Thus, the CSO that is stored in tunnels can receive a high level of treatment prior to discharge, but flows in excess of the tunnel's capacity typically receive no treatment.

3.2.3 Swirl Concentrators

The swirl concentrator is a specially configured gravity solids separator that retains floatables in the unit, passes concentrated solids to the sewer, and discharges the remaining flow to the receiving waterbody. The swirl concentrator can provide effective separation of floatables over a wide range of hydraulic loadings, while removing approximately 15 percent of suspended solids[17].

3.2.4 Screening Facilities

Screening of CSOs can be effective in removing large solids and floatables and is typically used in conjunction with other storage and treatment systems. The effectiveness of this technology is directly related to the size of the screen openings, which can vary from bar racks to coarse and fine screens and microstrainers. Screened materials are generally removed mechanically. Screening, a physical treatment process for CSO discharges, is usually applied when a high level of BOD/TSS removal is not necessary.

3.2.5 Conclusion

Based on this brief review of available CSO control technologies, San Francisco's transport/storage facilities clearly provide the highest level of water quality protection available. Swirl concentrators and screening facilities can reduce floatables, but provide limited removal of BOD and suspended solids. Deep tunnels allow for a high level of treatment for combined flows that do not exceed its storage capacity, although combined flows in excess of tunnel capacity receive little or no treatment. In San Francisco's system, combined flows are either stored for later treatment when capacity becomes available at the treatment plant or are subjected to primary-equivalent treatment prior to discharge when transport/storage capacity is exceeded. This treatment provides a high rate of removal for BOD, TSS, floatables, and settleable solids that is not possible with deep tunnels, swirl concentrators, or screening facilities.

3.3 Non-Water Quality Environmental Impacts

By 1996, the City will have constructed about 70 MG of storage on the Westside, consisting of 47.6 MG in the Westside Storage/Transport project, 19.7 MG in the Richmond and Lake Merced Storage/Transport project, and an additional 2.2 MG of storage in the sewer lines. The Westside Storage/Transport, one of the largest wastewater storage structures in the nation, is a 2.5-mile long, box-like structure located beneath the Great Highway. Approaching full containment of combined flows (assuming one overflow per year) would require the construction of either an additional 515 MG of storage or the construction of a 65 MGD wastewater treatment plant and an additional 220 MG of storage[18].

Constructing the required storage facilities would involve the excavation of many miles of City streets and would be extremely disruptive to local residents. Siting an additional wastewater treatment plant in a densely populated city such as San Francisco would be extremely difficult, possibly involving the condemnation of private property. Neighborhood disruption resulting from construction on this scale would include street closure for up to one year, dust and noise nuisances, potential vibration damage from the excavation and pile-driving equipment, and traffic disruption from truck deliveries and workers commuting to and from construction sites. Although land and property values would probably be unaffected in the long term, properties in the vicinity of construction activities would likely take longer to sell during the construction period than they would normally.

The fact that these extensive construction activities would occur in a densely populated city and adjacent to environmentally sensitive coastal areas was a consideration for designing and constructing the City's current system to allow for an average of eight overflows per year, rather than one. In 1979, the SWRCB (with EPA concurrence) granted an exemption to the Ocean Plan that allowed up to eight overflows per year on the Westside, partially due to the fact that the Central Coast Regional Coastal Commission had denied the City a required development permit based on one overflow per year because of the size and location of the transport necessary for a one overflow system[19]. The major increase in facility size that would be necessary to go from eight overflows per year to one overflow per year was judged to be too disruptive to the coastal area. Other concerns voiced by the Coastal Commission include future beach erosion, sewer exposure, seismic disturbances, and groundwater problems.

3.4 Comparison with Other Municipalities

Approximately 1,100 cities in the United States have either full or partial CSSs, and the degree of overflow control varies enormously. Some cities, including San Francisco, Chicago, Milwaukee, Sacramento, and Seattle, have made major investments in CSO control; other communities are just beginning the first steps of evaluation and characterization of their overflow points.

Newer U.S. cities usually have separate storm and sanitary sewers. Cities with separate systems are required to provide secondary treatment to all wastewater in the sewage system but are not required to treat their stormwater discharges. Storm runoff from urbanized areas can contain high levels of suspended solids, toxicants (e.g., lead, zinc, and copper) from street runoff, pathogens, and oxygen-demanding matter, all of which can degrade water quality. Comparing the overall pollutant removal levels of cities with separate sewers to the level of pollution control provided by San Francisco is therefore useful.

Table 3–2 compares San Francisco to a city with a "standard" separate sewer system. Both provide a high level of treatment to their sanitary sewage, but San Francisco also removes approximately 65 percent of the solids carried by stormwater. Another approach to this comparison to a "standard" city is evaluating how San Francisco would perform if it had separate sewers. Solids removal from wastewater is a good overall indicator of the degree of pollution control, because toxicants and bacteria are generally associated with these solids. As can bee seen in Table 3–2, San Francisco provides an overall higher level of pollution control than would a similar city with separate sewers.

Table 3–2. Comparison of Approximated Pollutant Removal Achieved by San Francisco to a City with a Standard Separate Sewer System

Pollutant Type	Removal Rate of Total Suspended Solids (Percent)	
	San Francisco (Combined System)	"Standard" City (Separate System)
Sanitary Sewage (8 billion gallons/year)	85	85
Stormwater (3 billion gallons/year)	65	0
Overall Removal Rate	80	62

3.5 Analysis of Full Containment

Full containment of storm flow is not required under the CWA's BAT/BCT requirements or by the CSO Control Policy. In fact, "full containment" of CSOs is extremely difficult to achieve because of the nature of precipitation events and usually defined stochastically (e.g., long-term average of 1, 0.2, or 0.05 overflows per year). The following section analyzes the costs and environmental benefits of full containment of all Westside storm flows (defined as one overflow per year), which could receive secondary treatment of all combined flows. Two options that would meet the necessary combination of increased treatment and storage are examined.

Option 1 would provide a limited increase in treatment capacity and a major increase in storage. This option assumes that the lack of available land or difficulties of constructing satisfactory treatment methods prevent the City from building more than 20 MGD of additional secondary treatment. Assuming one allowable overflow per year, an additional 515 MG of storage would need to be constructed, over and above an existing 70 MG: a second storage/transport box under the Great Highway and additional storage/transports under Avenues 45 through 48. Thirty-foot diameter tunnels would be constructed under Avenues 41 through 44 and part of 40th Avenue; tunnels would be constructed, because the street grade is too high for open-cut construction. Estimated capital costs for these facilities would be $1.3 billion[20].

Option 2 assumes that constructing a new 65 MGD secondary treatment plant on the Westside would be possible to double the existing treatment capacity. (It should be noted that two-thirds of the OWPCP was built underground due to the lack of available space.) In this case, an additional 220 MG of storage would be necessary to provide full secondary treatment to all combined flows, allowing one overflow per year. Estimated capital cost for this option, not including land acquisition costs for the treatment plant, would be $840 million.

Implementation of one of the above options would reduce TSS loading to the Pacific Ocean by an estimated 420 tons per year, at an incremental removal cost of approximately $68 per pound (Table 3–3). Extensive monitoring at the Ocean Outfall, however, shows a healthy marine environment; thus, identifying improvements to the marine environment attributable to elimination of the decant discharge would be difficult[21]. Constructing these facilities would reduce the average number of beach health advisories posted from 24 to 3 days per year. Assuming a capital cost of $840 million for Option 2 (not including land acquisition), the improvement in beneficial uses of reducing the number of overflow events would cost $8.2 million annually (assuming a 6.5% interest rate and a 50-year life) for each reduction in shoreline overflow events, or $2.7 million per day for each reduction in health advisory posting[22]. Virtually all costs would be borne by the residents of San Francisco, because the federal grant program for wastewater facilities has ended, and the availability of loans is limited. The capital cost per City resident would be at least $1,160.

The cost of TSS removal for San Francisco's Westside is presently over $10 per pound, as compared to removal costs of $0.26 per pound for the East Bay Municipal Utilities District and $0.51 per pound for the Central Contra Costa Sanitary District. The latter facilities have separate sewers, which significantly lower their treatment costs, as compared to San Francisco. The incremental cost of TSS removal for full containment would be approximately $68 per pound. Based on the guidance provided by the CWA, these costs are excessive compared to the benefits provided, and this expenditure would be wholly unwarranted under BAT or BCT.

Table 3–3. Comparison of TSS Removal Costs for Pre-Program, Master Plan, and Full Secondary Treatment for Westside Facilities

Stage	Annual Cost ($, millions)	Average TSS Discharged (tons/yr)	Average TSS Removed[a] (tons/yr)	Percent TSS Removal[a]	Incremental Cost of TSS Removal ($/lb)[b]
Pre-program Facilities[c]	—	3,800	—	—	—
Full Master Plan (1996)	46.5[d]	1,580	2,220	58	10.5
Full Secondary on Westside (1 overflow)	57.2[d,e]	1,160	2,640	69	68[f]

[a] Compared to Pre-Program facilities.

[b] Divides total annual cost by pounds of TSS removed; other measures of water pollutant loading (e.g., BOD and toxicants) also improve.

$57,200,000 / (420×2000) =

[c] Pre-program facilities represent the baseline for comparison of TSS emissions.

[d] Assumes a 50-year life, 6.5% interest rate, and O&M of 0.02% of capital cost.

[e] Excludes land acquisition costs for a 65 MGD treatment plant.

[f] For comparison, secondary treatment of wastewater costs approximately $0.26 per pound of TSS removed for the East Bay Municipal Utilities District and approximately $0.51 per pound TSS removal for the Central Contra Costa Sanitation District.

SECTION 4

CONFORMANCE OF THE CITY'S SYSTEM WITH THE FINAL CSO CONTROL POLICY

4.1 BAT/BCT AS APPLIED TO THE NINE MINIMUM CONTROL TECHNOLOGIES SPECIFIED IN THE FINAL CSO POLICY

CSOs, untreated mixtures of sanitary sewage, and urban stormwater runoff, can contain high levels of suspended solids, bacteria, heavy metals, floatables, nutrients, oxygen-demanding compounds, oil, grease, and other pollutants. Nationwide, these discharges are considered among the most significant remaining sources of water quality impairment. Historically, EPA policy documents concerning the control of combined sewer facilities did not propose the construction of treatment facilities as part of the minimum technology-based controls, assuming that construction would take place only as necessary to comply with local WQSs. EPA's 1989 National CSO Strategy remained consistent with previous EPA policies by requiring controls going beyond BCT/BAT only if necessary to meet WQSs, and established the following six minimum control technologies:

1. Proper operation and regular maintenance,
2. Maximum use of the collection system for storage,
3. Review and modification of pretreatment programs,
4. Maximization of flow to the POTW for treatment,
5. Prohibition of dry-weather overflows, and
6. Control of solid and floatable materials in CSO discharges.

Item 6 in the Strategy represented a change from previous policies in that controlling solid and floatable material requires the construction of some treatment facility and is analogous to BAT requirements applied to non-toxic and non-conventional pollutants. Federal and state regulatory agencies generally have not required the construction of control and treatment facilities for combined sewer discharges for purposes of meeting BAT/BCT requirements; rather, such facilities are required to meet only certain WQSs. The nature of CSOs makes it difficult to determine whether a control technology should be termed BCT or BAT; this distinction is not critical, however, because both types of controls must be implemented.

In April 1994, EPA issued a final *Combined Sewer Overflow (CSO) Control Policy*, which establishes a consistent national approach for controlling discharges from CSOs. EPA obtained extensive input from key stakeholders in developing its policy to take into account the site-specific nature of CSOs and their impacts and cost effectiveness. The 1994 Policy added three minimum control technologies to the 1989 Strategy:

7. Pollution prevention,
8. Public notification, and
9. Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

The final Policy therefore increases the number of technology-based requirements. The six controls from the 1986 Strategy and three additional controls from the 1994 Policy are collectively referred to as *the nine minimum control technologies.*

4.2 Conformance of the City's System with the Nine Minimum Control Technologies Specified in the CSO Control Policy

Permit writers developing NPDES permits refer to both the 1989 Strategy and 1994 Policy as part of the best professional judgment process in proposing permit conditions. An evaluation of the City's compliance with the nine minimum control technologies shows that the City has met or exceeded each technology and is therefore in conformance with these guidelines. The following text describes how San Francisco has met each of the nine control technologies.

1. *Proper Operation and Regular Maintenance:* Proper operation and maintenance of CSSs decreases pollutant loadings that occur during wet-weather events. Solids can settle out of the sewage and collect in the large combined sewers during dry-weather periods; these solids can become remobilized and flushed from the combined system by the first storm, or the so-called "first flush" phenomenon. San Francisco's hilly topography minimizes the amount of sewage solids that settle out of the wastewater. Sewer system inspection and maintenance ensures that breaks and blockages do not occur when the system is fully charged, as it is during storm events. Operation and maintenance of the City's CSS fall within the purview of three bureaus within the City's Department of Public Works: the Bureau of Street and Sewer Repair, the Bureau of Water Pollution Control, and the Bureau of Engineering. The City has an aggressive program of sewer system maintenance, including cleaning sewer pipes and catch basins, repairing main and side sewers, relieving flooded catch basins and plugged main sewers, and investigating

public requests. The City also has a program whereby television cameras are routed through sewer lines to visually inspect lines for breaks, illegal connections, etc.

Operation and maintenance procedures for the City's Westside Facilities are described in the City's Westside Operation Plan[23]. The system allows for combined flows to be routed first to the Oceanside Water Pollution Control Plant or stored in the Westside Transport for later treatment; decanted discharge can also be pumped to the Southwest Ocean Outfall for ocean disposal. Only after these steps have been taken are overflows of decanted combined effluent discharged to the near-shore waters. Procedures described in the Operation Plan ensure that the system operates as it was designed and constructed.

2. *Maximum Use of the Collection System for Storage:* This requirement refers to the use of existing sewers to hold a portion of surplus flows during storm events. To the extent allowed by existing facilities, this has always been San Francisco's policy. The City's hilly terrain, however, previously limited the ability of the sewer system to store flows. The storage/transport construction program has increased the citywide storage capacity of existing sewers to an estimated 23 MG[24].

   The Westside facilities provide for the temporary storage of about 70 MG of combined flows that exceed the treatment plant capacity[25]. This amount of storage is sufficient to hold all runoff from a rainfall event of approximately 0.52 inches. Stored wastewater is treated after the storm flow subsides. Only after the storage facilities are filled to capacity and the treatment plants are operating at full capacity does an overflow to the beach occur. The storage in both the sewers themselves and the system as a whole is therefore maximized before an overflow event occurs. However, it should be noted that the storage/transport facilities were constructed to meet WQSs, while the minimum treatment technology refers to existing <u>collection</u> systems.

3. *Review and Modification of Pretreatment Requirements:* Pretreatment programs limit the amount of toxicants discharged to the sewer system from industries and related sources. San Francisco has an approved and fully functioning Industrial Waste Pretreatment Program, including the establishment of Local Limits for several pollutants[26]. Although San Francisco has relatively few industrial sources (particularly on the Westside), the City has an ongoing effort to identify industrial and other pollutant sources and reduce the loading of toxicants and other pollutants of concern. This program, administered by the City's Bureau of Environmental Regulation and

Management (BERM), includes enforcement inspections, pretreatment monitoring, collection system monitoring, and permitting of Significant Industrial Users (SIUs).

The main dischargers of toxicants to the Westside system are hospitals and other medical facilities, with lesser amounts contributed by laundry, photographic, and car wash facilities[27]. Laboratory analysis indicates the presence of copper, lead, mercury, nickel, silver, zinc, and PAHs in wet-weather effluent from the RSWPCP[28]. Most of these pollutants are believed to originate from motor vehicles and would therefore be unaffected by pretreatment programs.

4. *Maximization of Flow to the POTW for Treatment:* This requirement refers to operating treatment plants at maximum capacity during storm events, which has always been San Francisco's policy. The City's system has been designed and constructed to maximize flows to the OWPCP. The OWPCP recently replaced the RSWPCP, constructed in 1938, which provided a maximum of 45 MGD of primary treatment capacity[29]. The OWPCP provides up to 43 MGD of secondary treatment capacity (average dry-weather flow is about 24 MGD), and another 22 MGD of primary treatment capacity during wet-weather periods, for a total treatment capacity of 65 MGD during wet weather. Treated effluent is combined prior to discharge to the Pacific Ocean via the SWOO. Flows to the OWPCP are maximized prior to any discharge of decant from the Westside Transport to either the SWOO or to the near-shore waters of the Pacific Ocean. Maximization of flows to the City's treatment plants is also required by existing NPDES permits.

5. *Prohibition of Dry-Weather Overflows:* Previous wastewater permits issued to the City have prohibited dry-weather discharge of untreated wastewater from the CSS. Even prior to the Master Plan construction program, the system was designed to hold and treat all dry weather flow. The Westside Transport has enough storage capacity to provide for about three days of dry weather flow. After the 1989 Loma Prieta earthquake, the RSWPCP was without electrical power for more than one day. All wastewater generated in the Westside service area during the power outage was stored in the WST and subsequently treated.

6. *Control of Solid and Floatable Materials in CSO Discharges:* Control technologies assumed as part of the 1986 Strategy include, for example, baffles to control floatables and screening or swirl concentrators to control solids. These technologies remove aesthetically objectionable materials that would otherwise remain on beaches or float on

water surfaces after a storm; they have little effect, however, on suspended solids or bacterial loading of the overflows. Rotary screening provides only about five percent TSS removal, and swirl concentrators provide about 15 percent removal.

The City's storage/transport system provides a substantially higher level of control of solid and floatable materials in CSO decant discharged to the Bay, the SWOO, and to near-shore waters of the Pacific Ocean. Baffles control floatables, and the flow is passed over a weir to remove settleable solids. A study was conducted to determine the solids removal efficiency of the WST, which concluded that the performance of the Transport was not markedly different from that of a primary treatment plant, providing between 15 and 50 percent removal of TSS; the baffling system was shown to retain the majority of the macroscopic floatable material that entered the Transport[30]. Beach deposition of CSO floatables has therefore been largely eliminated.

7. *Pollution Prevention:* Pollution prevention is source reduction and other practices that reduce or eliminate pollutants through the increased efficiency in the use of resources or the protection of resources by conservation. Two major source reduction efforts implemented by the City's BERM focus on reducing the pollutants released to the environment through the sewer system: (1) the development of an overall pollution prevention program and (2) the implementation of a wastewater waste minimization program as part of the pretreatment requirements. The City's proactive water pollution prevention and pretreatment programs, managed by BERM, minimize the introduction of toxic pollutants into the CSS. (The pretreatment program is discussed in greater detail under Item 3 above.)

The City undertook a study of Best Management Practices (BMPs) to determine which would provide the most cost-effective reduction in pollutant loadings into the CSS during both dry- and wet-weather periods[31]. The most important pollutants of concern during wet-weather periods include PAHs, copper, lead, and cyanide. The main sources of these pollutants are automobiles and automotive-related businesses; other sources include tar shingles, wood preservatives, paints, algicides, and manufacturing.

A key BMP is the City's street sweeping program, which directly reduces pollutants originating from street surfaces; all City streets are swept at least once per week with vacuum sweepers. Catch basins are also cleaned regularly to reduce the pollutant loading during storm events. Other BMPs selected for implementation include an education program and provision of alternative disposal methods for residential hazardous waste, regulatory measures to reduce the risk of toxic spills, and public agency measures to prevent contact of rainfall runoff with potential contaminants.

Table 4–1 illustrates the total estimated pollutant reduction that could occur from implementation of the City's source reduction strategies. Note that these are estimates, and reductions could increase if previously unknown pollutant sources are identified and targeted for source reduction strategies.

Table 4–1. Total Estimated Pollutant Reduction from Implementation of the City's Water Pollution Prevention Program

Pollutant	Estimated Reductions	
	lbs/dy	mg/l
Copper (Cu)	14.7	0.0027
Mercury (Hg)	0.16	0.0003
Lead (Pb)	3.7	0.007
Nickel (Ni)	1.9	0.004
Silver (Ag)	2.2	0.004
Zinc (Zn)	24.2	0.045
Cyanide (Cyn)	0.87	0.0015

(Source: City and County of San Francisco, 1994 NPDES Permit Program, Attachment #1, Appendix A, page 6)

8. *Public Notification:* The City has a long-term practice of posting notices along the shoreline for three days following any shoreline discharge. When a CSO event occurs, the City posts notices on beaches in the vicinity of the overflow warning the public that waters contain high levels of bacteria and may therefore be unsuitable for water contact recreation. Warning signs remain posted until monitoring indicates that bacteriological levels are within an acceptable range. Additionally, if a shoreline discharge occurs, or if routine monitoring indicates high bacteriological levels, the City notifies the surfing and windsurfing communities through a recorded hotline, warning that waters are unsafe and surfing is not recommended. When bacterial counts have returned to safe levels, this message is discontinued.

9. *Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls:* The City has ongoing shoreline, Ocean, and Bay monitoring programs that include both routine long-term monitoring of overflow and receiving waters and special short-term studies undertaken to support development of CSO control strategies or characterize CSO impacts on beneficial uses. Shoreline samples are collected for bacteriological analysis three times per week along the San Francisco Bay and Pacific Ocean. Water and sediment sampling is routinely conducted both in the Bay and Ocean. Numerous special studies have been conducted since 1966, when the City first undertook an in-depth study of the CSO problem.

   Shoreline bacteriological levels have been monitored for the past 15 years at 45 locations around the City at a frequency of 8 to 12 times per month at each site; visual observations of overflow debris and recreational uses in the vicinity of the overflow structures are also reported. Monitoring results show that coliform levels are elevated at shoreline stations near CSO structures during and shortly after CSO events, but generally return to background levels within one or two tidal cycles following the cessation of the overflow.

   Water quality monitoring of overflows has been routinely conducted since 1983, when the City's first CSO control facilities became operational. Flow-weighted, storm-composite samples are collected using automatic samplers and analyzed for constituents including BOD, TSS, oil and grease, phenols, and metals; in recent years, total PAHs have been added to the routine analysis. Full-priority pollutant scans are run on representative storm-composite samples of CSO one to two times per year. As new CSO control facilities come on-line, they will be added to monitoring program. A special monitoring program in the southeastern portion of the City documents benefits of CSO control on water contact recreation and shellfishing. Collected data are submitted annually to the RWQCB.

4.3 Consideration of Sensitive Areas

Although the nine minimum control technologies represent a technology-based approach to CSO controls, the major emphasis of the CSO Control Policy is long-term compliance with WQSs. One goal is to give highest priority to the protection of *sensitive areas*. Section II.C.3. of the Policy states:

> EPA expects permittee's long-term CSO control plan to give the highest priority to controlling overflows to sensitive areas. Sensitive areas, as determined by the NPDES

authority in coordination with state and Federal agencies, as appropriate, include designated Outstanding National Resource Waters, National Marine Sanctuaries, waters with threatened or endangered species and their habitat, waters with primary contact recreation, public drinking water intakes or their protection areas, and shellfish beds. For such areas, the long-term CSO control plan should:

a. prohibit new or significantly increased overflows;

b. i. eliminate or relocate overflows that discharge to sensitive areas wherever physically possible and economically achievable, except where elimination or relocation would provide less environmental protection than additional treatment; or

ii. where elimination or relocation is not physically possible and economically achievable, or would provide less environmental protection than additional treatment, provide the level of treatment for remaining overflows deemed necessary to meet WQS for full protection of existing and designated uses. In any event, the level of control should not be less than Evaluation of Alternatives below; and

c. Where elimination or relocation has been proven not to be physically possible and economically achievable, permitting authorities should require, for each subsequent permit term, a reassessment based on new or improved techniques to eliminate or relocate, or on changed circumstances that influence economic achievability.

Permitting requirements in Section IV.B.2.e. also provide for a reassessment of overflow to sensitive areas where elimination or relocation of overflows has not previously been possible in light of new technology or changed economics. Comparing the City's program with these provisions of the Policy is useful for judging the adequacy of previous wastewater control planning.

San Francisco's program focused from the outset on CSO controls that would protect beneficial uses of receiving waters (i.e., areas with non-contact and water contact recreation and shellfish beds). The 1974 Master Plan EIR/EIS discussed the costs and benefits of achieving various citywide overflow requirements. A lengthy planning period followed, including detailed beach recreational use surveys, resulting in the establishment of final overflow frequencies ranging from one to ten per year, on average. The most stringent overflow requirement (one per year) was applied to the southeastern portion of the City where extensive shellfish beds (primarily clams) exist; the least stringent requirement (ten per year) applied to those areas where maritime (shipping) is the main beneficial use. Eight overflows per year were approved for the Westside, based on a cost-benefit analysis that compared marginal costs to marginal benefits (i.e., cost of mass pollutant emission reductions versus reductions in days of beach posting). All subsequent planning, design, and construction of the City's wastewater control facilities were based on these overflow frequencies. On the Ocean side, Baker Beach, a popular sun-bathing area, was identified as a sensitive area. When the Richmond Transport is completed in 1996, overflow will be redirected from Baker Beach to Mile Rock, at the base of a steep, essentially inaccessible area, to substantially reduce potential human exposure. No other overflow structure relocations are feasible on the Westside.

In conclusion, the City's planning efforts have historically focused on protection of beneficial uses and sensitive areas; current CSO control facilities meet the sensitive area planning requirements of the Policy.

4.4 Compliance with the Presumption Approach of the CSO Control Policy

The Policy identifies two approaches for compliance with WQSs: (1) *the presumption approach*, in which a program that meets designated criteria is presumed to meet CWA requirements, and (2) *the demonstration approach*, in which a program that does not meet designated criteria can demonstrate that WQSs are nevertheless being attained. This section examines San Francisco's system in light of the presumption approach guidelines.

Section II.C.4.a of the CSO Control Policy describes requirements of the presumption approach for achieving long-term control of CSOs:

> A program that meets any of the criteria listed below would be presumed to provide an adequate level of control to meet the water quality-based requirements of the CWA, provided the permitting authority determines that such presumption is reasonable in light of the data and analysis conducted in the characterization, monitoring, and modeling of the system and the consideration of sensitive areas described above. These criteria are provided because data and modeling of wet weather events often do not give a clear picture of the level of controls necessary to protect WQS.
>
> > i. no more than an average of four overflow events per year, provided that the permitting authority may allow up to two additional overflow events per year. For the purpose of this criterion, an overflow event is one or more overflows from a CSS as the result of a precipitation event that does not receive the minimum treatment specified below; or
> >
> > ii. the elimination or the capture for treatment of no less than 85% by volume of the combined sewage collected in the CSS during precipitation events on a system-wide annual average basis; or

iii. the elimination or removal of no less than the mass of pollutants identified as causing water quality impairment through the sewer system characterization, monitoring, and modeling effort, for the volumes that would be eliminated or captured for treatment under paragraph ii. above.

Combined sewer flows remaining after implementation of the nine minimum controls and within the criteria specified at II.C.4.a.i or ii, should receive a minimum of:

- Primary clarification (Removal of floatables and settleable solids may be achieved by any combination of treatment technologies or methods that are shown to be equivalent to primary clarification.);
- Solids and floatables disposal; and
- Disinfection of effluent, if necessary, to meet WQS, protect designated uses and protect human health, including removal of harmful disinfection chemical residuals, where necessary.

Demonstrating compliance with *only one of Items i, ii, or iii* means that the system is presumed to meet WQS; San Francisco meets *all three criteria*:

i. *Discharge of an Average of No More than Four Untreated Overflows per Year:* Permitted overflow frequencies for San Francisco range from one to ten per year, depending upon the discharge zone. (Areas with more sensitive beneficial uses have lower frequencies.) At program completion, all overflows will be discharged from the storage/transports and will have received flow-through treatment. Thus, the City has *no* untreated overflows, because flow-through treatment meets the definition of treatment as used in the *Policy*. The storage/transports are specifically designed and operated to provide both solids settling and floatable removal and are considered equivalent to primary clarification.

   Disinfection of the overflow was evaluated during the Master Plan process. Potential bacteriological control technologies include conventional chlorination, high-rate chlorination, ozonation, and ultraviolet light; however, the only technology commonly used for disinfection of wastewater in the United States today is conventional chlorination. The feasibility of chlorination of the overflow has been considered and rejected in the past for the following reasons:

   - Total chlorine demand changes rapidly as flow rate and chlorine demand change, thereby making correct dosage extremely difficult to maintain;

- Chlorine compounds are highly toxic to aquatic life and cannot be reliably removed for the reasons noted above;
- Effective disinfection requires adequate mixing and a long contact time, conditions that cannot be attained during peak flows associated with CSOs; and
- Overflows are discharged from multiple points in the City's sewer system and would necessitate a complex, prohibitively expensive system of chlorine injection points.

For these reasons, disinfection would be ineffective and could potentially harm aquatic organisms[32]. Additionally, overflows usually occur during the rainy winter season when cool air and water temperatures limit water contact recreation activities. Because disinfection of the City's overflows is not considered practical, and no control technology is deemed appropriate, the City is therefore presumed to be in compliance with the discharge frequency criterion.

ii. *Treatment of At Least 85% of the Wet-Weather Combined Flow:* This compliance option requires the CSS to provide treatment (equivalent to primary clarification) to 85 percent of the wet weather combined flows on a system-wide annual basis. San Francisco's facilities will provide secondary treatment to 39 percent of the average annual combined flow, primary treatment to 38 percent of the combined flow, and flow-through treatment within the storage/transports to the remaining 23 percent. Because flow-through treatment meets the Policy's definition of treatment, San Francisco will provide 100 percent treatment and therefore exceeds this criterion.

iii. *Reduction in Discharge of a Mass of Pollutants Equivalent to Option 2:* This compliance option requires the municipality to achieve a pollutant reduction performance equivalent to implementation of Option 2, which was included for communities, such as San Francisco, that are implementing site-specific control programs.

During wet weather, San Francisco provides an overall estimated removal of 59 percent of total suspended solid loading, assuming the following conservative removal efficiencies: secondary (80 percent), primary (55 percent), and storage/transports (30 percent). An approximation of the removal efficiency of a community that provides primary treatment to 85 percent of the combined flow would be a removal rate of approximately 47 percent. Thus, San Francisco's removal rate of 59 percent compares favorably with the hypothetical removal rate of 47 percent. The City exceeds the criteria presented in this approach and is therefore presumed to be in attainment of WQSs.

4.5 Analysis of Compliance Based on the Permitted System as an Integrated Whole

When evaluating the City's compliance with the CSO Control Policy, particularly the nine minimum control technologies, the consideration of sensitive areas, and the presumption of compliance with WQSs, considering the wastewater treatment and control facilities as an integrated system is important. Prior to the construction of the City's Master Plan facilities, untreated overflows from the combined sewers occurred routinely during wet-weather periods, resulting in water quality degradation, frequent beach closings, and deposition of unaesthetic floatables on beaches. The program has increased the overall level of treatment of the City's wastewater, and all combined sewage receives a minimum of primary-equivalent treatment prior to discharge. Only during periods of heavy rainfall does overflow to the shoreline occur, and this overflow receives flow-through treatment in the storage/transport structures prior to discharge, removing essentially all floatables and most settleable solids. The City has a long-term environmental monitoring program and consistently provides public notification in the event of a shoreline discharge. Also, the City has made substantial progress in reducing the toxicity of the wastewater by strict limitation of the discharge of toxicants to the sewer system, regular street sweeping, and implementation of other BMPs.

Considering San Francisco's system as an integrated whole, the City has met or significantly exceeded all nine minimum control technologies in the recently finalized CSO Control Policy. Equating these nine minimum control technologies with BCT/BAT requirements, the City has therefore gone beyond compliance with BAT/BCT requirements to meet stringent WQSs and has provided higher levels of control to areas identified as the most sensitive. The City's Master Plan program has been driven by the water quality needs of the Bay and Ocean, not by technology-based limitations. The City has constructed a wastewater treatment system that protects both water quality and the beneficial uses of these receiving waters.

SECTION 5

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July 30, 2014

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Robyn Stuber
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Region IX, Pacific Southwest Office
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RE: Oceanside Efficacy Report

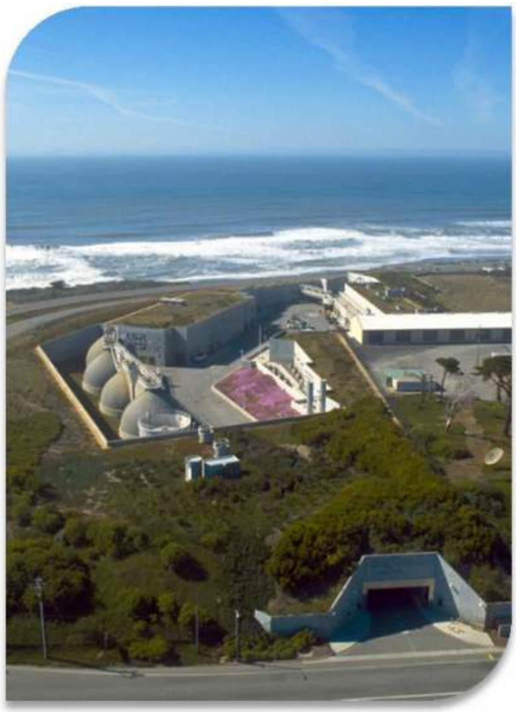
Dear Mr. Whitworth and Ms. Stuber,

Enclosed please find the San Francisco Public Utilities Commission's *Characterization of Westside Wet Weather Discharges and the Efficacy of Combined Sewer Discharge Controls*, submitted as required by the Oceanside Water Pollution Control Plant and Westside Wet Weather Facilities National Pollutant Discharge Elimination System Permit No. CA0037681, RWQCB Order R2-2009-0062. This Report summarizes the results of the SFPUC's monitoring efforts to evaluate the level of wet weather controls being provided by the Westside Wet Weather Facilities, and its effects on water quality. Please contact Laura Pagano at (415) 554-3109 if you have any questions about the content of this Report.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who *manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Sincerely,
for TM

Tommy T. Moala
Assistant General Manager
SFPUC Wastewater Enterprise



Characterization of Westside Wet Weather Discharges and the Efficacy of Combined Sewer Discharge Controls

San Francisco Public Utilities Commission
Oceanside Water Pollution Control Plant & Westside Wet Weather Facilities
RWQCB Order R2-2009-0062, NPDES No. CA0037681

July 30, 2014

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1.0 INTRODUCTION

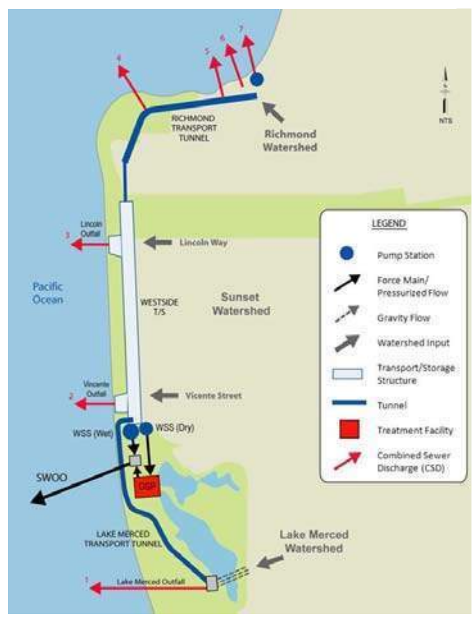
This Report is being submitted to comply with the requirements of the Oceanside Water Pollution Control Plant and Westside Wet Weather Facilities National Pollutant Discharge Elimination System (NPDES) permit, Permit No. CA0037681, Order No. R2-2000-0062 (Oceanside Permit), issued to the City and County of San Francisco (San Francisco) by the San Francisco Regional Water Quality Control Board (Regional Water Board) and the United States Environmental Protection Agency (USEPA) in August 2009.

Consistent with the federal Combined Sewer Overflow (CSO) Control Policy,[1] the Oceanside Permit requires monitoring to comply with the Nine Minimum Controls and to evaluate post-CSO control construction compliance.[2] The objectives of these monitoring requirements are to evaluate the effectiveness of construction and other wet weather controls in meeting established performance goals and to assess the impacts of wet weather discharges on receiving waters.[3] As described in this Report, San Francisco implements multiple monitoring programs designed to assess whether its Oceanside Wet Weather Facilities are performing as designed, and impacts, if any, to receiving waters. The results of these monitoring efforts confirm that the performance of the Westside Wet Weather Facilities is exceeding the original wet weather control design goals and that the level of control being provided is protecting beneficial uses.

1.1 Westside Facilities Description

San Francisco's Westside Facilities consist of the Oceanside Water Pollution Control Plant (OSP), the Westside Pump Station, and three large transport/storage (T/S) structures: the two-chambered Westside T/S Structure, the Richmond Transport Tunnel, and the Lake Merced Transport Tunnel. These facilities collect and treat stormwater and wastewater generated within San Francisco's Westside Drainage Basin, which comprises about forty percent of San Francisco's land area and includes a primarily residential service area population of around 250,000.

Figure 1-1 Westside Facilities



During dry weather OSP provides secondary treatment to an average of 14 to 15 million gallons per day (MGD) and discharges the treated effluent through the deep-water Southwest Ocean Outfall (SWOO) which extends approximately 3.8 miles (3.3 nautical miles) offshore. During wet weather, OSP can treat up to 65 MGD, with 43 MGD receiving secondary treatment and another 22 MGD receiving primary treatment. In addition to the wet weather treatment capacity at OSP, the Westside Facilities include approximately 72 million gallons (MG) of wet weather storage. As discussed further in Section 2 of this Report, this combination of storage and treatment capacity means that the majority of annual combined flows receive secondary treatment at OSP prior to deep-water discharge through the SWOO.

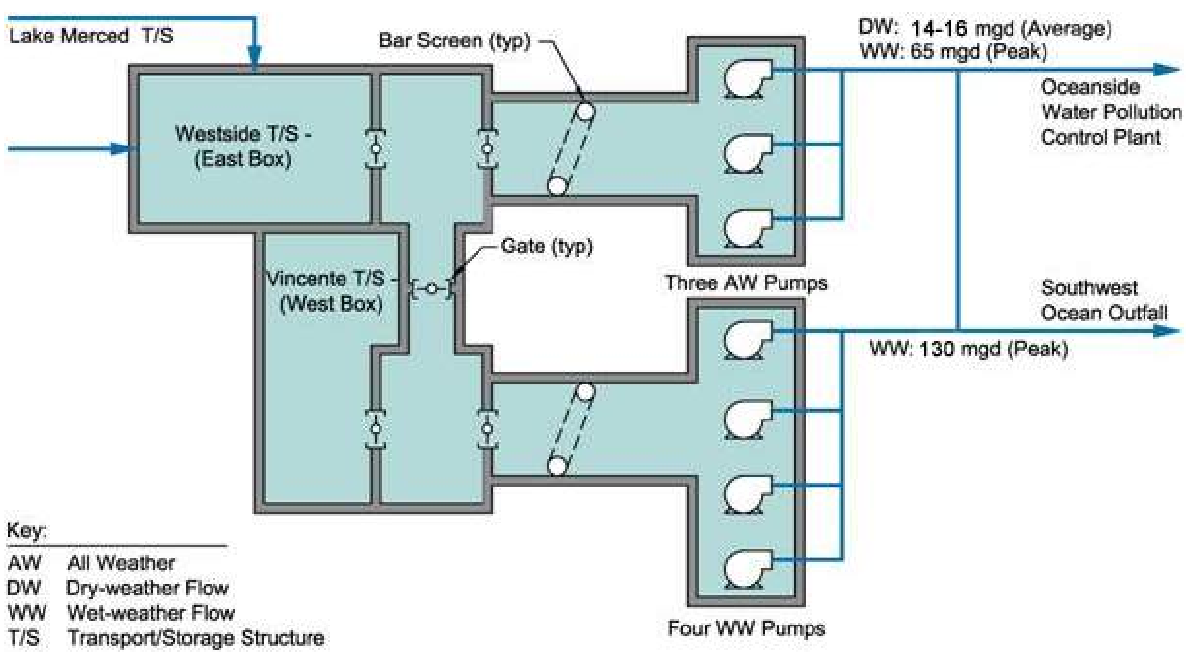
[1] *Combined Sewer Overflow Policy*, 59 Fed. Reg. 18688 (April 14, 1994).
[2] Oceanside Permit at p. 26.
[3] *See* USEPA *CSO Post Construction Compliance Monitoring Guidance*, EPA-833-K-11-001 (April 2011).

Almost all wet weather flows receive treatment either at OSP or in a T/S structure prior to deepwater discharge. In contrast, municipalities with separate storm sewer systems typically provide no treatment to stormwater flows.

Figure 1-2 shows a simplified schematic of the Westside's dry and wet weather flows and treatment capacity. The Westside T/S structure and the Westside Pump Station are the key components of the Wet Weather Facilities. When wet weather flows are less than 65 MGD, all flows are pumped to OSP for treatment and discharged through SWOO. When flows are greater than 65 MGD, the Westside T/S structure's "East Box" fills up and flows are "decanted" over a baffled weir into the "West Box." After passing through a bar screen, these flows are pumped by the Westside Pump Station wet weather pumps to SWOO. Decant pumping flow rates depend on the amount of decanted effluent in the West Box and on the tide level, but cannot exceed 130 MGD. In the event that the capacities of OSP, the T/S structures and the Westside Pump Station are exceeded, the combined flows in the T/S structures flow out combined sewer discharge (CSD) outfalls to the Pacific Ocean.

The decant flow and the CSDs from the T/S structures receive the equivalent of wet weather primary treatment by the T/S structures. The large volume of the T/S structures and the weir configurations allow for solids to settle prior to discharge, and the baffles hold back trash and other floatable materials, consistent with the minimum treatment requirements specified in the CSO Control Policy. Additionally, decant flow passes through bar screens prior to reaching the Westside Pump Station

Figure 1-2 Westside Wet Weather Flow Schematic



1.2 Westside Wet Weather Facilities Design and Construction

The Westside Wet Weather Facilities are the result of a lengthy planning and regulatory process that began in the 1970s and ended with the construction of the Richmond T/S structure in 1997, just three years after the adoption of the CSO Control Policy. The control plan for the Westside was based on a series of comprehensive studies that evaluated the benefits and costs of different levels of overflow control. The studies included surveys of use (including recreational and shellfishing) and evaluations of the potential impacts on public health and biological resources. They were submitted to the Regional Water Board which then issued an order finding that a long-term annual average CSD frequency of eight (8) on the Westside would protect beneficial uses and serve the public interest.[4] These studies also provided the basis for the State Water Board to approve an exception for CSDs to certain California Ocean Plan requirements, including those related to compliance with numeric water quality standards and prohibitions on the discharge of untreated waste.[5]

1.3 Westside Wet Weather Monitoring Program

San Francisco's Westside wet weather monitoring program is designed to generate information to evaluate whether the Westside Wet Weather Facilities are controlling wet weather flows consistent with the Facilities' design, and confirm that the current level of wet weather control continues to protect beneficial uses. The monitoring program consists of the following elements:

- Monitoring and hydraulic modeling of wet weather discharge frequency, duration and volume;
- Flow and total suspended solids (TSS) monitoring to estimate the annual mass of pollutants removed from combined flows and stormwater prior to discharge;
- Sampling and analysis of recreational receiving waters for bacteria on a weekly basis year-round and after CSDs;
- Collection of recreational use data;
- Sampling and analysis of CSD and decant for conventional and toxic pollutants; and
- Southwest Ocean Outfall monitoring of the effects of the discharge on marine waters.

This Report provides a synopsis of the results of this monitoring program; detailed results for several of these efforts have been submitted in previous reports, including the SFPUC's monthly and annual reports, the *Monitoring Study to Effectively Characterize Overflow Impacts and the Efficacy of CSO Controls Annual Status Reports*, and the *1997-2012 Southwest Ocean Outfall Regional Monitoring Program Summary Reports.*

The key results of this monitoring include:

- **Monitored CSD Frequency.** Since 1997, when the Westside Wet Weather Facilities were completed, the average annual number of storm events that resulted in one or more CSDs was seven, and no individual CSD outfall has an average annual discharge frequency of more than five. Both annual averages are below the system's design criteria, which is that no more than eight storm events will trigger CSDs on a long-term average annual basis.
- **Modeled CSD Frequency.** Hydraulic modeling of a typical year's rainfall patterns indicates that the average annual number of storm events that result in a CSD from one or more locations is seven, which is generally consistent with the historical data.
- **Level of Treatment for Combined Flows.** In the last three years of this permit (2011-2012, 2012-2013, and 2013-2014), the system collected for treatment an average of almost 1.5 billion gallons of stormwater and more 5.5 billion gallons of sanitary flows. Six billion gallons,

[4] RWQCB Order No. 79-12.
[5] SWRCB WQ Order 79-16.

86 percent, of combined flows received secondary treatment and only 100 million gallons, one percent, was discharged as CSDs.

- **Total Suspended Solids Removed from Stormwater.** The treatment of stormwater flows over the past three years of this permit resulted in an average annual 73 percent reduction in total suspended solids loading from stormwater; which represents an estimated 1.2 million pounds of TSS that would have been discharged in a separate system.
- **Recreational Use and Impacts.** The impact of CSDs on recreational use is minor; beaches on the Westside are posted as a result of a CSD less than an average of three percent of days during the year. Sampling of beach water quality during or as soon as practicable during daylight hours a CSD occurs indicates that bacteria concentrations typically drop to ambient levels within 24 hours of a CSD.

  Recreational use data collected by the SFPUC indicates that very few people use beaches for water contact recreation during or immediately following a CSD, so that the potential for recreational users to be exposed to elevated bacteria concentrations is small.
- **CSD Monitoring.** Direct sampling of CSDs for metals and conventional pollutants suggests that CSD pollutant concentrations are highly variable, but are typically relatively low. Concentrations of copper and zinc in CSDs were frequently elevated, but were in the range of concentrations expected in urban stormwater runoff.
- **Receiving Water Monitoring.** A voluntary near-shore receiving water sampling effort at Ocean Beach during CSDs found that concentrations of fecal indicator bacteria at and near the outfalls were elevated, but that concentrations of other pollutants were low.
- **Ocean Outfall Monitoring.** Sampling of sediment quality, benthic communities, and bioaccumulation in organisms over sixteen years has found no discernible impacts of the Southwest Ocean Outfall discharge on marine beneficial uses.

2.0 EFFECTIVENESS OF WET WEATHER CONTROLS

The federal CSO Control Policy describes two types of wet weather controls: (1) the Nine Minimum Controls (NMCs), and (2) Long Term Control Plans (LTCPs). NMCs are management measures to reduce the impacts of combined sewer overflows that do not require significant engineering studies or construction, and that can be implemented in a relatively short period of time.[6] LTCPs consist of an agency's long-range capital plans and projects to provide cost-effective controls that will protect water quality standards.

This section describes the measures that the SFPUC implements consistent with the NMCs to reduce, through non-capital efforts, the occurrence and effect of CSDs. It also describes the performance of the system in terms of controlling CSDs since San Francisco completed construction of its LTCP in 1997. Finally, this section includes a summary of the level of treatment provided to combined sewer flows in a typical year to demonstrate the large volumes of flow receiving treatment, and the results of a pollutant mass balance exercise conducted for three of the five permit years to illustrate the environmental benefit provided by treating hundreds of millions of gallons of stormwater annually.

2.1 Nine Minimum Control Implementation

The CSO Control Policy's NMCs described nine objectives that can be achieved through the selection of management actions based on system-specific considerations. This section briefly lists the programs that the SFPUC undertakes to further the objectives of the NMCs.

<u>CONTROL MEASURE 1: Conduct Proper Operations and Regular Maintenance Programs</u>

The purpose of this control measure is to ensure that an agency has in place operations and maintenance (O&M) programs that will reduce wet weather discharges by ensuring collection system performance. The SFPUC has a mature collection system asset management plan that utilizes closed circuit television (CCTV) inspections and the Maximo Computerized Maintenance Management System to store condition assessment information and prioritize work orders. In addition to collection system maintenance, the SFPUC is undertaking an extensive condition assessment of all pump stations, CSD outfalls, T/S structures and other conveyances greater than 36 inches in diameter. The purpose of this condition assessment is to identify schedules and costs for rehabilitation and replacement of these capital assets.

<u>CONTROL MEASURE 2: Maximize Use of the Collection System for Storage</u>

Maximizing the collection system for storage by keeping sewers clean and free of debris ensures that the agency is maximizing wet weather storage, thereby increasing wet weather treatment and minimizing combined sewer discharges. The SFPUC performs routine sewer cleaning at a rate of approximately 110-150 miles of pipe per year. Recognizing that fats, oils and grease (FOG) can significantly reduce the capacity of pipes, the SFPUC has also implemented an aggressive permitting and incentive program to reduce FOG entering the system, and a program to convert the waste into biofuel that is housed at OSP.[7]

[6] *See* USEPA *Guidance for Nine Minimum Controls*, EPA-832-B-95-003 (May 1993).
[7] See San Francisco's 2013 Pollution Prevent Program Annual Report, submitted on February 28, 2014.

CONTROL MEASURE 3: Review and Modify Pretreatment Program

The Westside only has three entities subject to pretreatment program requirements, all of which are medical facilities that are subject to local limits. The details of inspections of these facilities have been submitted in the SFPUC's 2013 Pretreatment Annual Report.

CONTROL MEASURE 4: Maximize Flow to the Treatment Plants

The SFPUC has developed wet weather operations plans and operator training to ensure that the Westside Wet Weather Facilities are operated in a way that maximizes the treatment capacity of OSP. Operations staff also routinely undertake studies designed to understand and improve operation of the facilities during wet weather.

CONTROL MEASURE 5: Prohibit Combined Sewer Overflows During Dry Weather

San Francisco has never experienced a dry weather wastewater discharge from its CSD outfalls. This is largely due to the unique moat-like configuration of the system, which, for example, would require that the Westside T/S structure be filled with wastewater before any discharge could occur.

CONTROL MEASURE 6: Control Solid & Floatables in Discharges

Most solids and floatables control in CSDs occurs because the extremely large storage capacity of the system allows for solids to settle out before they are discharged, and because the discharge occurs after the combined flows have passed over a weir and baffle structure. This is especially true on the Westside where the Westside T/S structure includes two settling boxes so that flows pass over two weirs prior to discharge. San Francisco also has an extensive street sweeping program, which is an effective way to reduce the amount of sediment, fine particulates and sediment-associated pollutants (such as dioxin from air deposition or copper from brake pads). In 2013, for example, city agencies conducted mechanical and manual street sweeping on approximately 143,800 curb miles. High use commercial areas are swept daily, lower-use commercial areas are swept two to three times a week, and most residential areas are swept weekly. Additionally, the SFPUC routinely cleans catch basins to help remove sediment and associated pollutants from the system. Out of an estimated 28,000 catch basins in San Francisco, 6,393 of them were cleaned and flushed in 2013 alone.[8]

CONTROL MEASURE 7: Implement a Pollution Prevention Program to Reduce the Impact of CSDs

The details of San Francisco's extensive pollutant prevention program were submitted to the Regional Water Board in the 2013 Pollution Prevention Program Annual Report.

CONTROL MEASURE 8: Notify the Public of Overflows

Despite the relatively infrequent nature of CSDs on the Westside, the SFPUC has an extensive public notification program. This program includes permanent signs posted that inform the public of the

[8] See San Francisco's 2013 Pollution Prevent Program Annual Report.

potential for CSDs. All recreational beaches are posted with additional notifications when a CSD has occurred and they remain posted until monitoring confirms that State standards for water contact recreation are being met. The public is also informed of CSDs (and any exceedance of water quality standards) through the SFPUC's Beach Water Quality website, an email distribution list and a telephone hotline. A mobile phone web-based application is currently being beta tested and is expected to be completed before the end of 2014.

CONTROL MEASURE 9: Monitoring to Characterize Impacts and the Efficacy of Controls

EPA Guidance describes the ninth minimum control as an "initial characterization of the [combined sewer system] to collect and document information on overflow occurrences and known water quality problems and incidents." Information to be collected includes maps and a general characterization of the system, documentation of overflow occurrences and summaries of information available on the quality or use of waters potentially affected by wet weather discharges. The SFPUC has extensively characterized its system, including the locations, size and conditions of collection system assets, storage structures, and outfalls and has even developed a detailed hydraulic/hydrologic model to simulate dry and wet weather flows. CSD occurrences are detected by the SFPUC's Distributed Control System, which includes sensors throughout the system that measure and transmit to operations real time information on the level of flows and the status of pump stations and other assets. Detailed information on the CSD frequency and water quality is included in the rest of this Report.

2.2 CSD Frequency, Duration and Volume

The performance target of San Francisco's LTCP was to reduce the frequency of near-shore wet weather discharges so that no more than eight storm events would trigger CSDs on a long-term annual average basis. As noted in the Regional Water Board order establishing this target, the design criteria of eight is not to be used for determining compliance or non-compliance because of the inherently variable nature of rainfall events and climate patterns. The design criteria is, however, helpful in understanding whether the Wet Weather Facilities are performing as designed, and thus providing the amount of wet weather control and water quality protection predicted. The SFPUC uses two approaches for assessing the performance of the Westside Wet Weather Facilities against the design criteria: direct monitoring of CSDs and hydraulic/hydrologic modeling of the Westside system. Both monitoring and hydraulic/hydrologic modeling of CSD frequency indicates that the Westside Wet Weather Facilities are controlling CSDs as, or even better than, predicted at the time of design and construction.

Direct monitoring involves measuring rainfall, the velocity of treatment plant flows, and flow levels in pump sumps and the T/S structures. These data are recorded in one minute increments and are then used to calculate the frequency and volume of CSDs and decant flow discharged, both of which are reported to the Water Board in monthly and annual reports. Table 2-1 shows the measured CSD frequency for each outfall on the Westside since CSD construction of controls was completed in 1997. The average annual discharge frequencies by outfall and for the system as a whole are lower than the design criteria of eight. System-wide, the long-term annual average number of storm events that result in one or more CSDs is seven. No individual outfall, however, has an annual average discharge frequency greater than five because not all storm events trigger CSDs at all locations.

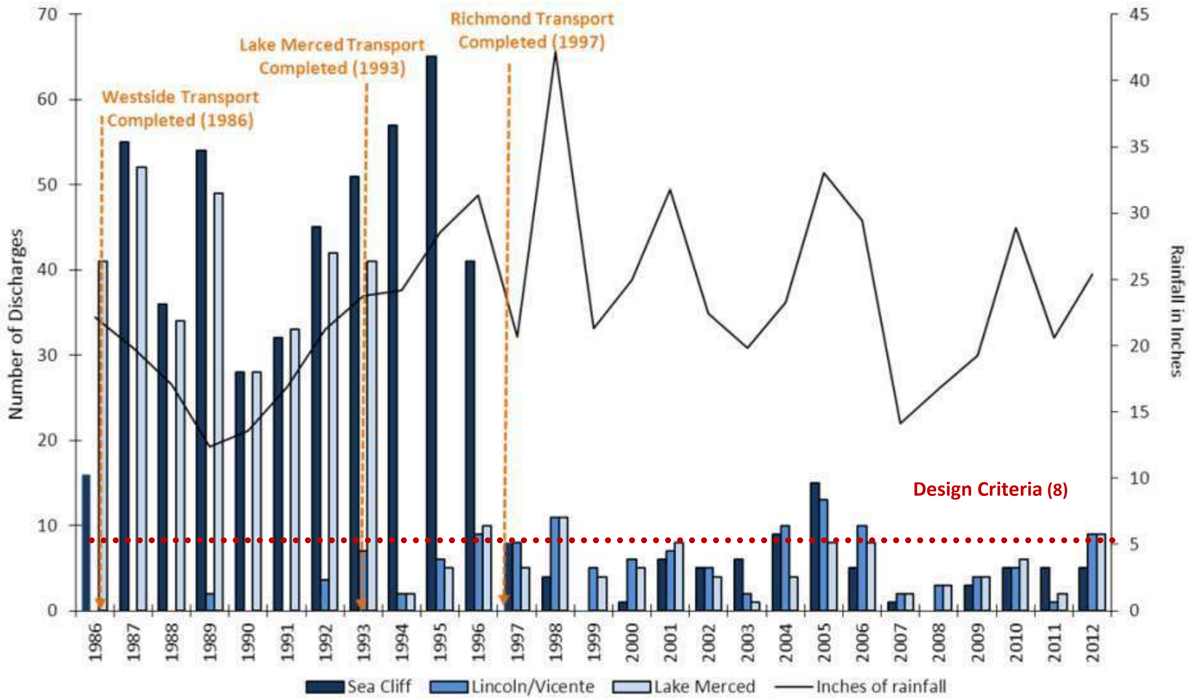
Similar results are presented graphically in Figure 2-1, which further highlights the dramatic decrease in CSD frequency, from an average of 114 times each year, to less than eight. It also shows the relationship between the different T/S structures and CSD frequency at particular outfalls. Since construction of the Westside T/S structure in 1986, the average annual frequency of discharges from the Lincoln and Vicente CSD outfalls has decreased to five. Similarly, the average annual CSD frequency from the Lake Merced outfall decreased to an average of six after construction of the Lake Merced T/S structure in 1997, and the Sea Cliff CSDs decreased to an annual average of four after construction of the Richmond Transport. Both Table 2-1 and Figure 2-1 exclude Mile Rock discharges because, as recognized in the OSP NPDES Permit, installation and maintenance of monitoring equipment at this location entails significant safety issues above and beyond routine closed space entry. The Mile Rock outfall is located at the end of a tunnel more than 4,000 feet in length that runs through hard rock from Cabrillo Street to the bottom of cliffs at Point Lobos. This outfall is only accessible by foot at the lowest tides, or through the tunnel.

Table 2-1 Measured Westside CSD Event Frequency, 1997 - 2014

Year (Jul1 – Jun 30)	Rainfall (inches)	Lake Merced (001)	Vicente (002)	Lincoln (003)	Sea Cliff #1 (005)	Sea Cliff Sewer (006) (3)	Sea Cliff #2 (007)	Annual CSD Events(2)
1997-1998	41.1	10	13	13	2	NR	10	14
1998-1999	18.9	6	7	7	0	NR	0	7
1999-2000	23.2	5	6	6	1	NR	1	7
2000-2001	13.8	2	0	0	2	NR	2	3
2001-2002	24.4	6	6	6	1	NR	1	6
2002-2003	22.3	5	6	6	1	NR	7	9
2003-2004	18.8	4	4	4	2	NR	8	8
2004-2005	26.2	7	7	6	5	NR	8	12
2005-2006	31.8	11	9	9	3	NR	9	13
2006-2007	14.8	2	1	1	0	NR	2	3
2007-2008	18.4	4	4	4	0	NR	1	4
2008-2009	18.3	4	4	4	0	NR	1	4
2009-2010	25.8	4	3	3	6	NR	7	7
2010-2011	30.1	5	4	4	0	0	3	7
2011-2012	17.6	3	3	2	2	0	3	6
2012-2013	19.7	6	6	6	3	1	3	8
2013-2014	12.0	3	2	2	0	1	3	5
AVERAGE	**22.8**	**5**	**5**	**5**	**2**	**1**	**4**	**7**
							DESIGN CRITERIA	**8**

(1) Per the Westside NPDES Monitoring and Reporting program, no CSD frequency data is reported for Mile Rock (004) because monitoring requires access which entails significant safety issues for inspection and maintenance personnel.
(2) A CSD event is a rainfall event that causes a discharge from one or more of the CSDs within the Westside System.
(3) The frequency of discharge from the Sea Cliff Sewer (006) was not recorded (NR) until telemetry was installed in 2010-2011.

Figure 2-1 Measured Westside CSD Frequency, 1986 - 2012



The SFPUC has invested substantial resources in developing, calibrating and validating a hydraulic/hydrologic (H&H) model, which is a planning tool capable of simulating both actual and artificial storm events, as well as sequences of storm events that account for the additive and antecedent effects of storms occurring close together. San Francisco's H&H model is a state-of-the art dynamic model that represents the system's actual physical characteristics (e.g., pipes, structures, pump stations) and operational set-points (e.g., pump start/stop elevations). This model is fully calibrated and results are routinely validated using rainfall information from the City's 20 rain gauges and data from more than 100 flow and level sensors installed throughout the system.

The results in Table 2-2 are the H&H model predictions for the "typical one year period", or "typical year." The typical year is an artificial year based on an analysis of 30 years of rainfall data for San Francisco that captures a range of storm magnitudes, durations and antecedent conditions and is intended to predict the long-term performance of a system. The H&H model predicts a system-wide average of 8 CSDs annually, which is higher than the actual performance. Differences between the typical year model predictions and actual performance are expected because, as stated previously, the typical year is an artificial year. Additionally, the model cannot fully replicate the judgment of experienced treatment plant operators who, during storm events, make informed decisions about storage and pumping speed to optimize system performance. For example, the model predicts an average annual CSD frequency of eight CSDs for Lake Merced, whereas the current frequency is five. Two of the eight CSDs predicted by the model, however, are less than 20 minutes in duration with volumes of less than 30,000 gallons. In the real world, operator experience and judgment could possibly prevent these discharges through pumping down in advance of a storm or other means to optimize system capacity.

The model results also show the relatively small volume and brief duration of CSDs. Approximately three billion gallons of stormwater are captured by the Westside Wet Weather Facilities in the typical year, yet less than 240 MG of combined flows are discharged as CSDs. Most of this CSD volume is from Vicente and Lincoln, with the discharges from the other outfalls – especially the Sea Cliff outfalls – being very small. The CSDs are typically very brief as well, with the median discharge being under three hours for all outfalls.

Table 2-2 Typical Year Model Results(1)

CSD Outfall	Annual CSD Event Frequency	Volume (MG)		Duration	
		Annual Total	Annual Median	Annual Total	Annual Median
Lake Merced (001)	8(2)	12.5	1.5	12 h 11 min	1 h 5 min
Vicente (002)	7	83.4	11	21 h 29 min	2 h 57 min
Lincoln (003)	7	124.6	16	21 h 6 min	2 h 51 min
Mile Rock (004)	6	15.7	3	8 h 30 min	1 h 20 min
Sea Cliff #1 (005)	1	0.0002	NA	6 min	NA
Sea Cliff Sewer (006)	3	0.2	0.1	1 h 59 min	40 min
Sea Cliff #2 (007)	2	0.02	NA	58 min	NA

(1) Results generated using CCSF H&H Model EHY13 ver. 211.
(2) Two of the eight CSDs at Lake Merced are triggered by the same storm event so that, on a system-wide basis only seven storm events result in one or more CSDs, which is below the design criteria of eight.

2.3 Level of Treatment for Combined Flows

Table 2-3 shows the estimated stormwater and wastewater flow into the system on an annual basis for the level of treatment provided to combined flows in the modeled typical year and for the past three years. The average dry weather flow in the system is 14.8 MG a day, or more five billion gallons annually. During a typical year, the system also collects and treats another three billion gallons of stormwater, with only four percent being discharged as CSDs. Over the past three years, an average of one percent of annual combined flows has been discharged as CSDs, with 99 percent of flows being treated either at OSP or within the T/S structures before deepwater discharge through the SWOO.

As is apparent from Figure 2-3, the percentage of annual combined flows treated to secondary standards over the past three years (an average of 85 percent) is greater than that predicted for the modeled typical year (75 percent). This is because the past three years have been exceptionally dry years for the region, so that the proportion of annual dry weather flows relative to wet weather flows is greater than it would be during wetter years. Because OSP only discharges primary and decant flows during wet weather events, the low amount of precipitation results in a higher percentage of annual flows receiving secondary treatment.

Table 2-3 Level of Treatment of Annual Combined Flows

	Monitored(1)				Modeled(1)
	2011-2012	2012-2013	2013-2014	3-Yr Average	Typical Year
Rainfall(3) (in)	**17.6**	**19.7**	**12.0**	**16.4**	**20.5**
INFLUENT (MG)	**7,000**	**7,160**	**6,720**	**6,950**	**8,140**
Stormwater	1,300	1,740	1,320	1,450	2,840
Wastewater	5,700	5,420	5,400	5,500	5,300
EFFLUENT (MG)	**7,000**	**7,140**	**6,720**	**6,950**	**8,140**
OSP Secondary	6,200	5,870	5,700	5,920	6,100
OSP Primary	200	230	180	200	500
Decant	530	910	780	660	1,300
CSDs	70	130	60	100	240

(1) Volume estimates based on level and flow data collected from the Distributed Control System.
(2) Results generated using CCSF H&H Model EHY13 ver. 211.
(3) Rainfall reported in monthly OSP reports.

Figure 2-2 Monthly Distribution of Combined Flows

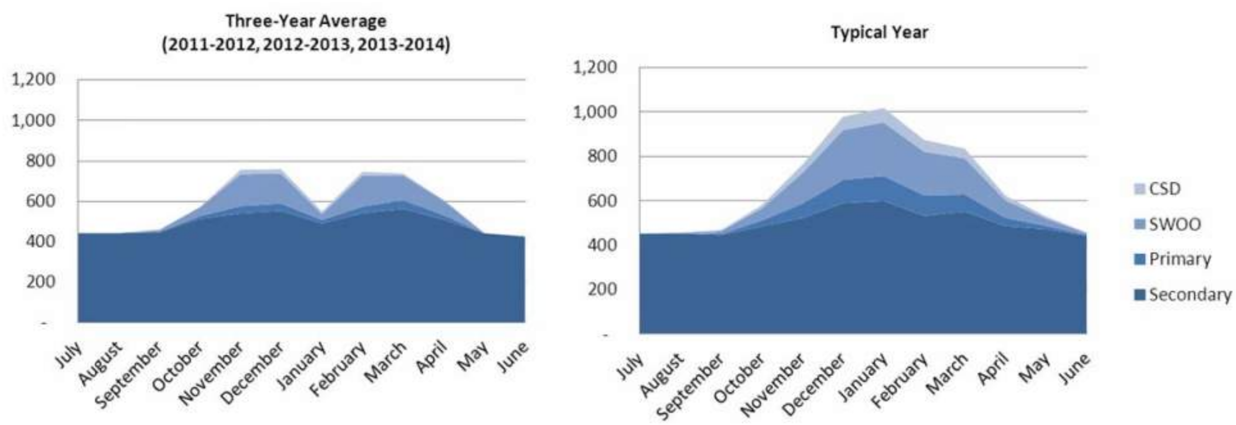
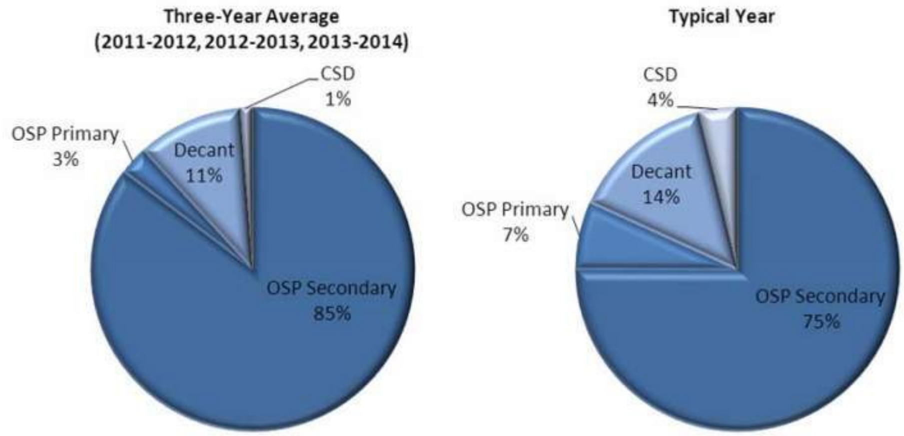


Figure 2-3 Annual Distribution of Combined Flows



2.4 Pollutants Removed from Stormwater Prior to Discharge

As an example of the Westside Wet Weather Facilities' efficacy in controlling pollutant loading from stormwater, the SFPUC developed a methodology to estimate the mass of total suspended solids (TSS) removed from stormwater prior to discharge. TSS was selected because it can be inexpensively and reliably measured and is often used as an indicator of other pollutants in stormwater.[9]

To estimate the mass of TSS of stormwater removed by the combined system, the SFPUC used its hydraulic model to simulate the volume of stormwater entering the system and the volume exiting the system, with base daily sanitary flows assumed to be 14.8 MG. The ratio of stormwater to wastewater in the influent was assumed to be the same as in all discharges (from OSP secondary and primary, decant and CSDs). Measured influent and effluent TSS concentrations from daily flow-paced composite samples were used to estimate the mass of TSS entering the system and exiting from OSP, respectively. The median of ten years of decant and CSD TSS samples were used to estimate the mass of TSS exiting the system in the form of decant and CSDs. The TSS removed from stormwater by the Westside Wet Weather Facilities was estimated to be the difference between the influent mass and the sum of the OSP, decant and CSD effluent masses.

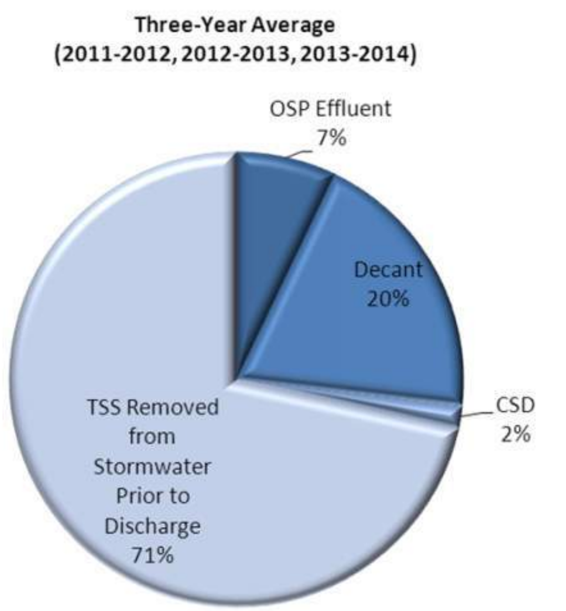
On average over the past three years, the Westside system removed an estimated 73 percent of TSS from stormwater prior to discharge through the SWOO or CSDs. The mass of all pollutants removed, however, is likely much greater than this because these estimates do not include the mass of large solids, such as trash and debris, that would not be collected by the samplers.

[9] A 2003 CalTrans study of thirteen storm events found that an average of 57 percent of cadmium, 75 percent of copper, and 92 percent of lead in stormwater was found in the particulate fraction.

Table 2-4 Mass Balance for TSS in Stormwater Portion of Combined Flows

	2011-2012	2012-2013	2013-2014	Average
TSS in Influent	**1,410,000**	**2,025,000**	**1,352,000**	**1,596,000**
TSS in Effluent	**411,000**	**506,000**	**390,000**	**436,000**
OSP	93,000	145,000	112,000	117,000
Decant	305,000	337,000	272,000	305,000
CSDs	13,000	24,000	6,000	14,000
TSS Removed from Stormwater (%)	71%	75%	71%	73%

Figure 2-4 Distribution of TSS in Stormwater



2.5 Historical Comparison

This section presents information collected by the SFPUC to compare the performance of the Westside T/S Structure to the performance and water quality benefits predicted at the time of its design. Unlike previous sections, which describe the performance of the system as a whole, this analysis is focused solely on the Westside T/S Structure because it is the keystone of the Westside Wet Weather Facilities and because detailed information on its expected benefits is available in historic facilities planning documents. These planning documents, completed in 1978, later became the basis of the Regional Board's order mandate to achieve an annual average CSD frequency of eight.

Table 2-5 compares the estimated design performance to actual performance for CSDs from the Westside T/S Structure for the past five years. Notably, the reduction in mass annual loading of BOD_5 and TSS was approximately 98 percent, which is substantially greater than the 1978 analysis which predicted a reduction of 84 percent. The impact in terms of the number of days the receiving waters did not meet total coliform standards was also less than expected. Pre-construction modeling predicted a reduction 84 percent over the uncontrolled levels, whereas actual reductions are greater than 95 percent on average for the past five years.

Table 2-5 Westside Transport Storage Structure Performance

Vicente & Lincoln CSD Structures (CSD 002 & CSD 003)						
	1978 Design Estimate	2009-2010	2010-2011	2011-2012[2]	2012-2013[2,3]	2013-2014[4]
No. CSD Events/Year[(1)]	8	3	4	3	6	2
% of Westside Combined Flows Treated at OSP Annually	96%	98%	99%	99%	99%	99.6%
% of Westside Combined Flows Discharged through CSD Outfalls 002 and 003	4%	2%	1%	1%	1%	0.40%
CSD Volume/ Yr (MG)	449	195	87	62	90	25
Total Duration of all CSD events (hours)	32	15.5	11.9	8.7	20.1	3.5
Minimum/Maximum Duration of CSD events (hours)	2/78	1.8/8.2	0.3/5.4	0.2/4.9	1.0/9.2	1.0/2.5
Average Duration of CSD events (hours)	4	5.2	3.0	2.9	3.3	1.7
Stormwater in CSDs (%)	94%	97%	96%	96%	95%	96%
Wastewater in CSDs (%)	6%	3%	4%	4%	5%	4%
Reduction in BOD_5 Loading v. 1978 Levels (%)[(5)]	**84%**	98%	99%	98%	98%	100%
Reduction in TSS Loading v. 1978 Levels (%)	84%	99%	100%	100%	100%	100%
No. Days Exceeding Total Coliform Standard (10,000 MPN/100mL)[(5)]	10	1	2	0	5	3
Reduction in No. Days Exceeding 10,000 MPN/100 mL Total Coliform Standard (%)	84%	99%	97%	100%	93%	95%

(1) A CSD Event is a storm event that resulted in a discharge from CSDs 002 and 003.
(2) Calculated using eDNA one minute data.
(3) For four events CSD-003 telemetry was non-functional, so data from CSD 002 was used to estimate the discharge volume.
(4) Calculated using Pi one-minute data.
(5) These rows show the reduction in BOD and TSS over uncontrolled (1979) levels that were predicted to occur after construction of the Westside T/S structure.

3.0 ASSESSMENT OF WET WEATHER IMPACTS

According to EPA, a post-construction monitoring program for combined sewer systems should include receiving water monitoring to assess the impacts of wet weather discharges on water quality.[10] This section describes the results of the SFPUC's related monitoring programs, which include fecal indicator bacteria (FIB) monitoring at public beaches, collection of data on recreational use, CSD sampling and analysis, and the extensive annual SWOO regional sampling effort.

3.1 Fecal Indicator Bacteria Monitoring

The SFPUC and the San Francisco Department of Public Health (SFDPH) jointly administer the city-wide Beach Water Quality Monitoring Program. The purposes of the program are to monitor fecal indicator bacteria concentrations at San Francisco beaches and notify the public when concentrations are likely to be elevated above the standards recommended by the California Department of Public Health for salt water beaches.[11] A detailed summary of the program and results are included in the *Southwest Ocean Outfall Regional Monitoring Program Sixteen Year Summary Report 1997-2012* (*SWOO Regional Monitoring Report*), which was submitted to the Water Board on April 3, 2014. This Report provides a synopsis of the program and the conclusions from the SWOO Regional Monitoring Report.

The main elements of the Beach Water Quality Monitoring Program are:

- <u>Weekly Monitoring</u>. Designated water contact recreation areas are sampled once a week year-round. If concentrations are elevated, the site is re-sampled daily until concentrations are below the CDPH levels.
- <u>Post-CSD Monitoring.</u> Designated water contact recreation areas in the vicinity of CSDs are sampled as soon as practicable following CSDs.[12] Samples are collected in ankle deep water on an incoming wave. If sample results indicate an exceedance of one or more FIB standards, the site is re-sampled daily are below the CDPH levels.
- <u>Public Notification.</u> Permanent signs in English, Spanish, and Chinese installed at major beach access points explain that beaches will be posted when it may be unsafe to enter the water.

  As a precautionary measure, beaches are sampled and posted when a CSD occurs at a location that could affect water quality at that beach even before sample results are available. Beaches remain posted until the sample results are available, which can be up to 24 hours after samples are collected. If the results indicate elevated bacteria levels, the beaches remain posted and are re-sampled. Beaches are also posted when no CSD occurs but when weekly sampling indicates FIB concentrations above the CDPH levels.

  Notification also includes a subscription email notification list, a recreational beach water quality hotline, and posting on the SFPUC website (http://beaches.sfwater.org). The SFPUC expects its web-based mobile phone notification application, which is being beta tested now, to be available before the end of the summer.

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10 USEPA *CSO Post Construction Compliance Monitoring Guidance*, p. 48 .

11 These standards are 104 MPN/100 mL for enterococcus, 400 MPN/100 mL for fecal coliform, and 10,000 MPN/100 mL for total coliform. The SFPUC measures E. coli, a subset of fecal coliform, as required by the OSP NPDES permit.

12 If, for example, a CSD begins at 5:00 p.m. during the winter and there is insufficient light to safely collect water samples in the surf zone, staff will sample and post at daylight the next morning.

Figure 3-1 shows the Oceanside FIB monitoring locations. Sites 15, 15E, 17, 18, 19, and 21.1 are sampled weekly and after a CSD. Sites 20, 21, and 22 are sampled only after a CSD.

Figure 3-1 Beach Water Quality Monitoring Stations

Table 3-1 illustrates the short duration of the impact of CSDs on FIB concentrations. It shows the total number of CSD events that occurred at Westside Beaches, and the number of those CSDs events that were associated with elevated FIB concentrations. The duration of CSD impacts was brief enough that, for the majority of CSD events, sampling did not detect an exceedance in the surf zone either at the CSD outfall or the adjacent stations. Posting and sampling of the beaches occurs as soon as practicable (when there is sufficient daylight to safely sample) once a CSD begins, so this suggests that the impacts of CSDs are typically less than fifteen hours in duration and may be much shorter. For all the CSD events at Baker Beach, Ocean Beach and China Beach that resulted in elevated FIB levels; concentrations dropped below water quality standards by the second day of sampling (less than 48 hours after the event occurred).

Table 3-2 shows the very small number of days that use of Westside beaches was affected by CSDs. For all beaches, the average annual number of days that the beaches were posted as the result of a CSD or a CSD-related exceedance was less than three percent (ten days). The average percentage of days that these beaches actually had elevated bacteria levels is likely even lower considering that the beaches are proactively posted for the 24 hours it takes to culture samples and confirm that concentrations are below the CDPH levels.

Table 3-2 also highlights that events or factors other than CSDs contribute to exceedances, especially at Baker Beach at Lobos Creek, which is on the State's list of impaired waterbodies. The cause of these dry weather exceedances is currently unknown, but it is believed that Lobos Creek and wildlife may be significant contributors.

Table 3-1 CSD Events Correlated to Elevated FIB Concentrations, 1997 – 2013

	Lake Merced Outfall (Ft. Funston)	Vicente Outfall (Ocean Beach)	Lincoln Outfall (Ocean Beach)	Seacliff I Outfall (China Beach)	Seacliff II Outfall (Baker Beach)
No. of CSD Events by Outfall	84	83	81	28	67
No. CSD Events with Elevated FIB Concentrations	15	25	39	4	17
% of CSD Events with Elevated FIB Concentrations	18%	30%	48%	14%	25%

Table 3-2 Days of Beach Postings, 2003 – 2013

Year	Ft. Funston (Lake Merced Outfall)		Ocean Beach (Lincoln and Vicente Outfalls)		China Beach (Sea Cliff I Outfall)		Baker Beach (Sea Cliff II Outfall)	
	Non-CSD(1)	CSD	Non-CSD	CSD	Non-CSD	CSD	Non-CSD	CSD
2003-2004	3	12	6	13	3	7	12	15
2004-2005	NA	10	4	15	0	5	9	14
2005-2006	NA	22	4	19	1	6	25	14
2006-2007	NA	3	2	3	0	0	3	4
2007-2008	NA	7	0	11	1	0	7	2
2008-2009	NA	7	0	7	0	0	16	2
2009-2010	NA	8	0	7	0	7	35	11
2010-2011	NA	10	0	9	0	0	20	5
2011-2012	NA	3	0	5	2	1	3	4
2012-2013	NA	12	1	14	0	2	11	8
Average	NA	9	2	10	1	3	14	8
Average Days Posted Annually	NA	2%	1%	3%	0%	1%	4%	2%

3.2 Recreational Use Monitoring

San Francisco beaches are popular recreation areas used by San Francisco residents and visitors throughout the year. Although the number of days that beaches are posted annually is very small and the number of days that there are elevated fecal indicator bacteria is even smaller, the potential exists for beach users to be exposed to undisinfected stormwater and wastewater discharged as CSDs. To better understand the potential threat to human health the SFPUC conducted an extensive recreational use survey at Ocean Beach from October 1998 through September 2000. This study concluded that water contact and non-water contact (including surf fishing) recreational activities along Ocean Beach were extensive, but recreational use following CSDs was very limited. The study concluded that CSDs have little impact on recreational use because they occur during storm events and little use was observed during the cold, short days of winter when CSD events tend to occur. Of the 154,054 people observed during the two-year study, only 17 percent were engaged in water contact recreation. Of the 17 percent involved in contact recreation, only 25 percent (four percent of the total) were surfers, meaning that they were fully immersed for extended periods of time. Less than one percent of all observed water contact users were observed following a CSD.

Since 2000 the SFPUC has continued collecting recreational use data but only during and immediately after CSDs. Staff recorded the number of full, partial and non-contact recreational use whenever posting, sampling, and de-posting a beach because of a CSD. The results of these observations for 2008 through 2014 are summarized in Table 3-3. Most (80 percent) users observed were engaged in non-water contact recreation, and fewer recreational users were observed when posting - which occurs during or shortly after a CSD - than when de-posting, which typically occurs one to two days after a CSD. While these observations cannot be extrapolated to estimate how many people were engaged in water contact recreation during periods of elevated FIB concentrations, they illustrate how the inclement weather conditions associated with CSDs discourage water contact recreation and limit exposure. This is consistent with an analysis of recreational use on the Bayside of San Francisco, which found that visibility, weather and temperature were the factors that most influenced recreational use. More details on Westside recreational use observations are included in the *SWOO Regional Monitoring Report.*

Table 3-3 Westside Recreational Use Observations, 2008 – 2014

Time of Observation	No. of Observation Events	Full Contact Users	Partial Contact Users	Non Contact Users	Total Users	Total Users/ Observation Event
Posting	117	38	3	274	315	2.7
Posting/Sampling	66	7	3	174	184	2.8
Sampling	88	81	16	308	405	4.6
De-Posting/Sampling	15	68	6	69	143	9.5
De-Posting	114	107	74	804	985	8.6
Total	400	301	102	1,629	2,032	-
Percent of Total	-	15%	5%	80%	100%	-

3.3 Combined Sewer Discharge Quality Monitoring

This section summarizes the results of ten years of sampling of the water quality of discharges from the Westside T/S structure CSD outfalls and of decant through the SWOO. Samples are collected by level-actuated refrigerated automatic samplers set up to collect time-paced composite samples. Because of the infeasibility of predicting the duration of discharges, the automatic samplers are typically set up to collect the minimum sample volume of three liters within the first five minutes and one liter each hour thereafter. This sampling regime is intended to maximize the number of laboratory analyses that can be performed for each sample. Occasionally the CSD is too brief to collect sufficient sample volume to perform all analyses, in which case conventional parameters and metals are prioritized.

A summary of the monitoring results is presented in Table 3-4, and more detailed results are included in Appendix A. The summary below compares the median and mean measured concentrations of various parameters against the results of a Caltrans study[13] characterizing pollutant concentrations in stormwater flows from highways, and Ocean Plan numeric water quality objectives. The comparison to the Ocean Plan numeric objectives for instantaneous maxima is provided only to illustrate the relatively low average concentrations of pollutants in CSDs. These Ocean Plan objectives apply only to the receiving waters, not stormwater or other effluent discharges. Moreover, the State Water Board order granting San Francisco an exception from certain provisions of the Ocean Plan explicitly notes that it is inappropriate to require compliance with numeric objectives during wet weather discharges.

As indicated in Table 3-4, the median and average concentrations of pollutants in CSDs are similar to those expected in stormwater runoff and are mostly below the water quality objectives specified in the Ocean Plan. Concentrations of zinc and copper are elevated, which is typical of urban stormwater. The primary sources of copper and zinc in urban stormwater runoff are likely to be car brake pads and tires, respectively. San Francisco's street cleaning program, which includes sweeping high-use commercial areas daily, reduces these pollutants, but source control programs are necessary for effective control. California has taken some steps in this direction, enacting a law requiring that the use of copper in brake pads be reduced to no more than 0.5 percent by weight by 2025,[14] and another phasing out lead tire weights.[15]

The toxicity of metals is also likely to be less than indicated by comparison with the water quality objectives. Zinc, as well as copper and several other metals have limited bioavailability and reduced toxicity when dissolved organic carbon and certain other chemicals are present. This reduced toxicity can be addressed by water quality criteria based on the biotic ligand model (BLM). In 2007, EPA promulgated revised water quality criteria for copper (freshwater) based on the BLM but has not yet done so for other metals or for marine waters.

The median and average concentrations for most parameters are higher in the decant samples than in the CSD samples. This may be the result of the timing of the sample collection and discharge relative to the storm event. Decant samples are collected much earlier during a storm event than the CSDs because CSDs do not occur until decant pumping through the SWOO has been maximized. This could result in higher concentrations of pollutants because the proportion of wastewater in the decant samples is likely to be higher than those in the CSDs, which may explain the higher concentrations of conventional pollutants and ammonia in the decant samples.

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[13] California Department of Transportation, *Storm Water Monitoring & Data Management Discharge Characterization Study Report*, CTSW-RT-03-065.51.42 (2003).
[14] Senate Bill 346 (2010).
[15] Senate Bill 757 (2009).

Table 3-4 Wet Weather Discharge Analytical Results, 2004 - 2014

Analyte	Decant			Vicente (002) CSD			CalTrans Avg(6)	Ocean Plan Obj.
	No. Samples	Median(1)	Average(1)	No. Samples	Median(1)	Average(1)		
Conventional Pollutants								
TSS (mg/L)	113	82	100	40	44	59	113	NA
BOD (mg/L)	65	52	65	38	26	29	-	NA
COD (mg/L)	100	116	168	32	81	87	-	NA
pH (Std. Units)	106	6.8	6.7	40	6.6	6.5	7.1	6.0 - 9.0(2)
Oil & Grease (mg/L)	106	<5	<5	37	<5	<5	5.0	75(2)
Toxic Pollutants								
Ammonia (mg/L)	70	3.2	5.2	40	2.2	2.4	1.0	6(3)
Copper (µg/L)(5)	64	41	46	40	27	29	34	30(3)
Lead (µg/L) (5)	63	13	14	40	11	12	48	20(3)
Zinc (µg/L) (5)	64	152	175	40	111	118	187	80(3)
Nickel (µg/L) (5)	64	3.6	3.9	40	3.6	3.8	11	50(3)
Cadmium (µg/L) (5)	64	0.2	0.4	40	0.1	0.3	0.7	10(3)
Chromium(4) (µg/L) (4)	64	3.2	3.9	39	3.4	4.2	8.6	20(3)
Arsenic (µg/L)(5)	65	0.7	3.2	40	0.7	1.1	1.0	80(3)

(1) To calculate the median and the average, estimated values were used for pollutants detected but not quantified (DNQ) and zeros were used for pollutants not detected.
(2) California Ocean Plan, Table 2 (formerly Table A).
(3) California Ocean Plan, Table 1 (former Table B). These objectives are provided for illustrative purposes only. They do not apply to CSD or decant discharges because they are receiving water, not effluent, limitations.
(4) Chromium results are expressed as total, but the Ocean Plan objective is expressed as hexavalent chromium.
(5) All metals are expressed as total recoverable metals.
(6) CalTrans Highway Table 3-3, average of all samples collected,

3.4 Wet Weather Discharge Characterization Special Study

During this permit term, the SFPUC decided to voluntarily conduct a special study involving direct monitoring of receiving waters before and after CSDs. The objective of the one-time study was to better characterize the impacts of CSDs on the receiving waters rather than relying solely on CSD pollutant concentrations to estimate the potential impacts. In 2012, the SFPUC developed and implemented a receiving water sampling and analysis plan. The plan involved sampling the surf zone on an incoming wave prior to and during a CSD event at multiple locations along Ocean Beach shown in Figure 3-2. Two sets of samples were targeted: One set collected during the storm, but prior to a CSD ("pre-discharge sample"), and one set collected during discharge. The pre-discharge samples were to be collected at shoreline stations 18 (foot of Balboa Street), 19 (at the discharge structure, foot of Lincoln Way), 20 (foot of Pacheco Street), and 21 (at the discharge structure, foot of Vicente Street) (Figure 3-2). The discharge samples were to be collected at the same four stations with additional samples collected 30 meters upcoast and downcoast of the two discharge structures at stations 19 and 21.

Figure 3-2 Wet Weather Discharge Characterization Study Stations

Implementation of this plan was significantly hampered by logistical and safety issues. Specifically, the unpredictable nature of CSDs made it difficult to determine when to mobilize field staff. Staff were mobilized on multiple occasions on which CSDs did not occur. On other occasions, the CSDs occurred during non-daylight hour when field sampling would have been unsafe, or on weekends when limited staff are available. When staff were mobilized, the often-dangerous winter surf conditions at Ocean Beach made access to the discharge challenging as shown in the images in Figure 3-3.

Figure 3-3 Vicente Outfall, November 30, 2012

These photographs were taken on incoming and outgoing waves while staff were sampling at the Vicente CSD outfall on November 30, 2012. Despite multiple mobilizations, SFPUC field monitoring staff were only able to collect samples on two occasions. On March 12, 2012, staff mobilized and collected pre-discharge samples, but no CSDs occurred. On November 30, 2012, staff collected samples from all stations while CSDs were occurring from the Vicente and Lincoln outfalls. The discharge water quality samples were collected in the middle of the discharge event, which began at approximately 4:00 a.m. and lasted until around 1:00 p.m. The first water quality samples were collected at 7:25 a.m. and the last at 10:00 a.m.

Table 3-5 shows the maximum, average and median of all samples collected at all locations during each event. The results indicate that some, but not all, pollutants are elevated in the discharge sample as compared to the pre-discharge sample. Concentrations of ammonia, nickel, cadmium, chromium and arsenic were similar for pre-discharge and discharge samples. Concentrations of pollutants expected to be found in stormwater – copper, lead, zinc, bacteria and TSS – were elevated in the discharge samples as compared to the pre-discharge samples, but only bacteria and a single lead result were greater than the Ocean Plan objectives. Samples were also analyzed for other metals and organics, most of which were at or below method detection limits and so are not summarized here.

Table 3-6 shows the results by location for the November 30, 2012 discharge sampling event and the results of the CSD effluent sample collected on the same day. From this single dataset, no clear relationship between the CSD concentrations and the receiving water concentrations is discernible. This may be due to differences in the timing of samples and the sample collection methodology. CSD sample collection was initiated at the time of discharge and was a time-paced composite whereas the receiving water samples were collected mid-discharge and as grab samples.

Similarly, no spatial relationship between the receiving water samples is discernible except for FIB, which was highest at the stations located at the CSD outfalls. Samples collected the following day and analyzed for FIB as part of the routine beach monitoring program were elevated only for enterococcus and only at Balboa (Station 18) and Sloat (Station 21.1).

Table 3-5 Summary of Results for all Stations, Pre and During Discharge

Analyte	Receiving Water, Pre-Discharge (3/12/2012)			Receiving Water, During Discharge (11/30/2012)			Ocean Plan Objective(2)
	Max	Median	Average	Max	Median	Average	
Conventional Pollutants							
TSS (mg/L)	70	61	62	103	73	79	NA
Enterococcus (MPN/100 mL)	31	10	15	>24,196	3,654	7,074	104
E. coli (MPN/100 mL)	63	31	34	>24,196	2,282	9,193	400
Total Coliform (MPN/100 mL)	171	158	156	>24,196	6,131	12,587	10,000
Toxic Pollutants							
Ammonia (mg/L)	0.5	0.5	0.4	0.5	0.5	0.4	6
Copper (µg/L) (4)	3	0.8	1.1	13	4.6	5.6	30
Lead (µg/L) (4)	1.2	0.8	0.9	21	5.7	9.3	20
Zinc (µg/L) (4)	6.2	5.3	5.4	22	15	15	80
Nickel (µg/L) (4)	6.3	5.6	5.6	6.1	4.4	4.6	50
Cadmium (µg/L) (4)	0.8	0.6	0.6	1	0.7	0.6	10
Chromium(4) (µg/L) (3)	8.7	7.5	7.5	7.9	5.8	6.1	20
Arsenic (µg/L) (4)	3.5	3.1	3	4.6	3.7	3.5	80

(1) For calculating the median and the average, estimated values were used for pollutants detected but not quantified (DNQ) and zeros were used for pollutants not detected.
(2) California Ocean Plan, Table 1 (former Table B), all values are the instantaneous maxima. These objectives are provided for illustrative purposes only and do not apply to San Francisco's wet weather discharges because of SWRCB WQ Order 79-16.
(3) Chromium results are expressed as total, but the Ocean Plan objective is expressed as hexavalent chromium.
(4) Expressed as total recoverable metals.

Table 3-6 Results for Individual Stations during Discharge Event (North to South)

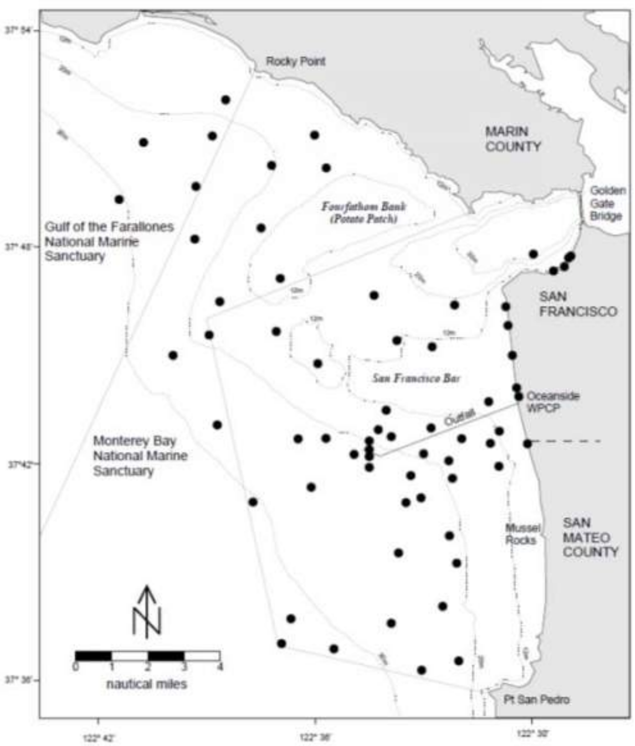
Station Name (Station Number)	Balboa (18)	Lincoln, 30 m N (19N)	Lincoln (19)	Lincoln, 30 M S (19 S)	Pacheco (20)	Vicente, 30 m N (21N)	Vicente (21)	Vicente 30m S (21S)	Vicente CSD
Conventional Pollutants									
TSS (mg/L)	62	74	72	103	67	88	68	97	68
Enterococcus	723	7,701	24,196	145	884	3,654	12,997	12,997	-
E. coli	2,282	14,136	24,196	443	583	15,531	24,196	158	-
Total Coliform	6,131	24,196	24,196	3,255	3,255	24,196	24,196	1,100	-
Toxic Pollutants									
Ammonia (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	3
Copper (µg/L)(1)	3.1	13	3.9	6.3	7.5	3.9	5.3	1.9	1.5
Lead (µg/L) (1)	4	21.0	4	16.7	7	2.2	3	16	7
Zinc (µg/L) (1)	8	22	32	16.7	16	9	22	13	87

(1) Expressed as total recoverable metals.

3.5 Southwest Ocean Outfall Offshore Monitoring Program

In April of this year, the SFPUC submitted the *SWOO Regional Monitoring Report* to the Water Board. This Report describes the results of the extensive SFPUC Offshore Monitoring Program, which involves the collection and analysis of physical, chemical, and biological parameters in order to assess and compare outfall (potentially impacted) and reference conditions by analyzing chemical and physical sediment quality, benthic infauna community structure, demersal fish and epibenthic invertebrate community structure, and physical anomalies and bioaccumulation of contaminants in organism structure.

Figure 3-4 Offshore Monitoring Stations



Analysis of the data collected since 1997 has not identified any trends that indicate that discharges from the SWOO are adversely affecting the surrounding environment:

- Sediment grain size, organic and inorganic pollutant levels have revealed no trends in sediment characteristics that would indicate that the discharges from the SWOO have adversely affected the surrounding environment, and have not produced any discernable effects on the physical characteristics or sediment or resulted in contaminant accumulation in the vicinity of the outfall.

- Reference envelope analysis shows that benthic infauna indicators (abundance, species richness, diversity, evenness) at outfall stations are the same as at reference stations.

- Most organic pollutants are infrequently detected in sediment samples and, when detected, occur at low concentrations. One outfall station was above reference conditions for polycyclic aromatic hydrocarbons (PAHs) in sediment in seven of the sixteen years sampled, but the high concentrations appear to correlate in both reference and outfall stations to high percentage of sediment fines, of which that station had the highest. Sediment metals concentrations at the outfall and reference stations do not differ.

- Organic pollutants and trace metals in crab tissue were found in varying levels but no correlation between sediment and tissue concentrations has been detected. As with demersal fish and epibenthic organisms the mobility of crabs limits their utility in determining an outfall effect because the origin of body burdens cannot be determined.

4.0 CONCLUSION

The results of the post-construction and system efficacy monitoring illustrate how that San Francisco's combined sewer system is controlling wet weather pollution consistent with the requirements of the CSO Control Policy and state water quality requirements. The system's performance in terms of CSD frequency and pollutant reduction has exceeded that predicted at the time the level of wet weather control was established and the system was designed. Data collected on CSD pollutant concentrations and in receiving waters indicates that the impact, if any, to beneficial uses is small.

<u>The Level of Wet Weather Control is Consistent with the Design Criteria.</u>
The 1979 regional and state orders that mandated the current level of CSO control found that construction a system with sufficient storage and treatment so that no more than eight storm events would trigger CSDs on a long-term average annual basis would protect beneficial uses. Since the construction of the Westside Wet Weather Facilities was completed in 1997, the frequency of storm events that result in a CSD for the system as a whole is seven, and for individual outfalls is five. These frequencies are also consistent with the predictions of San Francisco's H&H model simulations for the typical year, which is designed to be representative of long-term performance.

<u>The Combined Sewer System Provides Significant Environmental Benefits.</u>
The capacity of the Westside Wet Weather Facilities to capture and treat enormous volumes of stormwater provides a significant environmental benefit over separate storm sewer systems, with more than one million pounds of TSS and associated pollutants removed from stormwater annually. Virtually all stormwater flows receive at least the equivalent of wet weather solids removal prior to discharge more than three miles offshore, and baffling throughout the system ensures capture of floatable debris.

<u>Identified Impacts of the System are Small.</u>
Chemical analyses of CSD discharges show that the concentrations of metals and conventional pollutants in CSDs are usually lower than those found in urban stormwater. Exceptions are copper and zinc, the concentrations of which are similar to those in urban stormwater but, which based on the SFPUC's receiving water special study, appear to be rapidly diluted and dispersed after discharge.

The primary pollutant of concern in CSDs is fecal indicator bacteria, which is present in stormwater and in the small percentage of sanitary waste in CSDs. The dispersion and die-off of fecal indicator bacteria in San Francisco's receiving waters is not well-characterized, but appears rapid based on beach water quality monitoring program data that indicate that concentrations frequently return to ambient levels within 24 hours after a discharge. Recreational use monitoring further indicates that human exposure to high levels of fecal indicator bacteria is limited as a result of the very small contact recreation use that occurs during and shortly after CSDs.

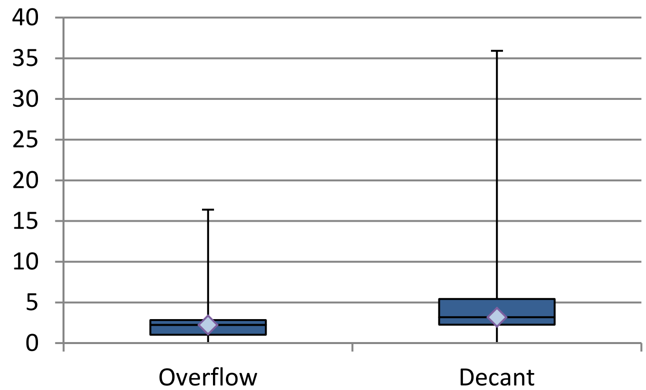
Long-term monitoring of the potential impacts of wet and dry weather discharges from the SWOO has not identified any discharge-related impacts to sediment quality or monitored organisms. This may be attributable to the high level of treatment provided to dry and wet weather flows, the small volume of discharge relative to other California ocean publicly owned treatment works, and the high dilution provided by the SWOO configuration which was designed to take advantage of ocean currents.

APPENDIX A
DECANT AND CSD CHEMISTRY RESULTS

These whisker plots show the range of results. for CSD and decant chemistry analysis The end points of the whiskers represent the minimum and maximum of each data set. The top box represents third quartile; the bottom box represents the second quartile; the line between them is the mean, and the diamond is the median.

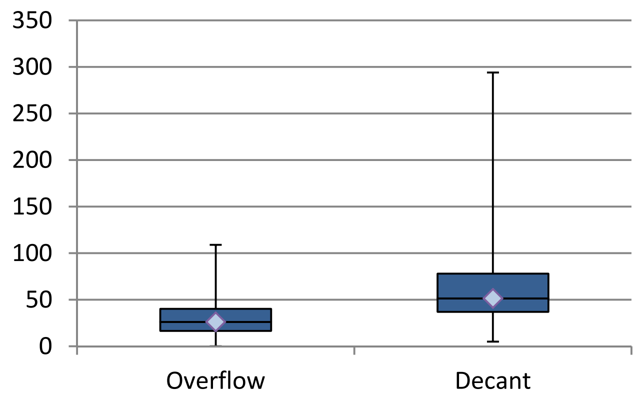
Total Suspended Solids (mg/L)

Statistic	Overflow	Decant
Count	40	113
Mean	59	100
Std. Deviation	37	80
Median	44	82
Maximum	169	525
Minimum	15	ND



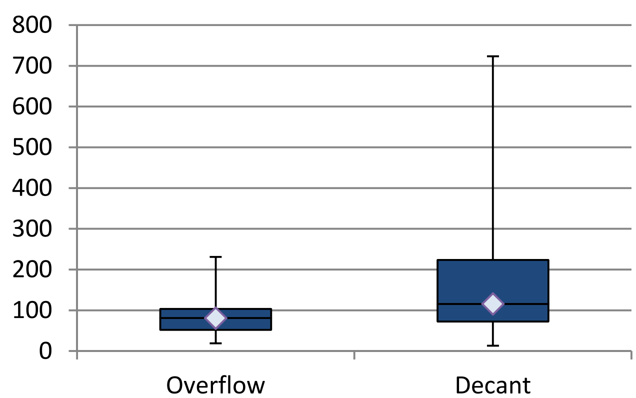
Biological Oxygen Demand (mg/L)

Statistic	Overflow	Decant
Count	38	65
Mean	29	65
Std. Deviation	20	50
Median	26	52
Maximum	109	294
Minimum	ND	5



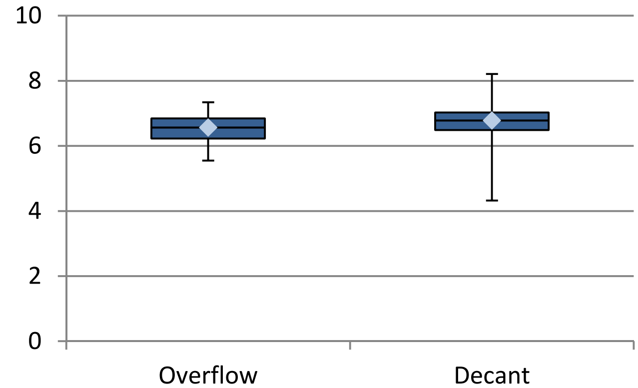
Chemical Oxygen Demand (mg/L)

Statistic	Overflow	Decant
Count	32	100
Mean	87	168
Std. Deviation	51	146
Median	81	116
Maximum	231	724
Minimum	19	13



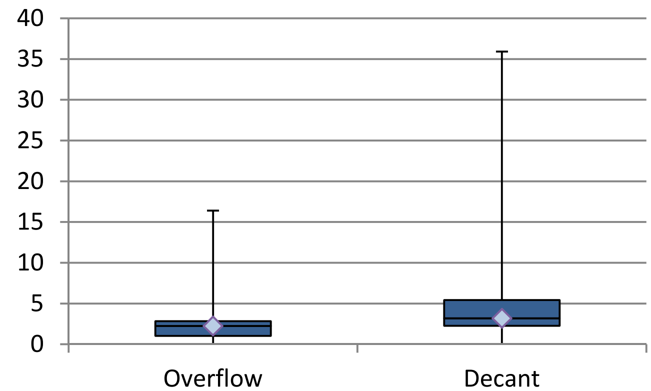
pH

Statistic	Overflow	Decant
Count	40	106
Mean	6.5	6.7
Std. Deviation	0.4	0.5
Median	6.6	6.8
Maximum	7.3	8.2
Minimum	5.6	4.3



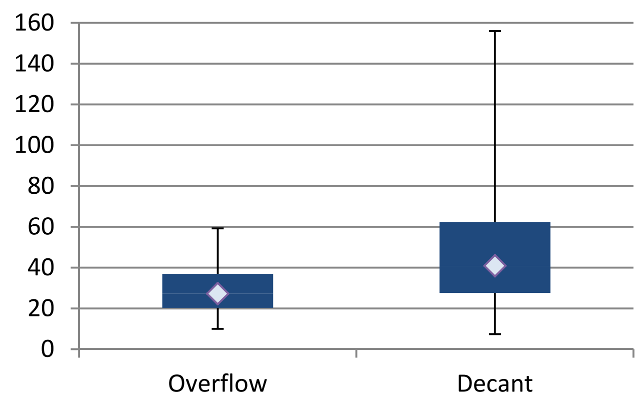
Ammonia (mg/L)

Statistic	Overflow	Decant
Count	40	70
Mean	2.4	5.2
Std. Deviation	2.5	5.8
Median	2.2	3.2
Maximum	16	36
Minimum	ND	ND



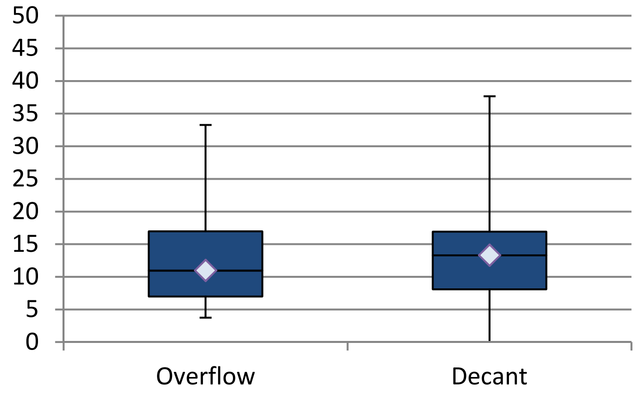
Copper (µg/L)

Statistic	Overflow	Decant
Count	40	64
Mean	29	46
Std. Deviation	12	26
Median	27	41
Maximum	59	156
Minimum	10	7



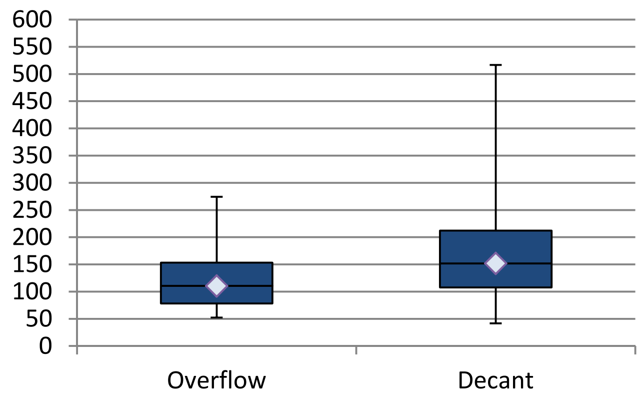
Lead (µg/L)

Statistic	Overflow	Decant
Count	40	63
Mean	12	14
Std. Deviation	7	8
Median	11	13
Maximum	33	38
Minimum	4	ND



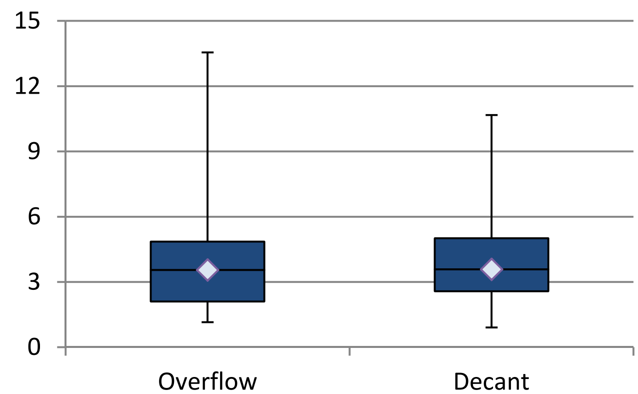
Zinc (µg/L)

Statistic	Overflow	Decant
Count	40	64
Mean	118	175
Std. Deviation	47	99
Median	111	152
Maximum	274	517
Minimum	52	42



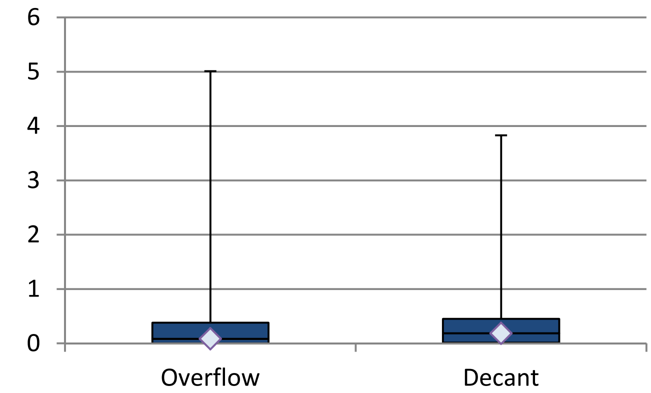
Nickel (µg/L)

Statistic	Overflow	Decant
Count	40	64
Mean	3.8	3.9
Std. Deviation	2.3	1.9
Median	3.6	3.6
Maximum	14	11
Minimum	1.2	0.9



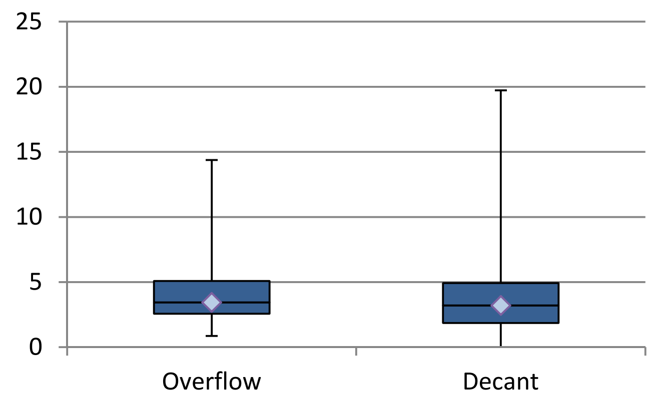
Cadmium (µg/L)

Statistic	Overflow	Decant
Count	40	64
Mean	0.3	0.4
Std. Deviation	0.8	0.7
Median	0.1	0.2
Maximum	5.0	3.8
Minimum	ND	ND



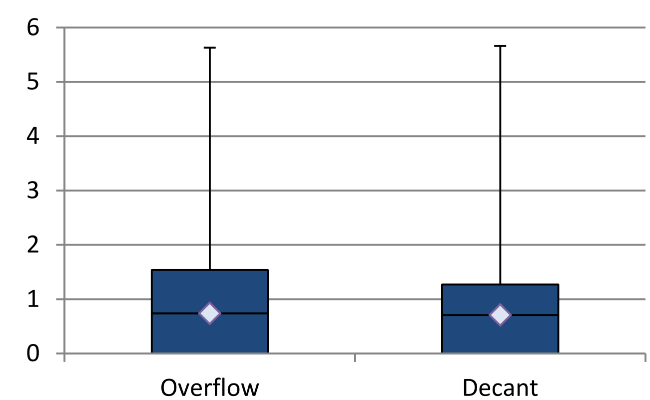
Chromium (µg/L)

Statistic	Overflow	Decant
Count	39	64
Mean	4.2	3.9
Std. Deviation	2.8	3.1
Median	3.4	3.2
Maximum	14	20
Minimum	0.9	ND

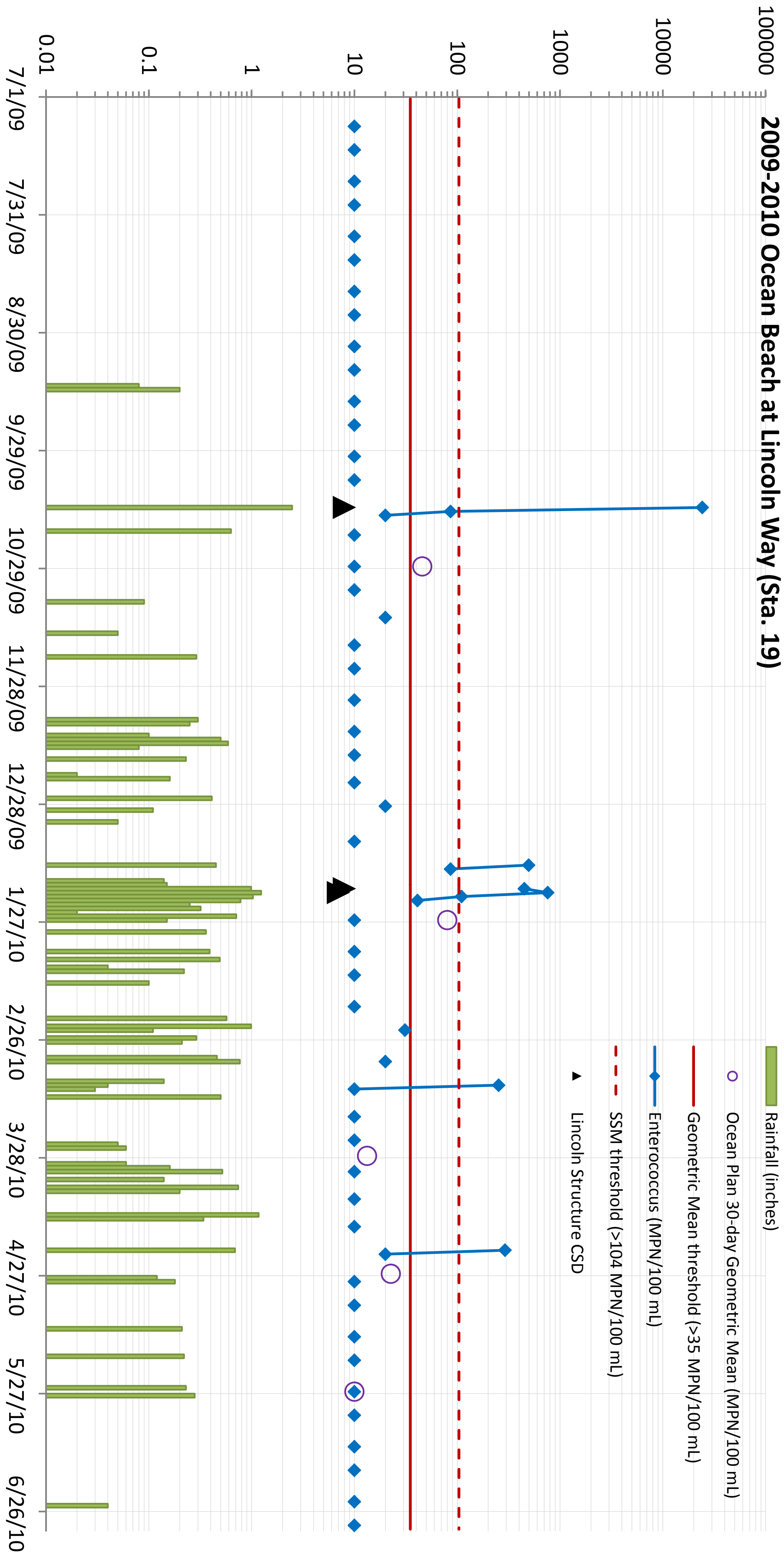


Arsenic (µg/L)

Statistic	Overflow	Decant
Count	40	65
Mean	1.1	3.2
Std. Deviation	1.3	1.1
Median	0.7	0.7
Maximum	5.6	5.7
Minimum	ND	ND



APPENDIX B
LINCOLN WAY BEACH MONITORING RESULTS


2009-2010 Ocean Beach at Lincoln Way (Sta. 19)
Rainfall (inches)
Ocean Plan 30-day Geometric Mean (MPN/100 mL)
Geometric Mean threshold (>35 MPN/100 mL)
Enterococcus (MPN/100 mL)
SSM threshold (>104 MPN/100 mL)
Lincoln Structure CSD
0.01
0.1
1
10
100
1000
10000
100000
7/1/09
7/31/09
8/30/09
9/29/09
10/29/09
11/28/09
12/28/09
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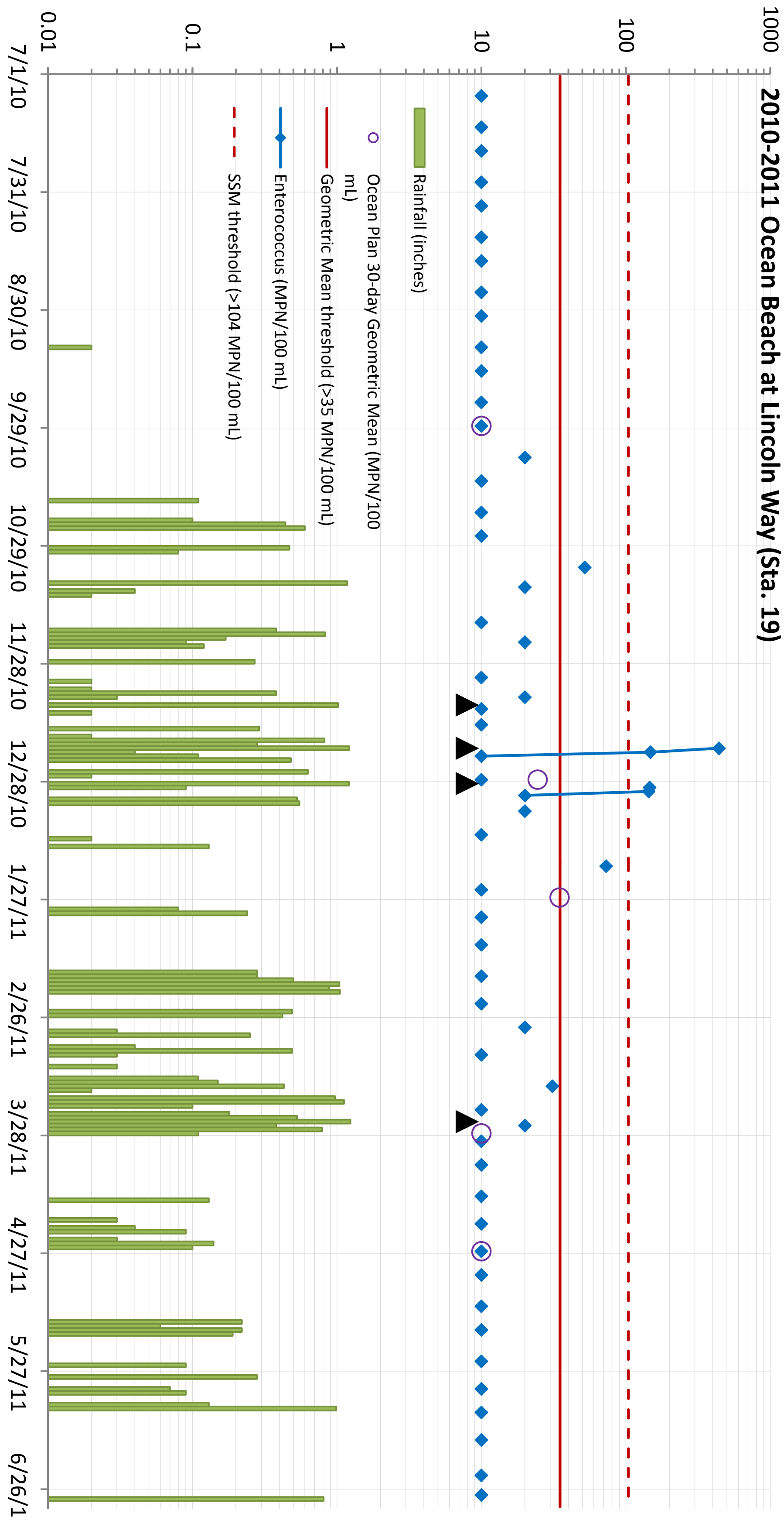
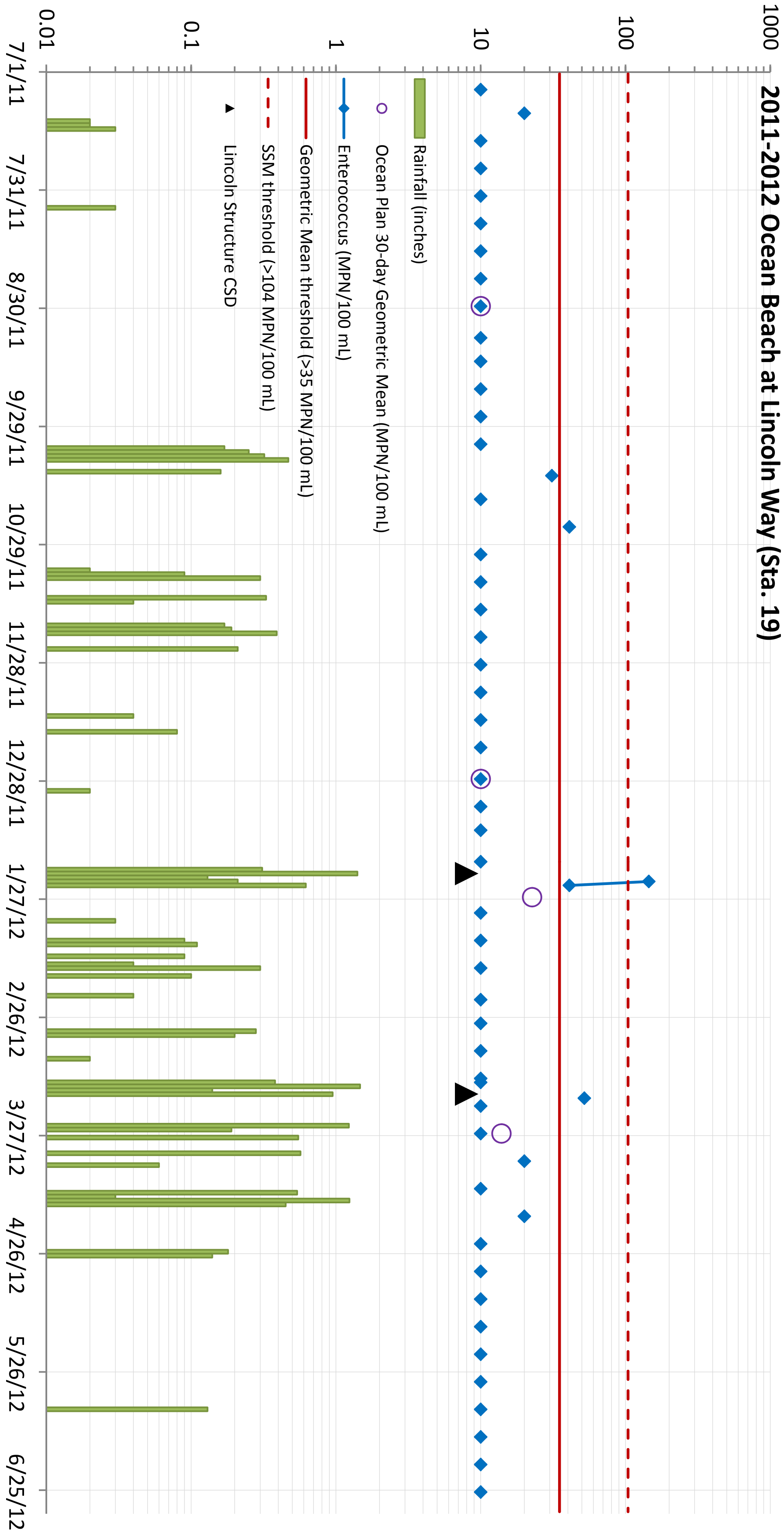
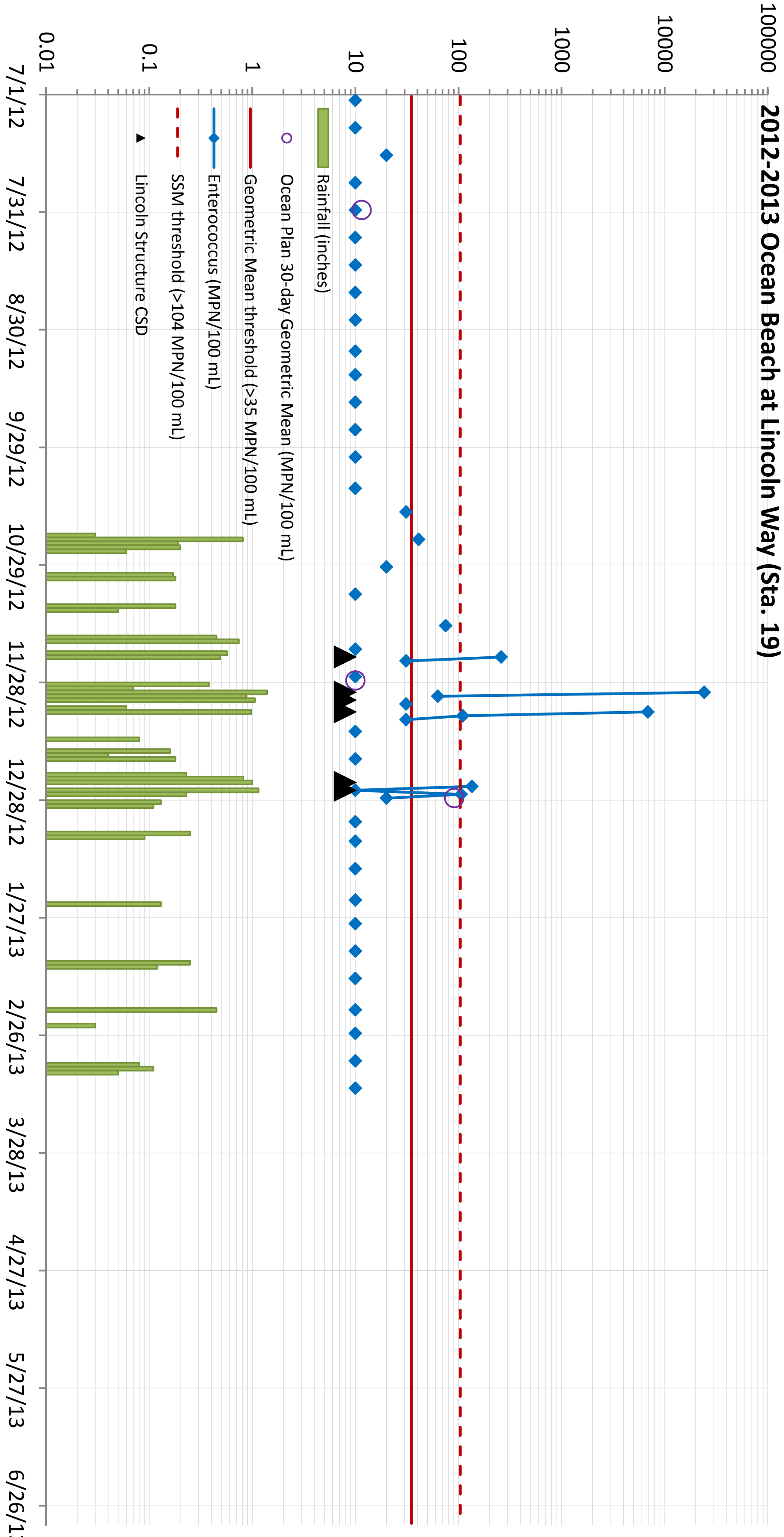
4/27/10
5/27/10
6/26/10


2010-2011 Ocean Beach at Lincoln Way (Sta. 19)
0.01
0.1
1
10
100
1000
7/1/10
7/31/10
8/30/10
9/29/10
10/29/10
11/28/10
12/28/10
1/27/11
2/26/11
3/28/11
4/27/11
5/27/11
6/26/11
Rainfall (inches)
Ocean Plan 30-day Geometric Mean (MPN/100 mL)
Geometric Mean threshold (>35 MPN/100 mL)
Enterococcus (MPN/100 mL)
SSM threshold (>104 MPN/100 mL)


2011-2012 Ocean Beach at Lincoln Way (Sta. 19)
1000
100
10
1
0.1
0.01
7/1/11
7/31/11
8/30/11
9/29/11
10/29/11
11/28/11
12/28/11
1/27/12
2/26/12
3/27/12
4/26/12
5/26/12
6/25/12
Rainfall (inches)
Ocean Plan 30-day Geometric Mean (MPN/100 mL)
Enterococcus (MPN/100 mL)
Geometric Mean threshold (>35 MPN/100 mL)
SSM threshold (>104 MPN/100 mL)
Lincoln Structure CSD


2012-2013 Ocean Beach at Lincoln Way (Sta. 19)
100000
10000
1000
100
10
1
0.1
0.01
7/1/12
7/31/12
8/30/12
9/29/12
10/29/12
11/28/12
12/28/12
1/27/13
2/26/13
3/28/13
4/27/13
5/27/13
6/26/13
Rainfall (inches)
Ocean Plan 30-day Geometric Mean (MPN/100 mL)
Geometric Mean threshold (>35 MPN/100 mL)
Enterococcus (MPN/100 mL)
SSM threshold (>104 MPN/100 mL)
Lincoln Structure CSD

Technical Memorandum

To: Gregory Norby (San Francisco Public Utilities Commission)

From: Daniel W. Donahue, PE (Pre-Construction Technical Advisor, Program Management Consultant)

Date: 5/17/2019

Subject: Current Performance of the Westside Collection System During Wet Weather

The purpose of this technical memorandum is to provide the San Francisco Public Utilities Commission (SFPUC) with an overview of the current performance of the Westside collection system during wet weather and the relationship between current performance and receiving water quality.

Background of Westside Collection System

During wet weather, when flows exceed the capacity of the Oceanside Water Pollution Control Plant and Westside Pump Station, the collection system may discharge to the Pacific Ocean as a combined sewer discharge (CSD) from Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD-005, CSD-006, and CSD-007. Based on State Water Board Order No. WQ 79-16, each hydrologic section of the Westside collection system was designed for a long-term average of eight CSDs, per typical year.

Actual and Modeled Performance of the Westside Collection System

Based on wet weather monitoring data, the current CSD frequency in the Westside collection system, averaged over a 20-year period (1997-2018), is represented in Table 1. The current 20-year average of CSD frequency is below the long-term average of eight CSDs, per typical year.

Table 1 Combined Sewer Discharge Frequency[1]

CSD-001	CSD-002	CSD-003	CSD-005	CSD-006	CSD-007
5.6	5.5	5.3	1.5	0.3	4.6

Based on the SFPUC's Hydrologic and Hydraulic (H&H) Model,[2] the frequency and volume of CSDs in the Westside collection system in a typical year is represented in Table 2.

[1] Monitoring data is not available for CSD-004 because the SFPUC's Oceanside NPDES permit has not historically required monitoring of CSD-004.

[2] The H&H Model simulates the performance of the combined sewer system and consists of two linked components: (i) the urban rainfall-runoff hydrologic model and (ii) the hydraulic network conveyance model. The hydrologic model represents the surface rainfall to runoff transformation through hydrologic parameters assigned to sub-catchments. The hydraulic model includes conveyance facilities such as sewers, manholes, pumps, weirs, gates, orifices, transport/storage boxes, and CSD structures. The model can simulate a range of wet weather scenarios, including a typical year rainfall dataset that represents an average annual rainfall year, historical storm events, and the SFPUC's level of service design storm.

Table 2: Westside Collection System CSD Volume and Frequency in a Typical Year

Discharge Location		Total Annual Volume (MG) Typical Year	No. of Events Typical Year
Ocean Beach	**001 – Lake Merced**	10.6	8
	002 – Vicente	55.4	7
	003 – Lincoln Way	115.9	7
Mile Rock	**004A – Mile Rock**	14.4	6
Seacliff	**005 – Seacliff #1**	0.0003	1
	006 – Seacliff (6' Brick)	0.0041	1
	007 – Seacliff #2	0.0125	2

The current modeled frequency of CSDs in a typical year for each hydrologic segment of the Westside collection system is within the long-term average of eight CSDs, per typical year, identified in State Water Board Order No. WQ 79-16.

Relationship Between CSDs and Receiving Water Quality

To understand the relationship between CSDs and receiving water quality, a three-dimensional Receiving Water Quality Model of San Francisco Bay was developed and calibrated. A three-dimensional model is required because CSDs are composed of freshwater, which is less dense than saltwater, meaning that the discharges are buoyant and tend to float at the surface. The model can be used to estimate concentrations of bacteria (i.e., Enterococcus) resulting from CSDs over a period of time. These concentrations can be summarized in a number of different ways including concentrations versus time at specific locations and maps of bacteria concentrations at specific time points. The duration that the enterococcus bacteria concentrations are greater than 104 MPN/100mL after a CSD is one potential metric for understanding the relationship between CSDs and receiving water quality. For purposes of this analysis, the focus for the Westside basin is the receiving waters along Ocean Beach and Seacliff, as shown in Figure 1.

Figure 1: Westside Receiving Waters and CSD Structures

There are six storm events that result in at least one CSD from the Westside collection system in a typical year. These six storm events were simulated as part of the Receiving Water Quality Model.

Examining the metric of enterococcus bacteria concentrations, the Receiving Water Quality Model indicates that based on the current performance of the Westside collection system there is a potential for an annual duration of 7 hours (0.3 day) in the receiving waters offshore Seacliff and 48 hours (2 days) in the receiving waters offshore Ocean Beach where concentrations of enterococcus bacteria could be over 104 MPN/100mL in a typical year. Table 3 summarizes the storm events and durations based on the Receiving Water Quality Model where enterococcus bacteria may be greater than 104 MPN/100mL.

Table 3: Modeled Westside Receiving Water Duration Enterococcus >104 MPN/100mL in a Typical Year

Receiving Water	Duration (hours)						
	Storm 1	Storm 2	Storm 3	Storm 4	Storm 5	Storm 6	Total
Seacliff	*ND*	4	3	*ND*	*ND*	*ND*	**7**
Ocean Beach	15	15	2	7	4	5	**48**

ND = No Discharge

The Receiving Water Quality Model indicates that based on current performance of the Westside collection system the enterococcus bacteria concentrations in the receiving waters would be below 104 MPN/100mL for over 99% of the typical year (i.e., 2 days per typical year). Further, the approximately 2 days occur in the winter months (i.e., between October and February).

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December 21, 2011

Mr. Derek Whitworth
San Francisco Bay Regional Water Quality Control Board
1515 Clay St., Suite 1400
Oakland, CA 94612

Subject: Submission of Oceanside Special Study, "Sensitive Areas Feasibility Report for Overflows"

Dear Mr. Whitworth:

Attached please find a Special Study, "Sensitive Areas Feasibility Report for Overflows," submitted by the City and County of San Francisco Public Utilities Commission (San Francisco). San Francisco submits this report pursuant to the requirements of Section VI.C.7 (page 28) of its Oceanside NPDES Permit (Order No. R2-2009-0062).

If you have any questions, please do not hesitate to contact my staff member, Laura Pagano, at (415) 554-3109 (lpagano@sfwater.org).

Very truly yours,

Tommy T. Moala
SFPUC Assistant General Manager
Wastewater Enterprise

LP/TTM/hc

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

Special Study: Sensitive Areas Feasibility Report for Overflows

Oceanside Water Pollution Control Plant

NPDES Permit No. R2-2009-0062

December 2011

Executive Summary

The NPDES discharge permit (Order No. R2-2009-0062, VI.C.7, page 28) for San Francisco's Oceanside Water Pollution Control Plant (OSP) and Westside wet weather facilities requires an assessment of techniques to eliminate or relocate combined sewer discharges (CSDs) from sensitive areas as well as a discussion of the level of treatment for any remaining CSDs necessary to meet water quality standards (WQS).

The sensitive areas which exist under the Oceanside permit are Ocean, China, and Baker Beaches, with the sensitive use being recreational contact. San Francisco operates wet weather facilities to minimize CSDs to these sensitive areas, and also has assessed and implemented techniques to reduce the frequency and volume of shoreline discharges to sensitive areas. In this report, we summarize these activities.

San Francisco's facilities and operations comply with the Presumption Approach alternative for implementing the national Combined Sewer Overflow (CSO) Policy[1] by treating combined sewage to the equivalent of wet-weather primary treatment. San Francisco has no untreated overflows from the system.

As specified by the OSP permit requirement, San Francisco has reviewed the latest disinfection technologies for the treatment of CSDs and summarized the information in this report. Based on this evaluation, San Francisco concluded that disinfection with chlorine followed by dechlorination remains technically infeasible at this time given current barriers to ensuring an accurate chlorine dosage, sufficient chlorine contact time, and complete dechlorination during real-time flow fluctuations that exist during storm conditions. Furthermore, the equipment and associated chemicals which would necessarily be stored in numerous remote locations could potentially harm the environment and public safety.

Following seven years of planning and public outreach, San Francisco is implementing a multi-year, multi-billion dollar Sewer System Improvement Plan (SSIP) intended to rehabilitate and improve our sewer system to maintain San Francisco's goals for regulatory permit compliance, system reliability and functionality, and sustainable sewer system operations. Through the SSIP, collection system project alternatives will be evaluated for both grey and green infrastructure opportunities appropriate for protection of beneficial uses, including water contact recreation.

While the SSIP planning and implementation effort is underway, San Francisco is implementing the following two strategies to minimize CSDs to all areas of the City, including sensitive areas:

(1) Continuing assessment of wet weather operations. San Francisco is studying potential real time operational improvements and control opportunities for the enhancement of wet weather operations. While current operations are effective at maintaining permit compliance, there may be additional opportunities to optimize wet weather operations to protect sensitive areas; and

(2) Green infrastructure and Low Impact Design (LID). Although progress can be challenging because many elements of LID can overlap boundaries with other jurisdictions, San Francisco has invested significantly in green infrastructure and LID. San Francisco's post construction controls program requires that specified projects incorporate LID and green infrastructure features. San Francisco has also begun using green infrastructure to reduce stormwater flows into the city's collection system. For

[1] Combined Sewer Overflow Policy, U.S. EPA, Section II.C.3, April 19, 1994, at 59 Fed. Reg. 18688.

instance, a number of green infrastructure demonstration projects have been implemented around the city, and a number of upcoming green infrastructure construction projects are anticipated, including the new headquarters for SFPUC and the Mission Bay, Treasure Island, Hunters Point Shipyard, Parkmerced and Transbay Terminal redevelopment projects. Furthermore, San Francisco has a suite of programs and policies that provide technical and financial support for stormwater management and graywater use by homeowners, community groups, builders, and other interested parties. Citywide only a small percentage of land is ideal for infiltration, however more opportunities may exist on the Westside.

San Francisco is mindful that climate change may provide additional challenges related to storm intensity and sea level rise. San Francisco remains committed, however, to protecting sensitive areas by using wet weather controls and LID/green infrastructure to reduce the total volume of CSDs to the Oceanside beaches and by examining additional grey infrastructure alternatives as the SSIP moves forward.

Table of Contents

1 Introduction

This report fulfills a NPDES permit special study requirement for the OSP and Westside wet weather facilities, owned and operated by the City and County of San Francisco. This report summarizes San Francisco's evaluations of CSD reduction strategies and describes past, current and planned future activities related to CSD reduction in the sensitive areas receiving waters of the Oceanside drainage basins.

1.1 Defining Combined Sewer Discharges (CSDs)

Throughout this document, authorized, treated combined sewer overflow discharges from the near-shore discharge structures are referred to as combined sewer discharges (CSDs). This is differentiated from untreated combined sewer overflow discharges from combined sewer systems that would be considered combined sewer overflows (CSOs).

1.2 Requirement for Sensitive Areas Consideration

The OSP permit requires that the City and County of San Francisco evaluate opportunities to minimize impact of CSDs within sensitive areas. The relevant excerpt from the OSP permit (Order No. R2-2009-0062, VI.C.7, page 28) is as follows:

> The Discharger shall submit a report, by December 31, 2011, implementing the "consideration of sensitive areas" section of the Combined Sewer Overflow Control Policy. At a minimum, the Discharger shall assess techniques (including green infrastructure and low impact development) to eliminate or relocate Combined Sewer Overflow Discharges (CSODs) from sensitive areas and discuss the level of treatment for any remaining CSODs necessary to meet water quality standards.

1.3 Location of Oceanside Sensitive Areas and CSD Outfalls

The CSO Policy defines sensitive areas as those with rare and endangered species (and their habitat), public drinking water intakes, primary contact recreation, and shellfish beds.[2] Only one of these uses applies to the area covered by the Oceanside permit: primary contact recreation. The locations where primary contact recreation occur (and thus the sensitive areas) are Ocean, China, and Baker recreational beaches.[3] CSD outfalls number 1-3 and 5-7 discharge to these recreational beaches. Outfall Number 4, Mile Rock, as described in the U.S. EPA's 1994 review of San Francisco's combined system, redirects CSDs from Baker Beach to a location at the base of a steep, essentially inaccessible area, which substantially reduces human exposure. [4]

[2] Combined Sewer Overflow Policy, U.S. EPA, Section II.C.3, April 19, 1994, at 59 Fed. Reg. 18688.

[3] "Analysis of the Adequacy of San Francisco's Combined Sewer Overflow Control Efforts" A report prepared for the U.S. EPA Region IX by The Cadmus Group, Inc., August 26, 1994.

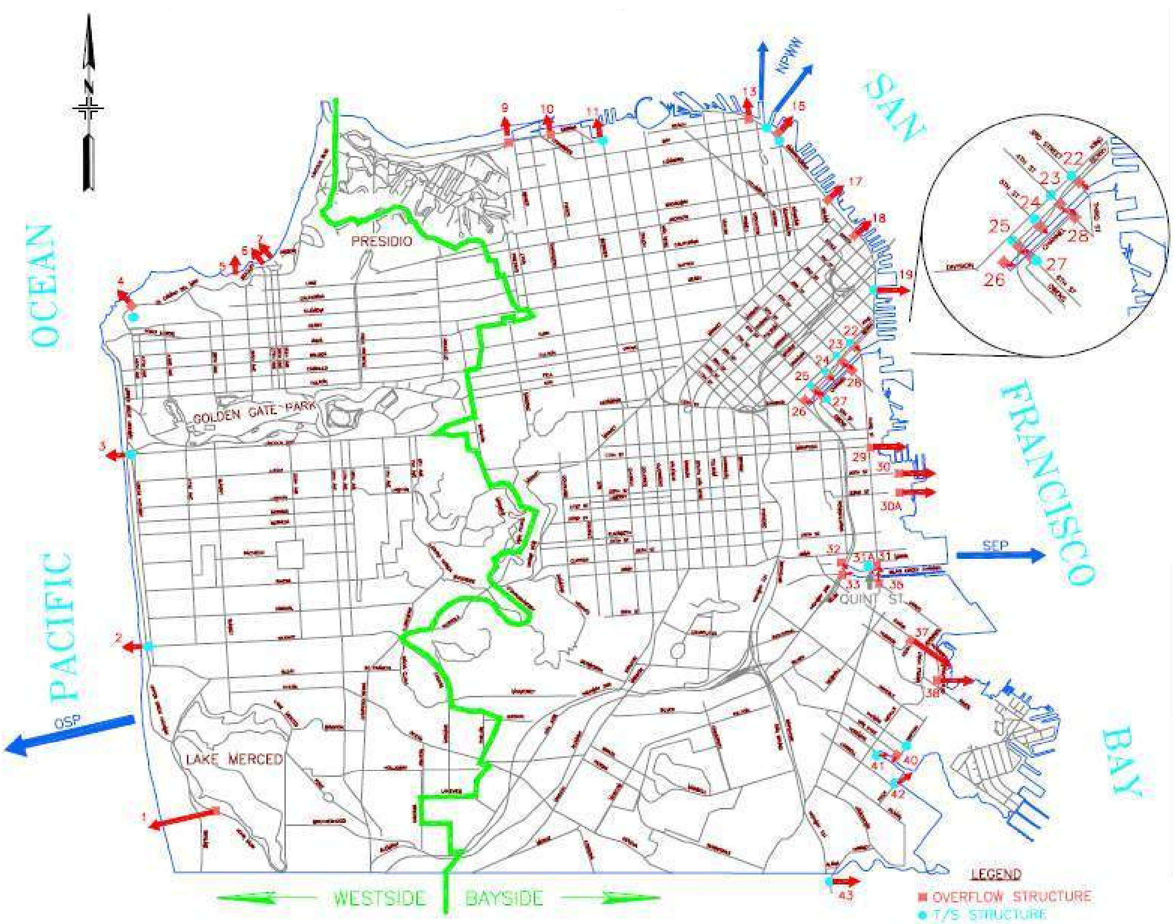
[4] "Analysis of the Adequacy of San Francisco's Combined Sewer Overflow Control Efforts" A report prepared for the U.S. EPA Region IX by The Cadmus Group, Inc., August 26, 1994.

Table **1** presents the number and name nomenclature of the Oceanside CSD outfalls as well as the corresponding neighboring beaches and associated watersheds. Figure 1 presents the locations of those Oceanside outfalls.

Table 1. Oceanside CSD Outfalls, Neighboring Sensitive Areas, and Corresponding Watershed.

No.	Name	Neighboring Sensitive Area	Corresponding Watershed Basin
1	Lake Merced	Ocean Beach	Lake Merced Basin
2	Vicente Street	Ocean Beach	Sunset Basin
3	Lincoln Way	Ocean Beach	Sunset Basin
4	Mile Rock	Does not directly discharge to a sensitive area	Sunset and Richmond Basins
5	Seacliff #1 Pump Station	China Beach	Richmond Basin
6	Seacliff	Baker Beach	Richmond Basin
7	Seacliff #2 Pump Station	Baker Beach	Richmond Basin

Figure 1 CSD Outfall Locations



2 Chronology of Efforts to Protect Oceanside Sensitive Areas

Since the 1970s, San Francisco has progressively implemented controls that have reduced raw and uncontrolled CSOs from an average of 114[5] times per year to zero untreated CSOs. This section describes the engineering analysis, constructed infrastructure, and resulting regulatory compliance and protection of Oceanside sensitive areas.

2.1 The 1978 Engineering Analysis to Eliminate Untreated CSOs

In 1976, the San Francisco Bay Regional Water Quality Control Board (RWQCB) issued San Francisco a NPDES Permit for the Oceanside facilities (RWQCB Order No. 76-23) that required construction of a system sized for only one wet weather untreated CSO per year. At that time, untreated (raw and uncontrolled) CSOs in the Oceanside system averaged 114 per year, overflowing directly through the shoreline outfalls to the receiving water.[6] In an effort to implement the 1976 permit criteria, San Francisco conducted an extensive engineering and cost-benefit analysis that evaluated infrastructure options that were expected to result in primary-treated CSDs based on long term discharges averages of 1, 4, 8, or 16 per year. San Francisco provided the results to the RWQCB in December 1978, along with a petition requesting that Order No. 76-23 be amended to establish a design standard of eight wet weather treated CSDs per year for the Oceanside facilities. The cost-benefit analysis presented the projected costs for each of the CSD scenarios, along with the estimated reductions in biochemical oxygen demand (BOD), suspended solids, and hours of overflow. The analysis also presented the costs relative to the exposure per person based on historical rainfall and flow records.

The analysis of the alternative to reduce to 1 CSD per year found that the Westside Transport/Storage (T/S) system would need to have a capacity greater than 80 million gallons (MG) (about 30 MG greater than the final built capacity of 49.3 MG) and that the OSP plant capacity would need to be expanded from the final-built wet-weather capacity of 65 million gallons per day (MGD) to a wet weather capacity of 240 MGD. In 1978, San Francisco concluded, and the RWQCB concurred, that the differences in costs between the eight overflows per year frequency being requested by San Francisco and the one overflow per year frequency that had been mandated by the NPDES permit were out of proportion to the derived benefits.

Following a comprehensive review of San Francisco’s engineering analysis, the RWQCB amended Order No. 76-23 via Order No. 79-12. The amended Order mandated that the new facilities be designed and built to reduce the nearshore discharges based on the design goal of 8 long-term average treated CSDs per year. Figure 2 presents the permitted CSD Design Criteria throughout San Francisco. In the development of these criteria, the RWQCB assigned fewer overflows to areas with more sensitive uses. For instance, an average of 10 CSDs per year is permitted in the dock area just south of the Bay Bridge, while in the shellfish harvesting area on the southeast side of San Francisco, an average of only 1 CSD per year is permitted. The RWQCB selected the 8 CSD per year criteria for the Oceanside basin based on

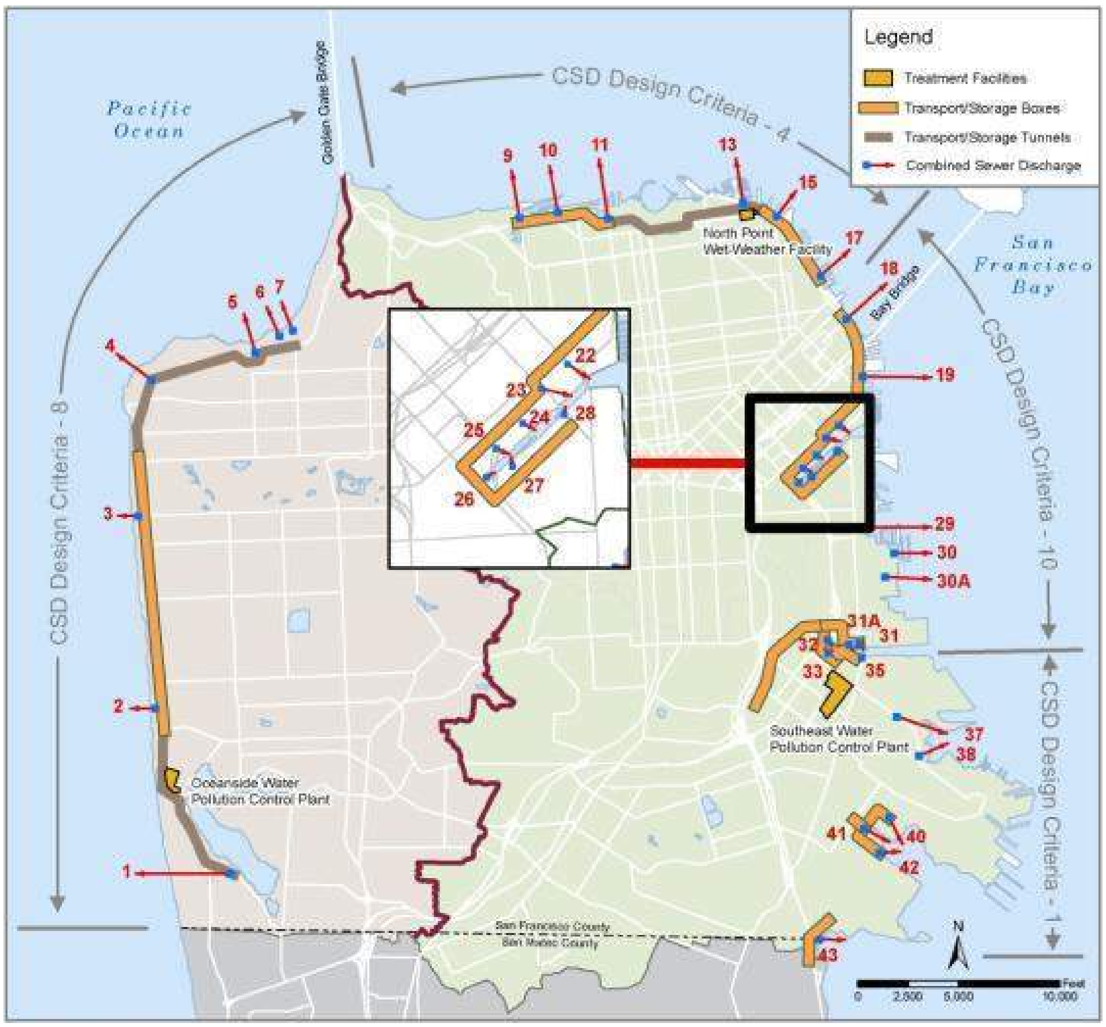
[5] Subsequent to the publication of the 1978 order, the SWRCB changed the definition of an overflow event. Under the current definition, the Westside facilities overflowed an average of 54 times per year prior to the implementation of the Westside system.

[6] From Monitoring Study to Effectively Characterize Overflow Impacts and the Efficacy of CSO Control, Annual Status Report, for Oceanside permit, October 29, 2010

recreational use, California Coastal Commission concerns regarding excessive construction in the coastal zone, and the "knee of the curve" of the cost-benefit analysis with respect to diminished pollution reduction benefits relative to increased costs. This process anticipated the adoption of requirements for development of a long term control plan (LTCP) and refinement of WQSs as required by the CSO Control Policy by fifteen years. The EPA has concluded that this process, and subsequent construction and operation of the infrastructure, provides protection to Oceanside sensitive areas:

> *"In conclusion, the City's planning efforts have historically focused on protection of beneficial uses and sensitive areas; current CSO control facilities meet the sensitive area planning requirements of the Policy"*[7]

Figure 2. CSD Design Criteria



[7] "Analysis of the Adequacy of San Francisco's Combined Sewer Overflow Control Efforts" A report prepared for the U.S. EPA Region IX by The Cadmus Group, Inc., August 26, 1994.

2.2 Completion of the Oceanside Wet Weather Control System

Following the revised RWQCB criterion of 8 annual CSDs from the Oceanside basins, San Francisco expended approximately $680 million dollars between 1976 and 1996 to construct an Oceanside control system capable of complying with the CSD criteria as well as upgrading to secondary treatment and providing a 4.5 mile long outfall which discharges to the ocean instead of the shoreline. The completed system is comprised primarily of a transport and storage system, pump stations, treatment facilities, and a large capacity outfall. Individual elements and system costs include:

- Westside Core Project (completed in 1986 at cost of $345 Million)
    - Westside Transport/Storage
    - Westside Pump Station (WPS)
    - Southwest Oceanside Outfall (SWOO)
- Oceanside Treatment Plant (OSP) (completed in 1993 at cost of $254 Million)
- Additional Transport/Storage Structures (cost of $81 Million)
    - Lake Merced Transport/Storage (completed 1993)
    - Richmond Transport/Storage Tunnel (completed 1997)

The system components are indicated in Figure 3.

The Transport/Storage (T/S) structures are an integral part of the overall design to protect the Oceanside sensitive areas from wet weather overflows. The T/S structures temporarily store and transport the mixture of storm runoff and wastewater to OSP.

The Transport/Storage structures were designed and are operated specifically to protect sensitive areas using the following methods:

- All flows from smaller storms are held in the storage/transports for later treatment at OSP
- For larger storms exceeding plant capacity, flows not receiving secondary treatment are directed to the Ocean Outfall rather than discharging at the shoreline
- Flows from the largest storms exceeding both plant and box storage capacity are directed to treatment, or the outfall, with the remainder receiving skimming and settling prior to shoreline discharge.

When flows exceed the capacity of the combined sewer system and T/S structures, the primary-equivalent treated mix of stormwater and wastewater discharges from one or more of the seven nearshore CSD discharge points (see Figure 4). Table 2 presents the capacity of each of the three T/S structures.

Consideration of reducing impact to the Oceanside sensitive areas was an integral part of the facility design. For instance, during construction of the Richmond T/S, San Francisco removed an outfall in a sensitive area on Baker Beach in the Golden Gate National Recreational Area. This beach outfall (008) was located right next to the outflow from the Lobos Creek and Presidio Water Treatment Plant.

Figure 3. Oceanside Transport/Storage, Treatment and Discharge Facilities

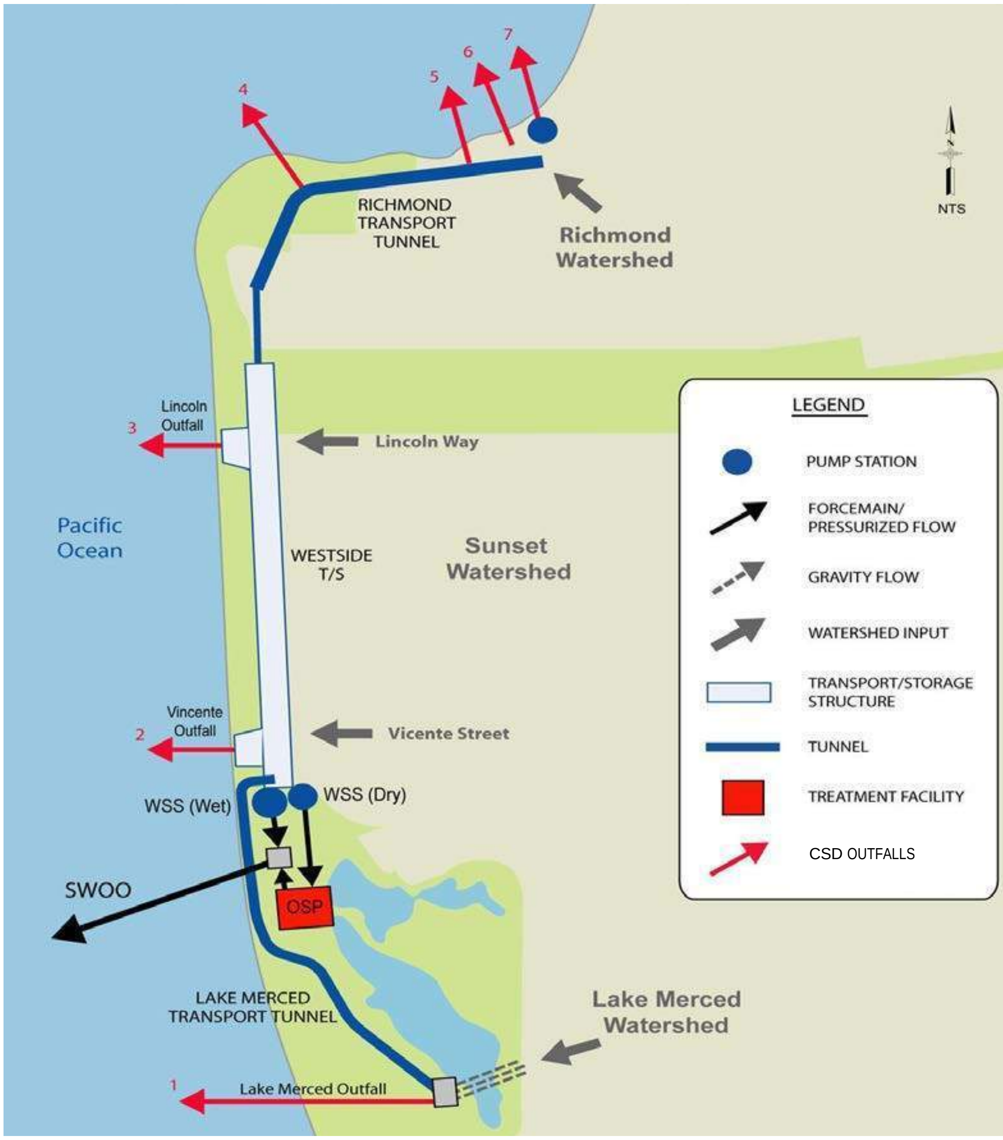


Figure 4. Combined Sewer System and Transport Storage Structures

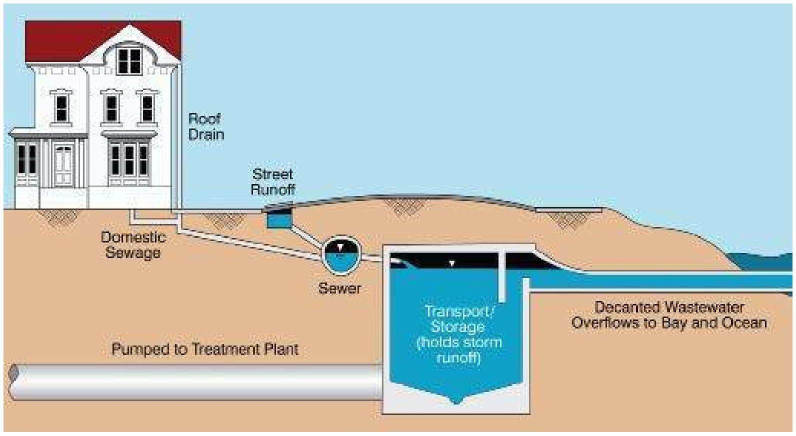


Table 2. Transport / Storage Structure Capacities on Oceanside

Structure	Transport/Storage (MG)
Richmond	12.0
Westside	49.3
Lake Merced	10.0
Total	71.3

2.3 San Francisco's Protection of Beneficial Uses Pursuant to the Ocean Plan and CSO Control Policy

San Francisco's Oceanside wet weather facilities protect beneficial uses in the Oceanside sensitive areas, pursuant to both the Ocean Plan and the national CSO control policy.

2.3.1 Sensitive Area Protection Pursuant to the Ocean Plan

Following the adoption of Order No. 79-12, the State Water Resources Control Board (SWRCB) held a public hearing to receive evidence pertaining to San Francisco's request for an exception from portions of the Ocean Plan. Based on the evidence presented, the SWRCB issued Order No. WQ 79-16 to clarify San Francisco's compliance with the Ocean Plan. In Order No. 79-16, the SWRCB noted that no exception to the Ocean Plan may be granted "if protection of ocean waters for beneficial uses will be compromised."[8]

In order to verify the protection of ocean waters for beneficial uses, the SWRCB identified three characteristics of the wet weather diversions that might adversely affect beneficial uses:

[8] Order 79-16.

- Toxicity
- Coliform
- Floatables

As further described below, the SWRCB considered the general public interest under each of these factors and concluded that San Francisco's Oceanside system protected beneficial uses.

Toxicity
The Department of Fish and Game reviewed the 1978 engineering analysis and identified three metals which may be present in wet weather diversions in concentrations in excess of that permissible in the Ocean Plan: lead, copper, and zinc. The SWRCB reviewed this potential threat and considered fish assay results, the length of CSDs, and the ability of this unique combined system to treat about 86 percent of incoming stormwater. The SWRCB concluded:

> *"In the long run, therefore, the amount of toxic substances entering the ocean from the proposed system will be substantially less than from other communities that do not have a combined system. Under these circumstances, we do not conclude that the marine habitat and sport fishing beneficial uses will be compromised because of toxic concentrations of lead, copper and zinc."*[9]

Coliform Bacteria
The SWRCB reviewed the percentage of domestic wastewater in combined wet weather flows (approximately 6%), the minimal use of beach areas during and immediately following winter storms and concluded:

> *"Given these circumstances, we do not believe that the elevated coliform concentrations for the time in question constitute a compromise of contact and non-contact recreational uses."*[10]

Floatables
The SWRCB also considered the issue of floatables, including aesthetics and likely organic and inorganic constituents. It concluded that the baffling and storage systems to be implemented in the Oceanside system would result in "substantial reduction" of both the floatables and settleable solids compared to the discharges prior to 1979 and concluded:

> *"As noted under our previous discussion regarding coliform, epidemiological data does not indicate the existence of adverse public health problems associated with the current wet weather discharges. Considering the foregoing discussion, we do not conclude that the beneficial uses under consideration will be compromised by the proposed discharges."*[11]

Consideration of Additional Public Benefits from a System that Treats Stormwater
Lastly, the SWRCB reviewed the general public interest served by the year-round treatment of combined flows:

[9] Order 79-16, Section II.B
[10] Order 79-16, Section II.B
[11] Order 79-16, Section II.B

> *"This totally combined system is unique and the only major system of its kind in the state of California. Consequently, when the discharger completes the projects and facilities discussed previously in this Order, presuming eight overflows, they will not only be treating ninty-nine percent of sanitary wastewater but will also be treating eighty-six percent of stormwater runoff. This combined treatment will substantially reduce pollutant loadings to the ocean from urban runoff, an accomplishment unique to the discharger's system. Unquestionably this serves the public interest."*[12]

Based on the above analyses, the SWRCB granted the following exception to the Ocean Plan:

> *"…Based upon the factors above, we find the public interest will be served by granting the discharger an exemption to the Ocean Plan to allow an average of eight overflows per year."*[13]

2.3.2 Sensitive Area Protection Pursuan to the National CSO Policy under the Presumption Approach

The Combined Sewer Overflow Control Policy (CSO Policy) is a national policy published by the U.S. EPA in 1994 and now incorporated into the Clean Water Act. During the development of the national CSO Policy, the framers reviewed the CSO control programs in progress around the country, including the Metropolitan Water Reclamation District in Chicago, the Milwaukee Metropolitan Sewerage District, the Metro (now King County) in Seattle and San Francisco's Clean Water Program. The review of these programs supported the development of the "presumption approach" as one of the options for CSO control. This option is called the "presumption approach" because a program that provides the defined level of control is presumed to provide adequate control to meet the CWA WQS. San Francisco's system provides the wet weather equivalent of primary treatment and has zero releases of CSOs and is therefore fully compliant with the requirements of the presumption approach of the national CSO Policy.

2.4 Oceanside Facilities Performance Protects Sensitive Areas

San Francisco's construction and subsequent operation of its wet weather facilities has provided significant benefit to the sensitive areas. Figure 5 presents the historical record of discharges (whether untreated CSOs or primary-treated CSDs) during and after construction of the Oceanside wet weather control system. The completion of the system has resulted in a marked reduction in the annual Oceanside discharges. Since system completion, the long-term annual average number of CSDs for the Oceanside has been lower than the long term average annual design criteria of 8 discharges.

In July 2011, San Francisco's Oceanside plant received NACWA's *Peak Performance Platinum Award* to recognize the facility's 100% compliance with its NPDES permits over a consecutive 15 year period.

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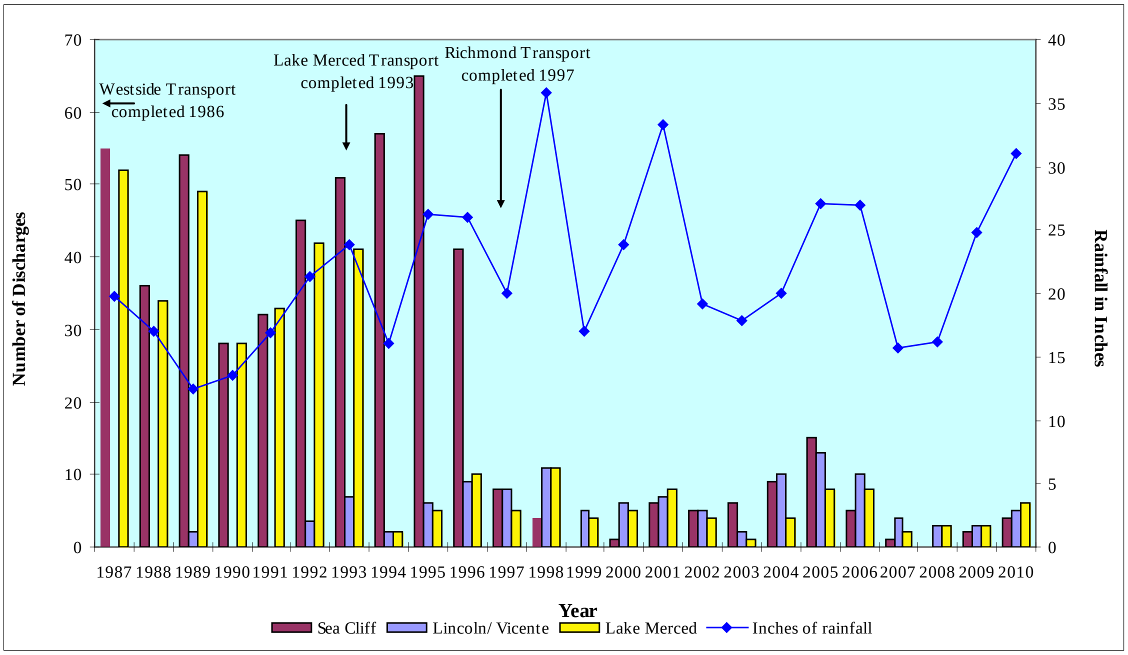
[12] Order 79-16, Section II.C
[13] Order 79-16, Section II.C

Figure 5. Annual Number of CSDs and Rainfall[14]



3 Discussion of Treatment Alternatives

For discharges to sensitive areas, the CSO Policy requires:

> "Where elimination or relocation of ***CSOs*** has been proven to not be physically possible and economically achievable, permitting authorities should require, for each subsequent permit term, ***a reassessment based on new or improved techniques… or changed circumstances***." *(emphasis added)*

In its review of the 1978 engineering analysis relative to the Ocean Plan, the SWRCB identified toxicity (metals), coliform bacteria, and floatables as possible characteristics in CSDs. San Francisco's wet weather system treats metals and floatables through secondary treatment facilities, primary treatment facilities, and the wet-weather-equivalent primary treatment system. San Francisco further minimizes heavy metals from entering the system through pretreatment and street sweeping programs. Therefore, this discussion of treatment alternatives focuses on the current state of disinfection technologies. Disinfection of CSDs was considered in the 1978

[14] From October 29, 2010 Oceanside CSO Annual Report

analysis and subsequently rejected; below San Francisco reassesses this conclusion based on updated disinfection technologies.

3.1 Updated Status of CSD Disinfection Technologies

Disinfection alternatives include chemical disinfection, ozone or ultraviolet light (UV). In 2009, San Francisco evaluated these disinfection alternatives for the OSP primary and secondary effluent.[15] That analysis is useful because the total suspended solids (TSS) of primary and secondary effluent brackets that of Oceanside CSDs. Oceanside CSDs have TSS values that range from 20 to 50 ppm, while the OSP primary effluent TSS average is 94 ppm and the secondary effluent TSS average is 11 ppm (dry weather) and 16 ppm (wet weather).

3.1.1 Chemical Disinfection

There are three disinfection technologies available: chlorination, bromination, or peracetic acid (PAA). For any of the chemical disinfectant methods, there are a number of technical challenges with respect to feasibility. These issues are summarized in Table 3.

Table 3. Feasibility Concerns for Chemical Disinfection

Area of Concern	Issue
Standby operation	• It is difficult to operate complex treatment facilities in a standby mode, compared with a POTW, for example, with full-time operation
Appropriate dosage and contact time in the transport/storage boxes	• Given the volumes in the storage boxes and the infrequency of actual discharges to the receiving waters, application of chemicals in the boxes could result in large quantities of chemicals being used even where shoreline discharges do not occur.
Adequate mixing of chemical disinfectant in the transport/storage boxes	• The large volume of the storage boxes would make adequate mixing and dispersion of chemical disinfectant difficult, which would limit its effectiveness in terms of coming into contact with and inactivating pathogens.
Security	• Chemical disinfection at multiple remote locations would require storage of equipment and hazardous chemicals in areas prone to vandalism, which presents associated environmental and public health risks.
Staff Training	• It is unrealistic to expect that even the most highly trained staff would be able to ensure adequate disinfection at multiple locations during real-time fluctuations for a system that they would infrequently use and while they are also seeking to maximize wet weather treatment elsewhere in the system.

Chlorination requires a minimum contact time and is followed by dechlorination prior to discharge.

[15] "An Evaluation of Alternative Disinfection Technologies for Treated Effluent," Technical Memorandum 701, prepared for the City and County of San Francisco 2030 Sewer System Master Plan, August 2009.

Of facilities that currently disinfect CSOs, most use chlorination.[16] Some use gaseous chlorine and supplement disinfection with dechlorination to minimize harmful residuals in the receiving waters.[17] However, concerns over the safety aspects of transporting, storing and applying gaseous chlorine have led to the almost exclusive use of liquid chlorine (sodium hypochlorite). Sodium hypochlorite can either be supplied by a manufacturer, at a concentration of 10 to 15 percent or created on-site. Purchased sodium hypochlorite is known to decay with time; a 15 percent solution may decay to 8 percent after just 120 days.[18] Such degradation in chemical quality would impact the rate at which the chemical would be applied to achieve the desired dose. This is usually handled by adjusting the chemical metering pumps.

The primary issues with chlorination in the transport/storage boxes are those noted in Table 3 above for any chemical disinfection method. San Francisco is particularly concerned about the unpredictability in actual discharge events. This impacts the feasibility of ensuring proper mixing dosage and maintaining chlorine contact time followed by complete dechlorination during real-time flow fluctuations as well as the feasibility of storing chemicals and equipment at numerous remote locations that may attract vandalism.

In addition, the use of chlorination produces disinfection by-products (DBPs), such as trihalomethanes (THMs). Also, chlorination of amines, which are present in most effluents, can produce N-chlorinated compounds that have been shown to be more toxic than their parent compounds.

Bromination is an alternative to chlorination and uses the BCDMH (1-bromo-3-chloro-5,5-dimethylhydantoin), a strong chemical disinfectant. BCDMH is currently in use to treat CSOs in Japan. When compared to sodium hypochlorite, the dose of BCDMH required to achieve comparable disinfection is about half, and disinfection is achieved in one-fifth the contact time. The use of BCDMH does, however, produce DBPs, including THMs. In addition, use of BCDMH as a disinfectant produces a chlorine and bromine residual, both of which would need to be treated with sodium bisulfite.

At the time of this analysis, there were no known installations of BCDMH disinfection systems in the United States and limited toxicity information was available comparing the aquatic toxicity of bromine to that of chlorine. One study indicated that different test organisms might be more or less sensitive to bromine as compared to chlorine, but overall, bromine seemed to be at least as toxic as chlorine.

Thus, the use of BCDMH poses little potential advantage over the use of sodium hypochlorite. It does not eliminate chemical usage in the disinfection system and it yields disinfection byproducts that appear to be at least as toxic as those resulting from the usage of sodium hypochlorite. Furthermore, as of 2009, there was only one supplier of BCDMH in the United States, which could lead to supply problems. Therefore, San Francisco staff did not evaluate BCDMH any further for the OSP primary or secondary effluents or for CSD disinfection.

PAA has long been used as a bactericide and fungicide in the food processing industry. Comprised of acetic acid and hydrogen peroxide, PAA has an oxidation capacity somewhere between that of ozone and sodium hypochlorite. PAA is considered a desirable disinfectant

[16] http://www.epa.gov/npdes/pubs/csossoRTC2004_chapter08.pdf
[17] This is based on a 2005 WERF study referenced in Technical Memorandum 701 of the Master Plan documentation.
[18] City of Akron, Ohio’s “Long Term Control Plan Review and Disinfection Investigation,” February 2005.

because it does not produce THMs or other DBPs, but is as simple to use as sodium hypochlorite. It has an additional advantage over sodium hypochlorite in that no dechlorination is necessary.

The main disadvantage of PAA is the high cost of the chemical. A 2003 study presented at WEFTEC in which Orange County Sanitation District (OCSD) compared the performance and cost of ozone, PAA, and sodium hypochlorite.[19] OCSD found that PAA did not perform significantly better than sodium hypochlorite, although it cost considerably more. In addition, it has the same technical infeasibility and reliability issues as previously stated for all three chemical disinfection alternatives in Table 3 above.

3.1.2 Ozonation

In the evaluation of ozone for OSP, ozonation was initially considered a feasible disinfection alternative for both the primary and secondary effluent. For the ozone evaluation, Ozonia and NuTech were contacted; only Ozonia responded. Ozonia indicated that the quality of OSP's primary effluent was outside of what is considered feasible to be treated by ozone, and provided a proposal only for treating the secondary OSP effluent. Further, the OSP analysis indicated that the capital costs, energy costs, and other recurring costs for the ozonation option were all much greater than the UV alternative. It is assumed that an evaluation of ozonation for CSDs would indicate this same capital and O&M cost differential.

3.1.3 Ultraviolet Light

UV systems fall into three basic categories: low pressure, low intensity; low pressure, high intensity; and medium pressure, high intensity. Of these, medium pressure, high intensity systems deliver the highest UV dosage per unit (as total dose delivered depends on the number of lamps and configuration), and are the most commonly used UV systems for larger municipalities. Low pressure, low intensity systems are generally considered applicable for systems with higher quality (e.g. filtered) effluents, and so were not considered in the OSP analysis for either the primary or secondary effluent, and therefore would also not be applicable to primary-treated CSDs.

A 2004 WERF report, "Effects of Wastewater Disinfection on Human Health" compiled several comparison studies of UV disinfection and chlorine with respect to inactivation of various pathogens.[20] Generally, that report identified UV disinfection as being more effective than chlorine disinfection, with results varying slightly depending on the individual characteristics of the wastewater.

UV disinfection lacks full scale application experience in this service (large number of widely distributed application points and very infrequent operations) and would be more expensive to construct and maintain than chemical alternatives. Further, UV is typically not an appropriate method for waters with significant variability in solids content and particle size (as in CSDs) because the solids shield the UV from getting to the microorganisms.

3.2 Treatment Alternatives Conclusions

There are 6 CSD relief points that discharge to the Oceanside sensitive areas. These points are dispersed and separate relief disinfection facilities would need to be sized for the peak flow for

[19] This is based on a 2003 WEFTEC presentation referenced in Technical Memorandum 701 of the Master Plan documentation.
[20] This study was originally referenced in Technical Memorandum 701 of the Master Plan documentation.

each relief point (taking into consideration opportunities for consolidation) as determined by the collection system model for the selected design storm or design conditions.

San Francisco has concluded that UV technologies would be technically infeasible primarily due to the concern of particulates shielding the microorganisms from treatment. With respect to chemical disinfection, chlorination treatment of discharges at the 6 relief points to sensitive areas would be both very costly and unlikely to be consistently technically feasible during real-time wet weather conditions. The use of this disinfection process at the CSD relief points would require multiple chemical storage facilities and substantial structural improvements to provide minimum contact time for the chemicals to react. Additionally, any proposed level of CSD disinfection would have to account for the locations and significant security issues associated with dispersed use of these chemicals.

Based on this analysis, San Francisco concludes that CSD disinfection continues to be infeasible at this time.

4 Minimizing CSDs Through Wet Weather Operations

In addition to implementing the nine minimum controls, completing its long term control plan under the CSO Policy, and eliminating untreated CSOs, San Francisco also seeks to minimize discharge of the CSDs through operational controls. This section describes the existing controls that are protective of sensitive areas and then discusses possible opportunities for San Francisco to further minimize CSDs by optimizing wet weather operations controls.

4.1 Existing Operational Controls Protect Sensitive Areas

In 2011, San Francisco updated its Combined Sewer System Operations and Maintenance Plan (CSS O&M Plan). This plan provides operational scenarios for operating the T/S and the pump stations in the three sub-drainage areas with the Westside Pump Station and the Oceanside Treatment Plant. The plan covers the rising of wet weather flow, peak flow and return to dry weather operation. The updated CSS O&M Plan clarifies the process and procedures used by San Francisco to operate and maintain the sewer system to ensure compliance with the Nine Minimum Controls and CSO policy.

During wet weather, San Francisco operates the treatment facilities in such a way as to reduce volume and number of CSD releases. This is accomplished by:

- Maximizing flow to wastewater treatment facilities;
- Maximizing the utilization of storage facilities;
- Maximizing pumping of decant to the SWOO.

Wet weather management utilizes rainfall measurements, weather forecasts, and storage conditions in the Richmond, Lake Merced, and Westside T/S structures with a distributed control system at the plant. Treatment at the OSP is maximized in wet weather consistent with NPDES permit requirements, as presented in Figure 6. During wet weather, the OSP provides secondary treatment to a maximum flow rate of 43 MGD and primary treatment for flows up to 65 MGD. At full capacity, the plant discharges a blended stream of 43 MGD secondary effluent and 22 MGD primary effluent. The blended primary and secondary treated wet-weather effluent is discharged to the SWOO by gravity. Combined flows exceeding 65 MGD, and up to an additional 110 MGD (total wet weather capacity of 175 MGD), receive treatment in the Westside T/S before being pumped out through the SWOO (termed the “decant”), giving the system the capacity to discharge up to 175 MGD through SWOO. Flows exceeding 175 MGD discharge from the T/S structures via the CSD outfalls. Regardless of whether they are discharged from SWOO or from the CSD outfalls, discharges from the T/S have been treated in a manner similar to primary wet weather treatment via skimming and settling (controls solids and floatable materials) provided by flow going under a baffle and over a weir.

Following a wet weather event, treatment capacity at the three T/S facilities is maximized by dewatering the T/S boxes until they are nearly empty of stormwater flow. Control decisions and actions taken by operators are based on their assessment of current and forecasted weather conditions. Operators base their decisions on a combination of data sources such as:

- Current weather reports (e.g., National Weather Service website);
- Rainfall measurements;
- Contact between Oceanside and Northshore operators; and
- Status of pump stations (levels, gate positions, pump operation, and flow).

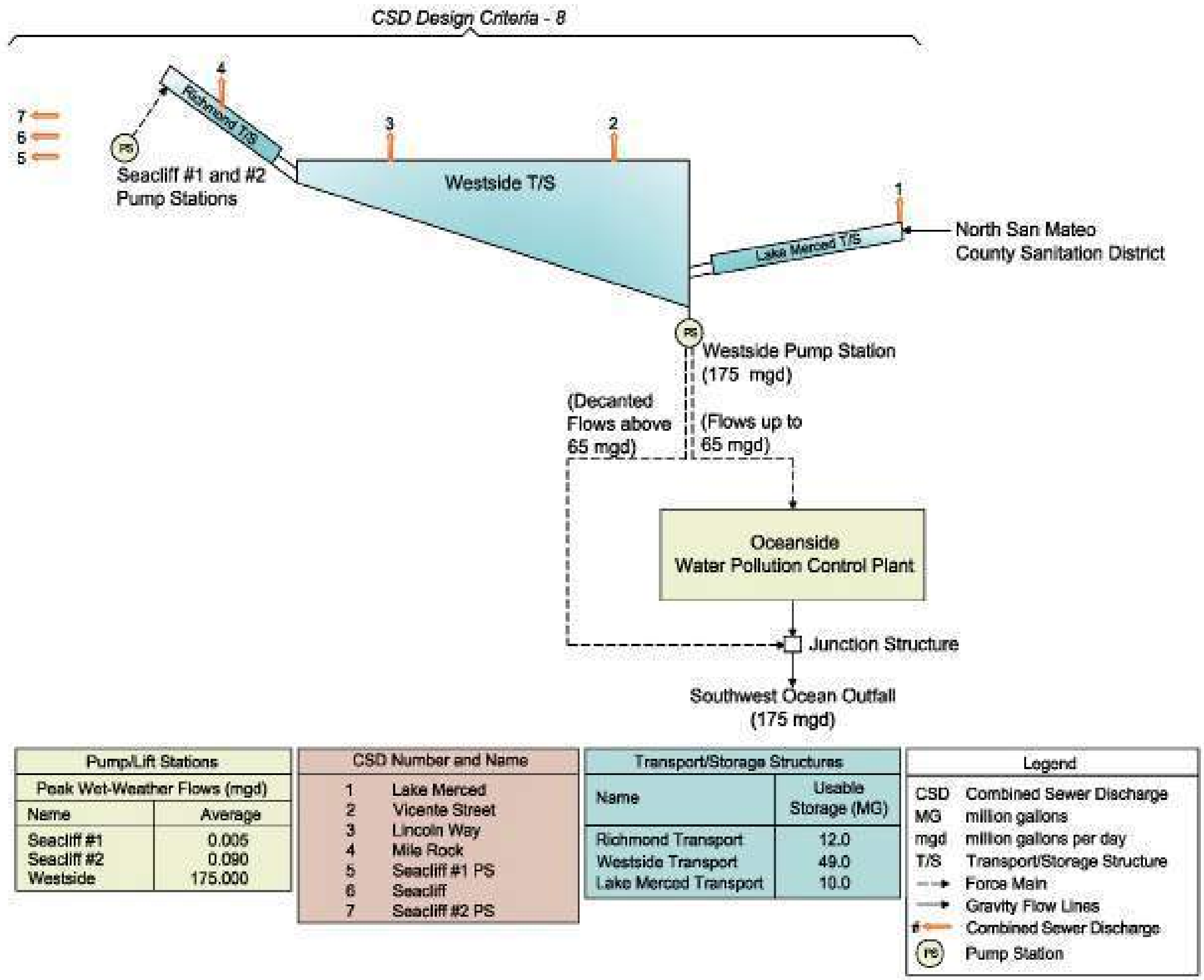
4.2 Continuing Assessment of Wet Weather Operations

While current operations maintain compliance with the permit, San Francisco seeks to continuously assess wet weather operations. In January 2011, San Francisco completed a study to identify potential real time operational improvements and control opportunities for the standardization of wet weather operations.

The study included a survey of wet weather flow management and operations including a review of operational data, documentation, and hydraulics. The study demonstrated that while current operational procedures are efficient in maximizing the flow in the collection system and to the OSP, there may be additional opportunities to further optimize storage capacity through enhanced data collection and potentially other operational control mechanisms. In order to gauge the potential for further optimization, however, more detailed system information is required. Towards this goal, efforts are underway to increase the data collection devices (flow meters and level sensors) in the collection system to gather data and better understand this potential. System optimization projects may reduce CSD volume and may result in additional pollutant removal.

Based on the initial study recommendations, San Francisco is conducting additional planning to determine the most cost-effective and appropriate options to enhance real-time data collection to support wet weather operations. It is important to ensure that changes in operations would not cause adverse effects, such as localized flooding or surcharging. Therefore, San Francisco anticipates that significant additional data and analysis is necessary to ensure that any proposed changes to operations will in fact protect neighborhoods from flooding and surcharging and will result in an improved level of capture, transport, treatment and discharge through SWOO to prevent CSDs onto the beaches.

Figure 6. Wet Weather Operational Strategy for the Oceanside Facilities



5 Minimizing CSDs Through Green Infrastructure

Green infrastructure and Low Impact Design (LID) have the potential to reduce the total volumes of stormwater flowing into the combined sewer system. Depending on the duration and intensity of the storm event, as well as the time of year, they may also reduce the volume of CSDs.

It is important to keep in mind that implementation of many LID elements require cooperation and coordination with other governing bodies outside the jurisdiction of the SFPUC (e.g., roof-drain disconnection is governed by the Department of Building Inspection). Therefore, wide-spread implementation of LID is likely to be a complicated, long-term effort.

5.1 Assessment of Quantifiable Benefits

In order to assess possible benefits of green infrastructure, San Francisco conducted a study to better understand the potential benefits of LID given San Francisco's geology and topography[21]. The project team analyzed several urban LID strategies and then selected those practices widely applicable across San Francisco for which modeling could be supported by adequate data and resources. The model evaluated the following five practices: ecoroofs, bioretention, street trees, permeable pavement, and roof-drain disconnection.

The potential for infiltration practices, such as un-lined bioretention and permeable pavement systems, was evaluated by creating an infiltration zone map of San Francisco. The infiltration zone map, developed using GIS software, represented areas that may generally be appropriate or inappropriate for infiltration practices. Delineation of the infiltration zones was based on five variables:

- slope
- depth to bedrock
- soil contamination
- soil group classification
- liquefaction risk

Throughout the city, the potential for infiltration systems was found to be limited due to:

- high bedrock
- high groundwater
- soil contamination
- unstable soils

Thus, the infiltration zone mapping showed that only a small percentage of the city would be considered ideal for infiltration. Based on those findings, the project team decided that infiltration practices would not be widely applicable throughout the city, and therefore was not included in subsequent LID modeling. While this modeling assessment was a city-wide assessment, on the Westside there are more sandy soils, rather than bedrock, and therefore there are more opportunities for infiltration. Such opportunities will be sought in green infrastructure programs for this area.

Volume Reductions. The modeling analysis reviewed the estimated volume reductions in a typical rainfall year. Modeling results (Table 4) show that implementing ecoroofs, street trees and roof disconnections is anticipated to reduce the volume of runoff entering the combined sewer system. The roof disconnection provided a positive result because the modeling assumed that flow from disconnected roofs would be kept from entering the sewer. This assumption will require further investigation to ensure that flows taken out of the sewer system do not re-enter at another location. Meanwhile the lined bioretention and permeable pavement were assumed to provide zero overall volume reduction because they were assumed to have limited temporary storage and the captured flows were assumed to drain to the sewer network within 72 hours.

Runoff Peak Flow Rate. Reductions in runoff peak flow rate are important because they indicate how LID might improve level-of-service of an existing sewer (e.g. reducing street flooding) and how LID might reduce CSDs. The LID model demonstrated that peak flow

[21] "Low Impact Development: San Francisco's Green Approach to Stormwater Management" by L. Kennedy, L. Holmes, and S. McDonald of Carollo Engineers, presented at WEFTEC 2007.

reductions may be possible for all of the LID practices modeled. Peak flow reductions were determined for design storms only, not for the typical rainfall year. The results are presented in Table 5.

Simulations showed quantifiable reductions in both the volume of stormwater entering the combined sewer system and the peak flows during wet weather events. These findings have helped San Francisco to prioritize current and future LID programs and demonstration projects.

LID analysis results thus far indicate that LID can provide some reductions to stormwater volume and peak flow. Further, the effect of LID on any particular subcatchment depends on the extent to which LID can be implemented in that subcatchment (e.g. the number of available street tree sites), as well as hydrologic characteristics of the subcatchment. However, more detailed investigations are needed to better understand the relationship between these peak flow reductions and actual decreases in CSD events or the systems hydraulic capacity needed for various design storm conditions.

Table 4. Estimated Annual Volume Reductions for a Typical Rainfall Year

LID Practice	Estimated Annual Volume Reduction
Ecoroofs	5-6 gallons/sq foot
Street Trees (if broadleaf evergreens, when 10-20 yrs of age)	1,100-1,500 gal/tree
Roof Disconnection	7-14 gallons/sq foot
Lined Bioretention (sidewalk, parking lot, streets)	TBD
Permeable Pavement (sidewalk, parking lot)	TBD

Table 5. Summary of Peak Flow Reduction Results

LID Practice	Percent Peak Reduction (%)		
	3-mo, 24-hr Design Storm	1-yr, 24-hr Design Storm	5-yr, 24-hr Design Storm
Ecoroofs	1.1 - 1.5 %	0.9 - 1.4 %	0.8 - 1.2 %
Street Trees	4.5 - 5.4 %	4.3 - 5.3 %	4.0 - 5.0 %
Roof Disconnection	2.5 - 5.1 %	2.5 - 5.1 %	2.5 - 5.1 %
Lined Bioretention	1.5%	0.6%	0.3%
Permeable Pavement	0.5%	0.6%	0.6%

5.2 Green Infrastructure Planning

San Francisco's sewer system strategic planning integrates all design elements and alternatives to optimize system performance and achieve established levels of service. Planning for the repair, replacement, operations, and management of all aspects of the system, including development of policies, strategies, procedures, and projects, optimizes the performance of the system while offering opportunities to reduce the ecological footprint of the system. The benefits of integrated watershed planning include improved long-term efficiencies associated from collaborative planning, increased focus of staff and financial resources to collaborate on priority projects and improved, site-specific solutions, and increased opportunities for community participation and leadership for long-term stewardship.

San Francisco's eight watersheds (drainage basins) are the central planning unit; of these, three drain to the Oceanside sensitive areas (Sunset Basin, Lake Merced Basin, and Richmond Basin). Sewer system issues are addressed in the context of the entire watershed, including the whole range of activities and opportunities available. For example, if it were to be shown that a section of the collection system needed additional capacity to operate efficiently, the traditional planning approach would simply require constructing larger sewers. San Francisco's integrated watershed approach requires consideration of the need to construct larger sewers together with evaluating opportunities in the watershed for reducing the quantity and flow rate of water entering the collection system by methods such as the infiltration, capture, storage, treatment, and reuse of stormwater. Seeking opportunities for sustainable facilities and operations within the wastewater infrastructure is a key component of integrated watershed management planning. Such opportunities include maximizing the capture and treatment of sewage and stormwater, reuse of stormwater and wastewater, use of green infrastructure, and pollution prevention.

In order to integrate and appropriately prioritize green and grey infrastructure in the SSIP, the SFPUC is currently developing the Urban Watershed Framework (UWF) which is a guidance document describing new procedures for planning and implementing SSIP collection system projects and programs throughout each of San Francisco's eight watersheds. The UWFtakes a triple bottom line approach to project planning and decision making. Because the environmental, social and economic costs and benefits are considered, it is anticipated that the UWF process will encourage multi-benefit projects including green infrastructure approaches that will further reduce the volume of stormwater discharged into the separate and combined sewer systems.

5.3 Current Programs and Policies Support Green Infrastructure

San Francisco supports a variety of programs and policies regarding green infrastructure throughout the city, each of which are described in this section:

- Stormwater Management Ordinance and Design Guidelines;
- Rainwater Harvesting Program;
- Better Streets Plan;
- Urban Watershed Stewardship Grant Program.

The implementation of these programs will not only change the way stormwater is managed across a patchwork of specific sites around San Francisco, but will also increase the public awareness of how the urban landscape and individual water management practices can be modified to enhance livability and protect the San Francisco Bay and Pacific Ocean aquatic environments. To the extent that these programs are carried out in the Oceanside watersheds, they will benefit the associated sensitive areas.

5.3.1 Stormwater Management Ordinance Supports Protection of Oceanside Sensitive Areas

San Francisco developed the Stormwater Management Ordinance and accompanying Stormwater Design Guidelines (Guidelines) to comply with its MS4 stormwater permit.

However, San Francisco applies these measures to the areas served by the combined sewer system as well. Projects disturbing 5,000 square feet or more of ground surface must be designed, constructed and operated in accordance with the the stormwater management design criteria listed in the Guidelines. The stormwater best management practices required by the Guidelines decrease the volume and rate of runoff and improve water quality of runoff. The Guidelines also support infiltration and onsite reuse of stormwater and identify plants that are water conserving and appropriate to San Francisco's climate. San Francisco currently has approximately 70 individual parcel projects throughout the city under review and several large scale redevelopment projects in the city that collectively cover 1,200 acres of land. One such

> **Parkmerced Redevelopment Project**
>
> *This is a planned redevelopment of a 150 acre parcel in the Lake Merced watershed which is hydraulically linked to CSD Outfall Number One (the Lake Merced Outfall). This project is currently proposing bio-swales and bioretention planters in the streets and sidewalks; streams, infiltration ponds and detention ponds in the public spaces; and permeable paving, green roofs and infiltration tanks on the private parcels. Upon completion of the Parkmerced project, all of the stormwater currently discharged into the combined system is expected to be diverted to the stormwater control features.*

project that will support protection of beneficial uses at Ocean Beach is the Parkmerced Redevelopment Project (see inset above).

5.3.2 Rainwater Harvesting Program

Several San Francisco departments (SFPUC, Department of Public Health, and Department of Building Inspection) have coordinated an increase in rainwater harvesting in San Francisco. In 2005, city staff amended the plumbing code to allow rainwater to be directed to alternative locations such as rain gardens, rain barrels, and cisterns.

In 2008, the three agencies signed a memorandum of understanding for rainwater harvesting systems to manage the review and approval of such systems.

Since 2008, San Francisco has provided grant funds for more than 640 rain barrels and 110 cisterns for use on private property through its Rainwater Harvesting Subsidy Program. These rainwater harvesting systems have created over 67,000 gallons of rainwater harvesting storage space on private properties throughout the city. San Francisco launched the fourth year of its Rainwater Harvesting Subsidy Program in October 2011. San Francisco has also provided funding and technical support for the installation of rainwater harvesting systems at 15 San

Francisco schools. Additionally, the San Francisco has installed a demonstration rainwater harvesting system at the Southeast Water Pollution Control Plant.

Complimenting these previous efforts, San Francisco plans to implement an incentive program that encourages people to disconnect their downspouts from the combined sewer system. The disconnected downspouts would be connected to infiltration LID measures (e.g., rain gardens) or rainwater harvesting cisterns. The allocated funding will reimburse up to 50% of the retrofit costs. Preliminary analysis estimates that this effort could result in downspouts being disconnected from 25% of buildings.

5.3.3 Better Streets Plan

The Better Streets Plan (BSP) creates a unified set of standards, guidelines, and implementation strategies to govern how San Francisco designs, builds, and maintains its pedestrian environment. The BSP reflects the understanding that the pedestrian environment is about much more than just transportation – that streets serve a multitude of social, recreational and ecological needs that must be considered when deciding on the most appropriate design. Through this program, San Francisco seeks to ensure that new street designs accommodate green stormwater management infrastructure. To the extent that San Francisco is able to implement this program in the three Oceanside watersheds, it may provide some reduction in peak stormwater flows and thus support the protection of beneficial uses.

5.3.4 Urban Watershed Stewardship Grant Program

San Francisco's Community Challenge Grant Program offers grants for community-based projects that help manage stormwater using green infrastructure. The grants are based on the idea that small actions by community members can add up to large benefits for San Francisco's watersheds and sewer infrastructure.

Figure 7 - 5th Ave. before Urban Watershed Stewardship Grant project

Figure 8 - 5th Ave. after Urban Watershed Stewardship Grant project

The grants support the planning, construction and maintenance of green stormwater management facilities. Projects harvest and use rainwater, remove impervious surfaces, or implement other green infrastructure like bioswales and rain gardens. In addition to managing stormwater, projects beautify neighborhoods, provide recreational opportunities, and educate residents about the city's water and wastewater systems. One example of a completed project is that on 5th Avenue which is depicted in Figure 7 and Figure 8. As is the case with other green infrastructure projects, San Francisco's city-wide programs assist with public education about the importance of proper stormwater management techniques and green infrastructure in particular.

6 Upcoming Efforts to Minimize CSDs Through Grey Infrastructure under the Sewer System Improvement Program

San Francisco is embarking on a Sewer System Improvement Program (SSIP), which is a collection of capital improvements that will meet the San Francisco Public Utilities Commission's endorsed level of service goals for regulatory permit compliance, system reliability and functionality, and sustainable operations of the San Francisco's sewer system.

6.1.1 SSIP Overview

The SSIP is the culmination of seven years of Sewer System Master Plan (SSMP) planning efforts and SSIP Commission workshops to develop system improvements that address the following system-wide challenges:

- Aging infrastructure and poor condition of existing facilities with little remaining useful life;
- Seismic deficiencies and lack of structural integrity;
- Limited operating flexibility and lack of redundancy; and
- The ongoing need to protect the environment and public health, meet regulatory challenges, and conserve resources.

During the next two years, San Francisco will be studying each of the eight watersheds within the city in the context of the UWF–conducting watershed characterizations, developing and evaluating a range of alternatives to address system challenges and to meet the following adopted levels of service:

- Provide a compliant, resilient, and flexible system that can respond to catastrophic events
- Minimize flooding
- Provide benefits to impacted communities
- Modify the system to adapt to climate change
- Achieve economic and environmental sustainability

The resulting recommended SSIP projects will reflect a cost-effective mix of system optimization, green infrastructure projects, and grey infrastructure projects.

6.1.2 Reducing CSDs Through Grey Infrastructure

With respect to the objective of reducing, eliminating or relocating CSDs that presently discharge to sensitive areas within the OSP service area, the SSIP will consider a variety of grey infrastructure solutions to determine the appropriate level of control for the protection of beneficial uses, including water contact recreation. Consideration will be given to the following:

- Further system optimization, including the possibility of raising overflow weirs;
- Increased pumping capacity at the Westside Pump station to push more flow out of the Southwest Ocean Outfall;
- Reactivate Mile Rock tunnel and divert more flow to Mile Rock outfall;
- Optimize Seacliff pump stations;
- Capture of CSD volume for subsequent high rate disinfection.

7 Summary

San Francisco has a long history of taking extensive measures to protect the sensitive areas (Baker, China, and Ocean Beaches) under its Oceanside permit. Spending approximately $680 million between 1976 and 1996, San Francisco constructed an extensive transport and storage system, pump stations, treatment facilities, and a large capacity outfall, all of which have been fully implemented. These measures have been evaluated by the EPA and found to comply with the CSO Control Policy. The State Water Resources Control Board also evaluated the Oceanside system and determined that it not only protects beneficial uses but that it "[u]nquestionably . . . serves the public interest"[22] because of the tremendous benefit it provides by treating stormwater.

San Francisco continues to protect these sensitive areas. San Francisco's SSIP will incorporate both grey and green infrastructure for meeting future system objectives, including minimizing CSD impacts to these sensitive areas. While the SSIP planning and implementation is underway, San Francisco is also implementing an operational optimization plan for wet weather controls. San Francisco's wet weather operations already protect sensitive uses, but under this program San Francisco will assess opportunities to improve existing system controls throughout a wet-weather event through additional data collection, and thereby continue to minimize CSD number and volume to sensitive areas.

In addition to the operational optimization, San Francisco has made substantial progress in developing green infrastructure / LID programs. San Francisco has implemented a number of LID/green infrastructure demonstration projects around the city, and has several upcoming construction projects that are anticipated to include green infrastructure. San Francisco also has a suite of programs and policies that provide technical and financial support for stormwater management and graywater use. To the extent feasible, San Francisco will continue to pursue these actions in the watersheds that are linked to the Oceanside beaches.

[22] Order 79-16, Section II.C

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2017-0059

APPROVING THE CLEAN WATER ACT SECTION 303(d) LIST FOR THE LOS ANGELES REGION AND THE CLEAN WATER ACT SECTION 303(d) LIST PORTION OF THE PROPOSED 2014 AND 2016 CALIFORNIA INTEGRATED REPORT

WHEREAS:

1. Section 303(d)(1) of the Clean Water Act (CWA) (33 U.S.C. § 1313(d)) requires states to regularly identify surface waters that do not meet applicable water quality standards (beneficial uses and water quality objectives) after technology-based controls have been implemented (referred to as the 303(d) List) and prioritize such surface waters for the purposes of developing total maximum daily loads (40 C.F.R. § 130.7(b)). The 303(d) List must include a description of the pollutants causing impairment and a completion date for ranking the development of a total maximum daily load (TMDL). States are required to submit their respective 303(d) Lists biennially to the United States Environmental Protection Agency (U.S. EPA) (40 C.F.R. § 130.7(d)).

2. In addition to submitting the 303(d) List, section 305(b) of the CWA requires states to report to U.S. EPA on the health of all their surface waters (referred to as the 305(b) Report). The State Water Resources Control Board (State Water Board) combines its reporting requirements under CWA sections 303(d) and 305(b) into a single "Integrated Report."

3. Only the 303(d) List requires approval by the State Water Board and U.S. EPA.

4. The process for developing and approving the 303(d) List is described in the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy):

   a. A Regional Water Quality Control Board (Regional Water Board) administers the listing process for the listing cycle applicable to the region or the State Water Board may administer the listing process for the region on behalf of a Regional Water Board.

   b. After approving the 303(d) List (region-specific lists are referred to as 303(d) lists) at a public hearing, the Regional Water Board submits the region-specific 303(d) List recommendations to the State Water Board. If the State Water Board administers the listing process on behalf of a Regional Water Board, the State Water Board consolidates that region's 303(d) List into the statewide list submitted to U.S. EPA without further consideration.

   c. The State Water Board consolidates the lists approved by the Regional Water Boards into a statewide 303(d) List.

   d. Before the State Water Board approves the statewide 303(d) List, the public is provided with notice of the proposed approval and an opportunity to submit written comment limited to those listing recommendations that are timely requested for review and the Regional Water Board listing recommendations that the State Water Board proposes to modify.

5. On behalf of the Regional Water Boards, by letter dated January 14, 2010, the State Water Board solicited water quality information and data from the public for the 2012 water quality assessment under CWA sections 303(d) and 305(b). The deadline of August 30, 2010 was specified for submittal of written comments, information, and water quality data for consideration for the Integrated Report. The State Water Board subsequently directed that, due to the volume of data received during the 2010 data solicitation period, only water quality data received through August 30, 2010 were to be evaluated for the 2012, 2014, and 2016 listing cycles.

6. The State Water Board has combined its reporting obligations under CWA sections 303(d) and 305(b) for the 2014 and 2016 listing cycles into a report titled, "2014 and 2016 California Integrated Report," which is available at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml.

7. The proposed statewide 303(d) List portion of the 2014 and 2016 California Integrated Report is a compilation of the 303(d) listing recommendations for the Regional Water Boards for San Francisco Bay, Central Coast, Los Angeles, Central Valley, Santa Ana, and San Diego.

The proposed 303(d) List for the Los Angeles Region

8. The State Water Board administered the listing process for the waters within the Los Angeles Regional Water Board's region in accordance with section 6.2 of the Listing Policy.

   a. On June 9, 2017, the State Water Board provided notice to the public in the affected region of the draft staff report and proposed 303(d) listing and delisting recommendations, the hearing date, and the opportunity to comment on the proposed listing and delisting recommendations pertaining to all waterbodies within the Los Angeles Region.

   b. On October 3, 2017, after providing written responses to all written comments received during the comment period, the State Water Board held a public hearing to consider and approve the proposed 303(d) List for the Los Angeles Region. Upon approval by the State Water Board, the listing recommendations on behalf of the Los Angeles Regional Water Board are compiled into the 303(d) List portion of the 2014 and 2016 California Integrated Report and submitted to U.S. EPA without further consideration by the State Water Board.

The Statewide 2014 and 2016 303(d) List

9. On October 3, 2017, and in accordance with section 6.3 of the Listing Policy, the State Water Board held a public meeting to consider approving the 303(d) List comprised of the recommendations from the Regional Water Boards for the San Francisco Bay, Central Coast, Central Valley, and San Diego regions.

   a. The State Water Board evaluated the Regional Water Board's waterbody fact sheets for completeness and consistency with the Listing Policy.

   b. The State Water Board consolidated the approved Regional Water Boards' lists into the statewide 303(d) List portion of the 2014 and 2016 California Integrated Report.

   c. The State Water Board considered timely requests for review from interested parties of specific listing recommendations made by the Regional Water Boards consistent with Sections 6.2 and 6.3 of the Listing Policy.

   d. On June 9, 2017, the State Water Board provided the public with notice of the draft staff report and proposed 2014 and 2016 303(d) List, the opportunity to submit written comments, and the date at which the board would consider approving the 303(d) List.

   e. The State Water Board limited written comment to the State Water Board's proposed changes to the listing and delisting recommendations submitted by the Regional Water Boards and the Regional Water Board's listing and delisting recommendations that were timely requested for review.

   f. The State Water Board responded in writing to written comments submitted during the comment period.

10. The State Water Board's approval of the 303(d) List portion of the 2014 and 2016 Integrated Report does not constitute an "approval" of a "project" subject to the California Environmental Quality Act. The 303(d) List, while formally approved by resolution, constitutes recommendations to U.S. EPA of the water quality limited segments within its boundaries, and a priority ranking of such waters in accordance with the CWA. U.S. EPA conducts an independent review of the State Water Board 303(d) List and either approves or disapproves the board's recommendations. Such recommendations have no potential to result in a "direct physical change in the environment, or a reasonably foreseeable indirect physical change on the environment" (Pub. Res. Code, § 21065). The 303(d) List satisfies reporting requirements of the CWA and provides information for setting priorities for future actions.

THEREFORE, BE IT RESOLVED THAT:

The State Water Board:

1. Approves the 303(d) List on behalf of the Los Angeles Regional Board for inclusion into the 2014 and 2016 California Integrated Report.

2. Approves the 303(d) List portion of the 2014 and 2016 California Integrated Report.

3. Authorizes the Executive Director or designee to transmit the 2014 and 2016 California Integrated Report and other supporting information to U.S. EPA for approval of the 303(d) List portion of the 2014 and 2016 California Integrated Report.

CERTIFICATION

The undersigned Clerk to the Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly approved at a meeting of the State Water Resources Control Board held on October 3, 2017.

AYE:	Chair Felicia Marcus Vice Chair Steven Moore Board Member Tam M. Doduc Board Member Dorene D’Adamo Board Member Joaquin Esquivel
NAY:	None
ABSENT:	None
ABSTAIN:	None

Jeanine Townsend

Jeanine Townsend
Clerk to the Board

Staff Report

State Water Resources Control Board

2014 and 2016 California Integrated Report Clean Water Act Sections 303(d) and 305(b)

October 3, 2017

EXECUTIVE SUMMARY

The goal of the Clean Water Act (CWA) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (33 U.S.C § 1251(a)). Pursuant to Clean Water Act sections 303(d) and 305(b) (33 U.S.C. §§ 1313(d), 1315(b)), each state is required to report to the U.S. Environmental Protection Agency (U.S. EPA) on the overall quality of the waters of the United States within its state. The U.S. EPA then compiles these reports into their biennial “National Water Quality Inventory Report” to Congress. Under CWA section 303(d), states are required to review, make changes as necessary, and submit to U.S. EPA a list identifying waterbodies not meeting water quality standards and the water quality parameter (i.e., pollutant) not being met referred to as the “303(d) List”. States are required to include a priority ranking of such waters, taking into account the severity of the pollution and the uses to be made of such waters, including waters targeted for the development of total maximum daily loads (TMDLs). Under CWA section 305(b), each state is required to report biennially to the U.S. EPA on the water quality conditions of its surface waters referred to as the “305(b) Report.” States are required to submit their 303(d) Lists and 305(b) Reports every two years (the listing cycle) (40 C.F.R. § 130.7(d)). The State Water Resources Control Board (State Water Board) administers this portion of the Clean Water Act for the State of California. The U.S. EPA developed guidance to states recommending that the 305(b) Report and the 303(d) List be integrated into a single report. For California, this combined report is called the “California Integrated Report” and it satisfies both the CWA section 305(b) and section 303(d) requirements.

For the 2014 and 2016 listing cycles, the reporting processes for the 303(d) List and 305(b) Report have been combined into the proposed 2014 and 2016 California Integrated Report. Only the 303(d) List portion of the proposed 2014 and 2016 California Integrated Report requires approval by the State Water Board and U.S. EPA. The 305(b) Report portion of the California Integrated Report requires no approval by the State Water Board or U.S. EPA. The proposed 2014 and 2016 California Integrated Report is a compilation of the data and information submitted for the Regional Water Quality Control Boards (Regional Water Boards) for the San Francisco Bay (Region 2), Central Coast (Region 3), Los Angeles (Region 4), Central Valley (Region 5), Santa Ana (Region 8), and San Diego (Region 9) regions. After approval of the 303(d) List by the State Water Board, the complete California Integrated Report will be submitted to U.S. EPA, which may make changes to the 303(d) list portion of the California Integrated Report before it approves the final California 303(d) List.

The 2014 and 2016 California Integrated Report provides the recommendations of Regional Water Board and State Water Board (collectively referred to as Water Boards) staff for changes to the 2012 California Integrated Report. The State Water Board evaluated the waterbody fact sheets for completeness, consistency with the Water Quality Control Policy for Developing California’s Clean Water Act Section 303(d) List (Listing Policy), and consistency with applicable law. In accordance with the requirements contained in Section 6.2 of the Listing Policy, regions 2, 3, 5, 8, and 9 approved their respective regional 303(d) List recommendations and submitted them to the State Water Board. Region 4 conducted a complete public participation process but did not approve its Regional 303(d) List recommendations. The State Water Board is administrating the listing process for Region 4 consistent with Section 6.2 of the Listing Policy. The fact sheets and associated lines of evidence specific to the Los Angeles Region are compiled in Appendix H. The State Water Board assembled the fact sheets and consolidated the five Regional Water Board 303(d) lists into the statewide proposed 303(d) List. The proposed 303(d) List and the 305(b) Report was compiled into this 2014 and 2016 California Integrated Report.

This Staff Report provides the following information and overview of the approach utilized to develop the 2014 and 2016 California Integrated Report:

a. Data sources used,
b. Objectives, criteria, and evaluation guidelines against which data were compared,
c. Methodology for assessing the attainment of water quality standards and identifying 303(d) listings,
d. Methodology used to categorize waterbody segments according to beneficial use support for the 305(b) Report, and
e. State Water Board recommendations for the 303(d) list portion of the 2014 and 2016 California Integrated Report.

Waterbody assessments are detailed in the appendices. Appendices A through G provide assessments of waterbodies in each California Integrated Report category based on beneficial use support. Appendix I presents all the fact sheets and supporting documentation for each waterbody-pollutant combination in the 2014 and 2016 California Integrated Report. These fact sheets include a listing recommendation and at least one Line of Evidence (LOE) describing the data and information used as a basis for each proposed decision. Appendix J is the 2012 California CWA section 303(d) List of Water Quality Limited Segments. Appendix K contains the miscellaneous changes report. Appendix L provides citations for all of the references used in developing the 2014 and 2016 California Integrated Report.

Water quality data collected by internal programs and provided by outside agencies and entities during the current combined listing cycles resulted in a large quantity of information and data for assessment. A total of 23,441 new fact sheets assessing unique waterbody-pollutant combinations in Regions 2, 3, 4, 5, 8, and 9 were developed during this evaluation. These fact sheets contain 42,839 new LOEs for Regions 2, 3, 4, 5, 8, and 9 and recommended 839 new listings and 134 delistings for Regions 2, 3, 4, 5, 8, and 9 (see Table 6). Of the new listings and delistings, the State Water Board revised Regional Water Board recommendations approved by Regions 2, 3, 5, 8, and 9, to remove 1 new listing, add 7 new listings, change 6 delistings back to listings, and add 1 new delisting. With State Water Board revisions and additions, 974 new listings and 191 new delistings in Regions 2, 3, 4, 5, 8, and 9 are recommended to be added to or removed from the to the 2012 303(d) List, for a total of 4,367 waterbody-pollutant combination listings statewide on the proposed 2014 and 2016 303(d) List. Table 1 shows a summary of the State Water Board recommendations for the 2014 and 2016 section 303(d) List.

Table 1 Summary of State Water Board Recommendations for waterbody-pollutant combinations being added or removed from the **2012 303(d) List**

Region	2012 303(d) List (Categories 4a, 4b and 5)	2014 and 2016 303(d) List				
		State Water Board Recommendations		Miscellaneous Changes*		Total 303(d) Listings (Categories 4a, 4b and 5)
		New 303(d) Listings	New 303(d) Delistings	Resulting in Listings*	Resulting in Delistings*	
1	185	0	0	0	0	185
2	333	24	7	6	10	350
3	712	275	47	0	24	940
4	823	129	62	0	0	890
5	730	273	45	0	0	958
6	156	0	0	0	0	156
7	68	0	0	0	0	68
8	132	28	15	0	0	145
9	445	245	15	1	0	675
TOTALS	3,584	974	191	7	34	4,367

** Miscellaneous changes resulted in additional listings and delistings created from mapping changes such as the splitting of a waterbody into additional segments or the merging of waterbodies into one single waterbody. Original 303(d) listings are copied from old segments to new segments and then delisted from the old segment. This generates more listings and delistings that should not be included in important counts of 2014 and 2016 new listings and delistings.*

Waterbodies that were assessed were placed into one of five Integrated Report beneficial use support related categories. The placement of a waterbody into the appropriate Integrated Report Category was based on the assessment of the available water quality data. The most common core beneficial uses evaluated are aquatic life, drinking water supply, human consumption of fish, non-contact water recreation, shell fish harvesting, and water contact recreation. Table 2 shows the 2014 and 2016 California Integrated Report Categories and the number of waterbodies in each category. The 305(b) Report portion of the 2014 and 2016 California Integrated Report consists of waterbodies in Categories 1, 2, 3, and 4c.

The proposed statewide 303(d) List portion of the 2014 and 2016 California Integrated Report consists of waterbodies in Categories 4a, 4b, and 5. U.S. EPA considers only waterbodies in Category 5 to be responsive to the reporting requirement of CWA section 303(d).

Table 2 Integrated Report Category Summary and Waterbody Count

Category	Description	Waterbodies
1	At least one core beneficial use is supported and none are known to be impaired.	449
2	Insufficient information to determine beneficial use support.	783
3	There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened.	29
4	At least one beneficial use is not supported but a TMDL is not needed.	266(Total)
4a	A TMDL has been developed and approved by U.S. EPA for any waterbody-pollutant combination, and the approved implementation plan is expected to result in full attainment of the water quality standard within a reasonable, specified time frame.	215
4b	Another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified time frame.	46
4c	The non-attainment of any applicable water quality standard for the waterbody segment is the result of pollution and is not caused by a pollutant.	5
5	At least one beneficial use is not supported and a TMDL is needed.	1,096
Total		2,623

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List of Abbreviations

Basin Plan	Regional Water Quality Control Plan
BPTCP	Bay Protection and Toxic Cleanup Program
BMI	Benthic Macro Invertebrates
Cal/EPA	California Environmental Protection Agency
CalWQA	California Water Quality Assessment (database)
CCAMP	Central Coast Ambient Monitoring Program
CCC	Criteria Continuous Concentration
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CFCP	Coastal Fish Contamination Program
CFR	Code of Federal Regulations
CMC	Criteria Maximum Concentration
CSTF	Contaminated Sediment Task Force
CTR	California Toxics Rule
CWA	Clean Water Act
ºC	degrees Celsius
ºF	degrees Fahrenheit
FED	Functional Equivalent Document
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DFG	Department of Fish and Game (see CDFW)
DO	Dissolved oxygen
dw	dry weight
EDL	Elevated Data Level
ERM	Effects Range Median
FCG	Fish Contaminant Goals
HCH	Hexachlorocyclohexane
HSA	Hydrologic Sub Area
HU	Hydrologic Unit
IBI	Index of Biological Integrity
ILRP	Irrigated Lands Regulatory Program
IR	Integrated Report
kg	kilogram(s)
Listing Policy	Water Quality Control Policy for Developing California’s Clean Water Act Section 303(d) List
LOE(s)	Line of Evidence(s)
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/kg	milligrams per kilogram (parts per million)
mg/L	milligrams per liter (parts per million)
µg/g	micrograms per gram (parts per million)

µg/L	micrograms per liter (parts per billion)
MPN	Most Probable Number
MTBE	Methyl tertiary-butyl ether
MTRL	Maximum Tissue Residue Level
NAS	National Academy of Sciences
ng/g	nanograms per gram (parts per billion)
ng/L	nanograms per liter (parts per trillion)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NTU	Nephelometric Turbidity Unit
oc	organic carbon
OEHHA	Office of Environmental Health Hazard Assessment
PAH	Polynuclear aromatic hydrocarbon
PBDE	Polybrominated diphenyl ethers
PCB	Polychlorinated biphenyl
PEL	Probable Effects Level
pg/L	picograms per liter
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RBI	Relative Benthic Index
RL	Reporting Level
SFEI	San Francisco Estuary Institute
SMWP	State Mussel Watch Program
SQG	Sediment Quality Guideline
SWAMP	Surface Water Ambient Monitoring Program
TDS	Total Dissolved Solids
TIE	Toxicity Identification Evaluation
TMDL	Total Maximum Daily Load
TSMP	Toxic Substance Monitoring Program
TSS	Total Suspended Solids
UAA	Use Attainability Analysis
USBR	U.S. Bureau of Reclamation
U.S. EPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WDR	Waste Discharge Requirement
WQO	Water Quality Objective
WQS	Water Quality Standard
ww	wet weight

I. Introduction

The CWA gives states the primary responsibility for protecting and restoring surface water quality. Under the CWA, states that administer the CWA must review, make necessary changes to, and submit the CWA section 303(d) List to the U.S. Environmental Protection Agency (U.S. EPA). CWA section 305(b) requires each state to report biennially to U.S. EPA, on the condition of its surface water quality. The U.S. EPA guidance to the states recommends the two reports be integrated (U.S. EPA, 2005a). For California, this “Integrated Report” is called the California Integrated Report and combines the State Water Board’s section 303(d) and 305(b) reporting requirements. The purpose of this Staff Report for the 2014 and 2016 California Integrated Report is to describe the assessment process, provide a report of surface water quality for the waterbody segments assessed as required by CWA section 305(b), and provide recommendations for additions, deletions, and changes to the 303(d) list for the 2014 and 2016 listing cycles.

II. Assessment Process

The water quality assessment process to comply with CWA sections 303(d) and 305(b) began with the evaluation of data collected from the surface water quality monitoring activities in California. The monitoring information is critical to understand and protect beneficial uses of water, develop water quality standards, and determine the effect of pollution and pollution prevention programs. Determining the exceedance of water quality standards, objectives, criteria, and guidelines (protective limits) forms the basis of water quality assessment for 303(d) and 305(b). Whether or not these protective limits are exceeded determines a water segment’s ability to support its assigned beneficial uses and also determines whether or not the pollutant waterbody combination should be placed on the 303(d) List.

The underlying basis for the proposed statewide 303(d) List portion of the 2014 and 2016 California Integrated Report is the 2012 Section 303(d) List, which was approved by U.S. EPA on July 30, 2015. After the State Water Board proposed recommendations are approved by the State Water Board, the 2014 and 2016 Integrated Report will be submitted to U.S. EPA for final approval to become the California 2014 and 2016 Integrated Report. Regions 2, 3, 5, 8, and 9 approved their respective regional 303(d) List recommendations and submitted them to the State Water Board. Region 4 conducted a complete public participation process but did not approve its Regional 303(d) List recommendations. The State Water Board is administrating the listing process for Region 4 consistent with Section 6.2 of the Listing Policy[1]. Throughout the assessment process, the Water Boards followed the requirements of the Listing Policy, which was adopted by the State Water Board on September 30, 2004, and amended on February 3, 2015.

Data and Information Used for the Assessment

The State Water Board solicited public data and information from January 14, 2010, to August 30, 2010. All of the data and information submitted for Regions 2, 3, 4, 5, 8, and 9 were considered in developing the 2014 and 2016 California Integrated Report. Specifically, data and information that were reviewed included:

[1] State Water Resources Control Board, Water Quality Control Policy For Developing California’s Clean Water Act Section 303(d) List (2015), p.19, § 6.1.3.

a. 2012 California 303(d) List and its supporting data and information.
b. Applicable Surface Water Ambient Monitoring Program (SWAMP) data.
c. Irrigated Lands Regulatory Program monitoring data.
d. Municipal Separate Storm Sewer System monitoring report data.
e. Fish and shellfish advisories; beach postings, advisories, and closures; or other water quality based restrictions.
f. Reports of fish kills, cancers, lesions, or tumors.
g. U.S. EPA's Storage and Retrieval Database and other U.S. EPA databases and information sources.
h. Southern California Coastal Water Research Project data, and the San Francisco Estuary Institute's Regional Monitoring Program data;
i. Existing internal Water Board data and reports;
j. Existing and readily available water quality data and information reported by local, State, and federal agencies (including receiving water monitoring data from discharger monitoring reports), citizen monitoring groups, academic institutions, and the public;
k. Other sources of data and information that became readily available to Regional Water Board staff.

All readily available data and information (as defined by section 6.1.1 of the Listing Policy) in the administrative record were considered in the development of the 2014 and 2016 California Integrated Report. Water Board staff developed LOEs in the California Water Quality Assessment (CalWQA) database that summarized the available data and information, and used these LOEs to make 303(d) listing recommendations and overall beneficial use support ratings.

A. Data Processing and Analysis

This section provides a description of the process for development of LOEs, the contents of the LOEs, and the standards and evaluation guidelines used to evaluate the monitoring data.

Data Processing

Contents of the LOEs

LOEs contain specific information used to determine if water quality standards for a water segment-pollutant combination are being met. This specific information includes:

a. Beneficial use(s) affected.
b. Pollutant name(s) pertaining to that water segment and data.
c. Water quality objectives (WQO) found in Basin Plans and federally promulgated water quality criteria (WQC) (e.g. the California Toxics Rule (CTR)) used to assess the data. WQOs and federally promulgated WQCs are the limits or levels of water quality constituents, which are established for the reasonable protection of beneficial uses of water.
d. Evaluation guidelines used for interpretation of narrative objectives. Evaluation guidelines are numeric values, scientifically-based and peer reviewed, that have been determined to protect applicable beneficial uses.
e. Detailed information specific to that data, such as type of data, the total number of samples assessed and the total number of those samples that exceeded the WQO or WQC.
f. Spatial and temporal information that explain where and when the data were collected.
g. References.
h. Quality assurance (QA) information.

Fact Sheet
A decision fact sheet is comprised of a recommendation and the supporting LOEs for each waterbody-pollutant combination assessed. The results of the staff analysis are presented as recommendations in the form of fact sheets. Decision fact sheets are presented in Appendices H and I.

Analysis
Analysis begins when the pollutant sampling results, described in the LOE, are compared with the pollutant's water quality standards, criteria, objectives, and guidelines that were developed to protect water quality. Results of this comparison, in terms of numbers of exceedances and beneficial uses being evaluated in this comparison, are recorded in the LOE.

References Used in the Analysis
This section of the staff report outlines the references used by staff to identify beneficial uses of water, WQO or WQC, and, for interpretation of narrative WQCs, evaluation guidelines.

<u>Beneficial Uses</u>
The beneficial uses for waters of California are identified in the Regional Water Boards' Water Quality Control Plans (Basin Plans). If a beneficial use was not designated for a water segment in the Basin Plan, but it was determined that the use exists in the water segment, the water segment was assessed using the existing beneficial use of the water.

<u>WQOs/WQCs</u>
The water quality objectives and water quality criteria used in the assessments were from the following water quality control policies, Basin Plans, State Water Board Water Quality Control Plans, and applicable law:

a. Basin Plans for regions 2, 3, 4, 5, 8, and 9;
b. Statewide Water Quality Control Plans (e.g., the California Ocean Plan (2012)).
c. California Toxics Rule (40 C.F.R. § 131.38).
d. Bacteria standards at bathing beaches (Cal. Code Regs., tit. 17, § 7958).
e. Maximum Contaminant Levels to the extent applicable. Examples include:
    - Table 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of the California Code of Regulations, title 22, section 64431.
    - Table 64444-A (Organic Chemicals) of the California Code of Regulations, title 22, section 64444.
    - Tables 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of the California Code of Regulations, title 22,section 64449.

<u>Evaluation Guidelines</u>
Narrative water quality objectives were evaluated using "evaluation guidelines" as that term is used in the Listing Policy. When evaluating narrative water quality objectives or beneficial use protection, Water Board staff identified evaluation guidelines that represent standards attainment or beneficial use protection. In selecting an evaluation guideline, Water Board staff:

a. Identified the water segment, pollutants, and beneficial uses.
b. Identified the narrative water quality objectives or applicable water quality criteria.
c. Identified the appropriate interpretive evaluation guideline that potentially represented water quality objective attainment or protection of beneficial uses.

Depending on the beneficial use and narrative standard, the following Listing Policy considerations were used in the selection of evaluation guidelines:

1. Sediment Quality Guidelines for Marine, Estuarine, and Freshwater Sediments:
Sediment quality guidelines published in peer-reviewed literature or developed by state or federal agencies were used when applicable. Acceptable guidelines included selected values (e.g., effects range-median, probable effects level, probable effects concentration), and other sediment quality guidelines. Only those sediment guidelines that are predictive of sediment toxicity were used (i.e., those guidelines that have been shown in published studies to be predictive of sediment toxicity in 50 percent or more of the samples analyzed).

2. Evaluation Guidelines for Protection from the Consumption of Fish and Shellfish:
Water Board staff selected evaluation guidelines published by U.S. EPA or Office of Environmental Health and Hazard Assessment (OEHHA). Maximum Tissue Residue Levels (MTRLs) and Elevated Data Levels (EDLs) were not used to evaluate fish or shellfish tissue data.

3. Evaluation Guidelines for Protection of Aquatic Life from Bioaccumulation of Toxic Substances:
Water Board staff selected evaluation guidelines for the protection of aquatic life published by the National Academy of Science.

B. Explanation of Specific Analyses

In this section some of the analyses conducted by Water Board staff are explained in more detail in order to allow for a better understanding of how data and information were evaluated.

Sediment Matrix Analyses

Pyrethroids, Organophosphates, Fipronil, and Fipronil Metabolites

Toxicity of pyrethroids, organophosphates, fipronil, and fipronil metabolites is dependent on the amount of organic carbon in the sediment. As a result, these pollutants are organic carbon normalized (OC-normalized) using the amount of organic carbon residing in the sediment sample. The OC-normalized result for the sample is then compared with the evaluation guideline, which was taken from peer-reviewed journal articles. The equation used for OC normalization is:

$$C_{\text{oc}} = \frac{C_{\text{total}}}{f_{\text{oc}}}$$

where,
C_{oc} = OC-normalized pesticide concentration (e.g., µg/g OC)
C_{total} = Total pesticide concentration measured (usually dry weight)
f_{oc} = the fraction of organic carbon in the sample (%OC/100)

For samples that were reported as "non-detect" (ND), the method detection limit (MDL) was OC-normalized and compared against the evaluation guideline. In the event that the OC-normalized MDL was above the evaluation guideline, the ND sample was not included in the analysis because it cannot be determined if the sample is above or below the evaluation guideline. However, if the OC-normalized MDL was below the evaluation guideline, the sample was counted as non-exceeding because the ND sample is also below the evaluation guideline. For samples that were reported as "detected, not quantified" (DNQ), the reporting limit (RL) was OC-normalized before being compared against the evaluation guideline. In the event that the

OC-normalized RL was above the guideline, the sample was not included in the analysis. However, if the OC-normalized RL was below the guideline, the sample was counted as non-exceeding. This is consistent with section 6.1.5.5 of the Listing Policy.

Tissue Matrix Analyses

Composite and Individual Fish Tissue Data Treatment

Fish tissue data may have two LOEs written for the same data, one that assesses for the composite samples and another that assesses the individual fish samples that made up the composite. These LOEs were analyzed separately to make one overall listing recommendation for a given waterbody-pollutant combination. The justification for this is individual fish continually move throughout the waterbody and bioaccumulate pollutants in tissue over time. Due to the movement of fish within a waterbody, each single fish can be assessed as one sample even if they were reported as part of a composite. As a result, data in fish tissue were assessed using a situation-specific weight of evidence approach relying on the best professional judgement of Water Board staff using both the composite and individual fish analysis to make a single listing recommendation.

Fish Tissue Screening Values and Mercury Criterion

OEHHA Fish Contaminant Goal:
OEHHA developed equations to determine Fish Contaminant Goals (FCGs) for the following pollutants: chlordane, DDTs, dieldrin, methylmercury, PCBs, selenium, and toxaphene (OEHHA, 2008). These equations are developed for chemicals that are carcinogens, non-carcinogens, or are considered non-carcinogenic nutrients. The FCG equations are:

- For a carcinogen,

$$Tissue\ concentration\ (ppb) = \frac{(Risk\ Level)(kg\ BW)(1000\mu g/mg)}{[CSF\ (mg/kg/day)^{-1}](CR\ kg/day)(ED/AT)(CRF)}$$

- For a non-carcinogen,

$$Tissue\ concentration\ (ppb) = \frac{(RfD\ mg/kg\text{-}\text{----}day)(kg\ BW)(1000\mu g/mg)}{(CR\ kg/day)(CRF)}$$

- For a non-carcinogenic nutrient,

$$Tissue\ concentration\ (ppb) =$$

$$\frac{[(RfD\ mg/kg\text{-}day)(kg\ BW) - mg/day\ Background\ Dietary\ Level](1000\mu g/mg)}{(CR\ kg/day)}$$

where,
Risk Level = 1.0×10^{-6}
CSF = cancer slope factor (OEHHA, 2008; OEHHA, 2005; or U.S.EPA, 2000)
BW = Body Weight (consumer) = 70 kg
CR = consumption rate as daily amount of fish or shellfish consumed
CRF = cooking reduction factor (OEHHA uses 0.7 for organic contaminants, State Board uses 1)
ED/AT = exposure duration/averaging time (30 yr exposure/70 yr lifetime)
RfD = chemical specific reference dose (OEHHA, 2008 or U.S. EPA, 2000)

Background dietary level = 0.114 mg/day (applicable to selenium only)

Water Board staff used these equations (with modification) to calculate Fish Contaminant Goals (FCGs) for these and other contaminants in fish and shellfish tissue. The FCG equation was modified by changing the cooking reduction factor from 0.7 to one. A cooking reduction factor is a numeric value that represents the approximate amount of a contaminant that is removed from tissue by cooking. A cooking reduction factor of 1 implies that there is no net reduction in contaminant concentration from cooking. U.S. EPA guidance allows for the assumption of no contaminant loss during preparation and cooking (U.S. EPA, 2000).

Whole Organism and Fillet:
Tissue sample fractions were reported as either "whole organism" or "fish fillet." The OEHHA-modified FCGs were used for assessment of both whole organism and fish fillet data.

U.S. EPA Methylmercury Criterion:
The U.S. EPA criterion for methylmercury in tissue with a consumption rate of 32 g/day was used for assessment of methylmercury in tissue (OEHHA, 2008 and U.S. EPA, 2000). The assessed data results were primarily for mercury and not methylmercury. U.S. EPA guidance recommends that tissue be analyzed for total mercury with the assumption that most mercury in fish tissue is comprised of methylmercury (U.S. EPA, 2000). The statewide objectives for mercury adopted under State Water Board Resolution No. 2017-027 were not utilized due to the date of the adoption and final U.S. EPA approval. These objectives will be utilized in future listing cycles.

Arsenic
Inorganic arsenic is the assessed pollutant. When results were reported as total arsenic, inorganic arsenic was calculated as 10% of the total arsenic result.

Polycyclic Aromatic Hydrocarbons:
Polycyclic aromatic hydrocarbons (PAHs) were assessed by comparing a potency-weighted total concentration of PAHs with the screening value for benzo(a)pyrene. The potency-weighted concentration was calculated for each PAH by multiplying the concentration of the PAH by a toxicity equivalency factor (TEF). The TEF is the toxicity of each PAH relative to benzo(a)pyrene. The potency-weighted concentrations for all PAHs were summed to create the potency-weighted total concentration for total PAH. The potency-weighted total concentration was then compared with the screening value for benzo(a)pyrene. The equation for the potency equivalency concentration is:

$$PEC = \Sigma\,(RP * C)$$

where,

PEC = Potency equivalency concentration
RP = Relative potency for the individual PAH
C = Concentration of the individual PAH

Shellfish Tissue

Reporting limits
Reporting limits for mussel watch shellfish results were not submitted with the data results. For this dataset, a minimum level was calculated based on the method detection limit. The

minimum level is calculated as the method detection limit multiplied by 3.18 consistent with U.S. EPA guidance on assessment of detection and quantitation approaches (U.S. EPA, 2004).

Arsenic
Inorganic arsenic is the assessed pollutant. When results were reported as total arsenic, inorganic arsenic was calculated as 10% of the total arsenic result.

Water Matrix Analyses

Metals

The U.S. EPA 304(a) aquatic life criteria were calculated for the dissolved fraction of a metal in water. The dissolved fraction of the reported metal is most toxic to aquatic life, whereas the total fraction is considered in human health assessments. The data submitted for metals were sometimes reported as the total fraction and not the dissolved fraction. If the data were reported as the total fraction, then total criteria and not dissolved criteria were used for assessment. The assessment outcomes were the same whether using a total metal result or a dissolved metal result due to the use of the CTR conversion equations. In the future, metals assessment will be made for the dissolved fraction as that is the most bioavailable form of the pollutants.

Pyrethroids

Evaluation guidelines used for assessments include the UC Davis Aquatic Life Water Quality Criteria and the U.S. EPA Office of Pesticide Programs Pesticide Ecotoxicity Database.
UC Davis recommends using the dissolved concentration of the pyrethroids with the UC Davis criteria; however, UC Davis does state that the use of whole water concentrations is also valid. Pyrethroid data were reported only as whole water concentrations and so assessments are for whole water concentrations. Conversion of whole water concentration to a dissolved concentration was not possible due to lack of information needed for the conversion.

Pesticide Evaluation Guidelines for Freshwater

Evaluation guidelines were taken from previous listing cycles and studies from the U.S. EPA Office of Pesticide Program Ecotoxicity Database. Studies selected from the Ecotoxicity Database were required to meet certain parameters for use as a guideline. The parameters focused on the quality and applicability of the study included the following:

- The study was classified as a Core[2] study
- The study was in freshwater
- Chemical > 80% pure
- Endpoint linked to survival, growth, or reproduction
- Species in a family that resides in North America
- Acceptable standard or equivalent method used
- Toxicity values calculated or calculable (i.e., LC50)

[2] A Core study is defined as: "All essential information was reported and the study was performed according to recommended EPA or ASTM methodology. Minor inconsistencies with standard recommended procedures may be apparent; however, the deviations do not detract from the study's soundness or intent. Studies within this category fulfill the basic requirements of current FIFRA guidelines and are acceptable for use in a risk assessment." (U.S. EPA, 2005b).

- Controls described (i.e., solvent, negative) and response reported meets acceptability requirements

The study that met the above parameters with the lowest toxicity value was selected as the guideline. If multiple studies for the same species and endpoint were available, the geometric mean was calculated and used as the guideline.

Indicator Bacteria Assessment Approach

The 2012 U.S. EPA Criteria for Recreational Water Quality was not finalized until November 26, 2012. The bacteria lines of evidence for water contact recreation (REC-1) had already been written using the 1986 U.S. EPA Ambient Water Quality Criteria for Bacteria, which were current at the time. The U.S. EPA 2012 criteria will be used to assess data collected as part of the next solicitation period.

For CWA section 303(d) listing purposes, bacterial data were assessed against the geometric mean criteria and the single sample maximum criteria. The Beaches Environmental Assessment and Coastal Health Act of 2000 recommends that the geometric mean (geomean) be calculated as a rolling average. State Board staff assessed bacterial data collected from marine and freshwater sources against the geometric mean objective in a rolling fashion if four or more data points per a 30 day period were available. Using four or more samples allows for more of the available data to be used because most bacteria samples are collected weekly and the rolling geomean looks at the steady state bacteria level.

Clarification for AB411

Section 3.3 of the Listing Policy states: “For bacterial measurements from coastal beaches, if water quality monitoring was conducted April 1 through October 31 **only**, a four percent exceedance percentage shall be used. For bacterial measurements from inland waters, if water quality monitoring data were collected April 1 through October 31 **only**, a four percent exceedance percentage shall be used if (1) bacterial measurements are indicative of human fecal matter, and (2) there is substantial human contact in the waterbody.” (Emphasis added.)

State Water Board staff interprets this to mean that all coastal beaches with data collected for only dry weather shall be evaluated based on a four percent exceedance frequency. This also holds true for inland surface waters. Water Board staff has discretion to determine if the waterbody in question satisfies caveats one and two listed in Section 3.3 above. If data are submitted for a time period that covers the entire year, then the associated LOE should be evaluated based on either a ten percent exceedance rate or a site-specific frequency.

During the 2014 and 2016 Listing Cycle, staff made a concerted effort to indicate when waterbodies were assessed using only dry weather data. Data that were assessed with different exceedance frequencies were evaluated independently to determine accurate use support ratings. Samples were not grouped unless they were applied to the same exceedance frequency.

Clarification for Data Assessed for the Shellfish Harvesting Beneficial Use (SHELL)

For marine waterbodies with the shellfish harvesting beneficial use, the total coliform objective in the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) states: “The median total coliform density shall not exceed 70 per 100 mL, and not more than 10 percent of the samples shall exceed 230 per 100 mL.” The State Board staff has applied the median

70 MPN/100 mL objective as a rolling geomean consistent with the implementation methodology outlined in the National Shellfish Sanitation Program Guide for the Control of Molluscan Shellfish (2011). In addition, a geomean captures the bacteria information consistent with the REC-1 objectives. The 230 MPN/100 mL was applied as a single sample maximum.

The Ocean Plan does not apply to enclosed bays, harbors, estuaries, and coastal lagoons. Applicable Basin Plan objectives were used for these waterbodies. This same implementation described above was utilized for the assessment of enclosed bays, harbors, estuaries, and coastal lagoons having the SHELL beneficial use when the Basin Plan uses a median value as an objective.

Toxicity Assessments

Water samples are usually tested for toxicity with multiple test species or matrices covering vertebrates, invertebrates, and plants. For toxicity assessments, one sample is defined as being of the same matrix from the same station on the same day. Each sample tested that has at least one species with a statistically significant difference from the control would be considered to have a toxic effect and thereby an exceedance. Each sample with an exceedance is counted once even if more than one species for that sample shows a significant difference. One LOE may summarize data that contains multiple tests and species-specific results, along with a record of the specific species that showed a significant difference.

The t-test statistical comparison method was used to determine if there was a statistically significant decrease in organism response in the sample as compared to the control. With SWAMP data, the statistical evaluation was completed and the sample was given a code to indicate if the test showed a significant effect. Initially during the 2014 and 2016 California Integrated Report process, SWAMP toxicity data was counted as an exceedance if the result had the Significantly Lower (SL) result code. The SL code is defined as the result being significant compared to the negative control based on a statistical test, less than the stated alpha level, and less than the evaluation threshold. Whereas the SG code is defined as significantly different compared to the control but the sample response is higher than the threshold. In this case the response is unlikely to be biologically significant. Through discussions with the SWAMP Toxicity Work Group, Water Board staff determined, for 303(d) assessment purposes, only the SL code should be used to determine whether a sample is considered to have a toxic effect and thereby an exceedance. This approach was first employed during the 2012 Integrated Report and was continued for the 2014 and 2016 Integrated Report.

III. Development of 2014 and 2016 303(d) Listing Recommendations, Beneficial Use Support Ratings, and Integrated Report Categories

Listing recommendations and beneficial use support ratings are determined and developed in the CalWQA database. These recommendations are created by summarizing all relevant LOEs for a water segment pollutant combination and, based on the Listing Policy, determining if the number of exceedances warrants a listing. Potential sources are only identified in fact sheets when a specific source analysis has been performed as part of a TMDL or other regulatory process. Otherwise, the potential source is marked “Source Unknown.”

A. 2014 and 2016 303(d) Listing Recommendations

Federal Listing Requirements
CWA section 303(d) requires states to identify waters that do not meet, or are not expected to meet, applicable water quality standards after the application of certain technology-based controls. The section 303(d) list must include a description of the pollutants causing the violation of water quality standards and a priority ranking of the water quality limited segments, taking into account the severity of the pollution and the uses to be made of the waters (40 C.F.R. § 130.7(b)(iii)(4)). As defined in CWA and federal regulations, water quality standards include the designated uses of a water segment, the adopted water quality criteria, and the State's Antidegradation Policy (State Water Resources Control Board (Resolution No. 68-16). Under State law (Porter-Cologne Water Quality Control Act, California Water Code § 13300 et seq.), water quality standards are beneficial uses of a water segment, the established WQOs (both narrative and numeric), and the State's Antidegradation Policy. Federal regulation defines a "water quality limited segment" as "any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after application of technology-based effluent limitations required by CWA sections 301(b) or 306" (40 C.F.R. § 130.2(j)). To restore water quality, a TMDL or other planning tool must be developed for water quality limited segments on the 303(d) List. A TMDL is the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources, and natural background (40 C.F.R. § 130.2(j)).

State Listing Requirements
The Listing Policy identifies the process by which the State Water Board and Regional Water Boards comply with the listing requirements of CWA section 303(d). The objective of the Listing Policy is to establish a standardized approach for developing California's section 303(d) List with the overall goal of achieving water quality standards and maintaining beneficial uses in all of California's surface waters.

Provisions of the Listing Policy
The Listing Policy provides direction related to:

1. Definition of readily available data and information.
2. Administration of the listing process including data solicitation and fact sheet preparation.
3. Application and interpretation of chemical-specific water quality standards; bacterial water quality standards; health advisories; bioaccumulation of chemicals in aquatic life tissues; nuisance such as trash, odor, and foam; nutrients; water and sediment toxicity; adverse biological response; and degradation of aquatic life populations and communities.
4. Interpretation of narrative water quality objectives using numeric evaluation guidelines.
5. Data quality assessments including following an approved Quality Assurance Project Plan (QAPP).
6. Data quantity assessments including water segment specific information, data spatial and temporal representation, aggregation of data by reach/area, quantitation of chemical concentrations, evaluation of data consistent with the expression of water quality objectives or criteria, binomial model statistical evaluation, evaluation of bioassessment data, and evaluation of temperature data.
7. The use of a situation-specific weight of evidence approach when all other factors don't result in a listing or delisting where information suggests standards nonattainment or attainment, respectively.

California 303(d) List Structure
The Listing Policy requires that all waters that do not meet, or are not expected to meet, water quality standards be placed on the section 303(d) list. The Listing Policy describes the categories of water that shall be included on the California 303(d) List including:
(1) waters still requiring a TMDL, and (2) waters where the water quality limited segment is being addressed. Water segments in the "Water Quality Limited Segments Being Addressed" category must meet either of the following conditions:

1. A TMDL has been developed and approved by U.S. EPA and the approved implementation plan is expected to result in full attainment of the standard within a reasonable, specified time frame.
2. It has been determined that an existing regulatory program is reasonably expected to result in the attainment of the water quality standard within a reasonable, specified time frame.

For California, this means that waters in Integrated Report Categories 4a, 4b, and 5 comprise the California 303(d) List (see criteria of these categories in section III.B of this report).

Listing & Delisting Methodology
After reviewing the Regional Water Boards' assessments, State Water Board staff determined whether or not the data demonstrated that the assessed waterbody was attaining water quality standards (i.e., whether the waterbody was impaired or not impaired). The determination for each waterbody-pollutant combination along with a presentation of the data assessment and the State Water Board staff recommended changes, when applicable, are documented in a fact sheet.

For a waterbody-pollutant combination that is not already listed on the 2012 303(d) List as impaired, staff made a recommendation to either list the waterbody-pollutant combination or not list it based upon the methodology specified in the Listing Policy.

For a waterbody-pollutant combination that is already listed on the 2012 303(d) List as impaired, staff made a recommendation to either keep the waterbody-pollutant combination on the list or delist it based upon the methodology specified in the Listing Policy.

Staff recommends listing or not delisting a water-body pollutant combination if adequate data exist to show that any of the following statements were true:

1. Numeric data exceed the numeric objective or evaluation guideline more than the prescribed number of times. The number of times varies by the number of samples and is based on a binomial distribution as described in the Listing Policy. See Sections 3.1, 3.2, 3.3, 3.5, 3.6, 4.1, 4.2, 4.3, 4.5, and 4.6 of the Listing Policy for more information.
2. A health advisory against the consumption of edible resident organisms or a shellfish harvest ban has been issued. See Section 3.4 of the Listing Policy for more information.
3. Nuisance conditions exist for odor, taste, excessive algae growth, foam, turbidity, oil, trash, litter, and color when compared to reference conditions. See Section 3.7 of the Listing Policy for more information.
4. Adverse biological response is measured in resident individuals as compared to referenced conditions and the impacts are associated with water or sediment concentrations of pollutants. See Section 3.8 of the Listing Policy for more information.
5. Significant degradation of biological populations and/or communities is exhibited as compared to reference sites. See Section 3.9 of the Listing Policy for more information.

6. A trend of declining water quality standards attainment is exhibited. See Section 3.10 of the Listing Policy for more information.
7. The weight of evidence demonstrates that a water quality standard is not attained. See Section 3.11 of the Listing Policy for more information.

Assumptions
In developing recommendations, staff assumed that:

1. The 2012 CWA section 303(d) List (Appendix J) would form the basis for the 2014 and 2016 303 (d) List submittal.
2. The provisions of the Listing Policy would direct staff recommendations.
3. Invasive species would be considered as pollutants and would be considered for inclusion on the section 303(d) list.
4. Water segment or pollutant listings are independent of the TMDLs that have been approved and are being implemented for a water segment. If a pollutant listing is removed from the list for any reason, that fact has no effect on the validity or requirements for implementing a TMDL that has been adopted and approved by U.S. EPA. Implementation of Basin Plan provisions is not affected by the section 303(d) list.
5. Provisions of Basin Plans, statewide plans, and other documents containing water quality standards were used as they are written. Judgments were not made during the list development process regarding the suitability, quality, or applicability of beneficial uses or water quality objectives.
6. Novel approaches for interpreting objectives were not used unless the approach was specifically allowed by the applicable water quality standards (e.g., analyzing wet and dry season data separately).

TMDL Scheduling
For water quality limited segments needing a TMDL or alternative planning tool, a completion schedule was developed by the Regional Water Boards (in compliance with federal law) based on the following Listing Policy provisions:

a. Water segment significance (such as importance and extent of beneficial uses, threatened and endangered species concerns, and size of water segment);
b. Degree that water quality objectives are not met or beneficial uses are not attained or threatened (such as the severity of the pollution or number of pollutants/stressors of concern) [40 C.F.R. § 130.7(b)(4)];
c. Degree of impairment;
d. Potential threat to human health and the environment;
e. Water quality benefits of activities ongoing in the watershed;
f. Potential for beneficial use protection and recovery;
g. Degree of public concern;
h. Availability of funding; and
i. Availability of data and information to address the water quality problem.

The recommendation for TMDL completion is the target year for Regional Water Board adoption of the TMDL. In some circumstances, TMDLs have been adopted by Regional Water Boards in the past but the approvals from U.S. EPA are pending. In these cases, the water segment-pollutant combination will remain in the Water Quality Limited Segments category of the section 303(d) list (Category 5). For those TMDLs that have been developed and approved by U.S. EPA and the implementation plans have been approved, the water segment and pollutant was placed in the Water Quality Limited Segments Being Addressed category of the section 303(d) list (Category 4).

Additions, Deletions, and Changes to the 2012 303(d) List

This Staff Report shows the proposed changes to the 2012 303(d) List. Appendices A through G provide lists of waterbodies in each Integrated Report category of beneficial use support. The rationale for the 303(d) listing/de-listing decisions for the Los Angeles region are documented in fact sheets in Appendix H. The rationale for all 303(d) listing/de-listing decisions statewide are documented in fact sheets in Appendix I. In addition to the changes discussed above and shown in the Staff Report, some waterbody segments' geographic delineations or names have been revised, as documented in the "Miscellaneous Changes" fact sheets in Appendix K. Appendix L provides citations for all of the references used in developing the 2014 and 2016 California Integrated Report.

Description of Staff Recommendations for 2014 and 2016 303(d) List:

In developing the 2014 and 2016 California Integrated Report section 303(d) List, Water Board staff reviewed and evaluated the water quality assessments and associated listing decision recommendations.

State Water Board staff reviewed the fact sheets that were prepared by the Regional Water Board staff in the CalWQA Database. These fact sheets were reviewed for consistency with the Listing Policy and to ensure the use of sound scientific judgment. State Water Board staff also evaluated statewide consistency regarding application of the Listing Policy. In addition to a general review of Regional Water Board fact sheets, there were timely requests for State Water Board review of specific 303(d) listing recommendations approved by the Regional Water Boards submitted by stakeholders consistent with Section 6.2 of the Listing Policy (see Table 3). State Water Board staff is administering the complete listing process for all the 303(d) list recommendations in Region 4.

The fact sheets in Appendix I include the added or deleted water-pollutant combinations and State Water Board staff proposed changes. These changes are also summarized below and in Table 4:

<u>San Francisco Bay Region (Region 2)</u>:

The San Francisco Bay Water Board recommended adding 24 waterbody-pollutant combinations and delisting 7 waterbody pollutant combinations from the 2012 California 303(d) List. The San Francisco Bay Water Board also re-segmented many of their waterbodies that resulted in several changes in scope of listings and delistings. State Water Board staff did not make changes to the San Francisco Water Board 303(d) List.

<u>Central Coast Region (Region 3)</u>:

The Central Coast Water Board recommended adding 275 waterbody-pollutant combinations and delisting 47 waterbody pollutant combinations from the 2012 California 303(d) List. The Central Coast Water Board also re-segmented many of their waterbodies that resulted in several changes in scope of listings and delistings. State Water Board staff did not make changes to the Central Coast Water Board 2014 303(d) list.

<u>State Water Board for the Los Angeles Region (Region 4)</u>:

The State Water Board recommends adding 129 waterbody-pollutant combinations to, and delisting 62 waterbody pollutant combinations from, the 2012 California 303(d) List. The fact sheets and associated lines of evidence for the decisions are located in Appendix H. For changes made to the State Water Board's proposed draft 303(d) list for the Los Angeles Region as a result of public comments submitted to the State Water Board, please see Table 5 below.

Central Valley Region (Region 5):
The Central Valley Water Board recommended adding 269 waterbody-pollutant combinations and delisting 45 waterbody pollutant combinations from the 2012 California 303(d) List. State Water Board staff recommends making the following changes to the Central Valley Water Board 2014 303(d) List:

Multiple Waterbodies: Metals are incorporated into the definition of toxicants within the Listing Policy. Assessment of toxicants requires the use of Section 3.1. This change is necessary to ensure consistent statewide application of the Listing Policy. State Water Board staff reassessed the following waterbodies using Section 3.1 of the Listing Policy, which resulted in the following new listings:

1. Kentucky Creek (Nevada County) – Iron
2. Oregon Creek (Yuba and Sierra counties) – Iron
3. Scotchman Creek (Nevada County) – Iron
4. Spring Creek (Nevada County) – Iron
5. Yuba River, South Fork (Spaulding Reservoir to Englebright Reservoir) – Iron

Indicator Bacteria Listings in Stanislaus National Forest: State Water Board staff received two requests to review five listing recommendations approved by the Regional Water Board. State Water Board staff reviewed and reassessed the data and information used to support the listing recommendations and found that the data submitted does indicate impairment exists in four of the five waterbodies. However, the data submitted for Jawbone Creek, unnamed tributary (Tuolumne County), indicates that there is insufficient information to make a listing recommendation but that the impairment may be probable. Consequently, State Water Board staff recommends the following listing recommendations be marked as Do Not List based on insufficient information due to lack of samples, but the evidence does indicate that impairment may be probable (Category 3):

1. Jawbone Creek, unnamed tributary (Tuolumne County)

Santa Ana Region (Region 8):
The Santa Ana Water Board recommended adding 28 new waterbody-pollutant combinations and delisting 18 waterbody-pollutant combinations on the 2012 303(d) List. State Water Board staff recommends the following changes to the Santa Ana Water Board 2014 303(d) List:

Chino Creek Reach 1B (Mill Creek confl to start of concrete lined channel): State Water Board staff determined that is was inappropriate to delist this waterbody for chemical oxygen demand impairment without analyzing more recent data that supports the Regional Water Board staff assertion that the closing of the sewage treatment plant has changed the environment such that beneficial uses are no longer impaired. Therefore, State Water Board staff recommends maintaining this Listing until more recent data can be assessed.

Santa Ana River, Reach 3: State Water Board staff determined that the Regional Water Board staff recommendation for delisting the following waterbody-pollutant combinations were inappropriate and recommends keeping them on the 303(d) List based on the conversion equations promulgated within the California Toxics Rule:

1. Santa Ana River, Reach 3 – Copper
2. Santa Ana River, Reach 3 – Lead

San Diego (Region 9):
The San Diego Water Board recommended adding 243 new waterbody-pollutant combinations and delisting 17 waterbody-pollutant combinations on the 2012 303(d) List. State Water Board staff recommends the following changes to the San Diego Water Board 2014 303(d) list:

Prima Deshecha Creek: State Water Board staff determined that Section 3.1 of the Listing Policy was the appropriate assessment methodology for Selenium. This assessment resulted in the following new listing for this waterbody-pollutant combination:

1. Prima Deshecha Creek – Selenium

San Diego River (Lower): State Water Board staff determined that the MUN beneficial use does not apply to this waterbody. Manganese was re-assessed for support of aquatic life beneficial uses and State Water Board staff found that the waterbody should be delisted.

San Vicente Reservoir: State Water Board staff determined that is was inappropriate to delist this waterbody for Color, Nitrogen, and pH impairments without analyzing more recent data that supports the Regional Water Board staff assertion that the presence of the invasive Species Dreissenid “quagga” mussels has resulted in the removal of nutrients and any related impairments. Therefore, State Water Board staff recommends maintaining this Listing until more recent data can be assessed.

Sandia Creek: State Water Board staff determined that the use of Section 3.1 of the Listing Policy was appropriate for assessment of Aluminum. The assessment resulted in a new listing.

Table 3 Specific Regional 303(d) Listing Recommendations Timely Requested for State Water Board Review

Region	Water Body	Pollutant	Regional Water Board Decision
2	Guadalupe Slough	Toxicity	List
5	Jawbone Creek (unnamed tributary)	Indicator Bacteria	List
5	Bull Meadow Creek	Indicator Bacteria	List
5	Rose Creek	Indicator Bacteria	List
5	Bell Creek	Indicator Bacteria	List
5	Niagara Creek	Indicator Bacteria	List
8	Anaheim Bay	Toxicity	List
8	Bolsa Bay Marsh	Toxicity	List
8	Bolsa Chica Ecological Reserve	Toxicity	List
8	Bonita Creek	Toxicity	List
8	Huntington Harbor	Toxicity	List
8	Newport Bay, Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido Channel to east end of H-J Morrings)	Toxicity	Do Not Delist
8	Newport Bay, Upper (Ecological Reserve)	Toxicity	Do Not Delist
8	Peters Canyon Channel	Toxicity	List
8	Rhine Channel	Toxicity	List
8	San Diego Creek Reach 1	Toxicity	List
8	San Diego Creek Reach 2	Toxicity	Do Not Delist (being addressed with a U.S. EPA approved TMDL)
8	Santiago Creek, Reach 4	Toxicity	List
8	Serrano Creek	Toxicity	List
8	Silverado Creek	Toxicity	List
8	Talbert Channel (Orange County)	Toxicity	List
8	Bonita Creek	Toxicity	List
8	San Diego Creek Reach 1	Benthic Community Effects	List
8	Serrano Creek	Benthic Community Effects	List
8	San Diego Creek Reach 1	DDT	List (being addressed with a U.S. EPA approved TMDL)
8	Seal Beach	Indicator Bacteria	Do Not Delist
8	Rhine Channel	Zinc	List
8	Rhine Channel	Lead	List
8	Newport Bay, Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido Channel to east end of H-J Moorings)	Copper	Do Not Delist
8	Newport Bay, Upper (Ecological Reserve)	Copper	Do Not Delist

Region	Water Body	Pollutant	Regional Water Board Decision
9	Agua Hedionda Lagoon	Toxicity	List

Table 4 Summary of State Water Board Staff Recommended Changes to Regional Water Board 303(d) lists

Region	Water Body	Pollutant	Regional Water Board Decision	State Water Board Recommendation
5	Kentucky Creek (Nevada County)	Iron	Do Not List	List
5	Oregon Creek (Yuba and Sierra counties)	Iron	Do Not List	List
5	Scotchman Creek (Nevada County)	Iron	Do Not List	List
5	Spring Creek (Nevada County)	Iron	Do Not List	List
5	Yuba River, South Fork (Spaulding Reservoir to Englebright Reservoir)	Iron	Do Not List	List
5	Jawbone Creek, unnamed tributary (Tuolumne County)	Indicator Bacteria	List	Do Not List
8	Chino Creek Reach 1B (Mill Creek confl to start of concrete lined channel:	Chemical Oxygen Demand	Delist	List
8	Santa Ana River, Reach 3	Copper	Delist	Do Not Delist
8	Santa Ana River, Reach 3	Lead	Delist	Do Not Delist
9	Prima Deshecha Creek	Selenium	Do Not List	List
9	San Diego River (Lower)	Manganese	List	Delist
9	San Vicente Reservoir	Nitrogen	Delist	List
9	San Vicente Reservoir	pH	Delist	List
9	Sandia Creek	Aluminum	Do Not List	List

The total State Water Board staff recommendations for the 2014 and 2016 303(d) List are summarized in Table 6. The last column includes the staff recommendation for the total 2014 and 2016 303(d) list including both the proposed and miscellaneous changes that were made for corrections.

Table 5 Summary of Changes to the Los Angeles Regional 303(d) list

Water Body	Pollutant	Original Recommendation	Revised Recommendation
Alhambra Wash	Benthic Community Effects	List	Do Not List
Alondra Park Lake	PCBs (Polychlorinated biphenyls)	List	Do Not List
Arroyo Seco Reach 1 (LA River to Holly Ave.)	Benthic Community Effects	List	Delist
Arroyo Seco Reach 2 (West Holly Ave to Devils Gate Dam)	Benthic Community Effects	List	Retired (data moved to Reach 1)
Ballona Creek Wetlands	Hydromodification	List	Delist
Calleguas Creek Reach 12 (was Conejo Creek/Arroyo Conejo North Fork on 1998 303d list)	Malathion	List	Retired (data moved to Reach 10)
Calleguas Creek Reach 12 (was Conejo Creek/Arroyo Conejo North Fork on 1998 303d list)	Chlorpyrifos	List	Retired (data moved to Reach 10)
Calleguas Creek Reach 12 (was Conejo Creek/Arroyo Conejo North Fork on 1998 303d list)	Diazinon	List	Retired (data moved to Reach 10)
Calleguas Creek Reach 10 (Conejo Creek (Hill Canyon)-was part of Conejo Crk Reaches 2 & 3, and lower Conejo Crk/Arroyo Conejo N Fk on 1998 303d list)	Malathion	List	Do Not Delist
Calleguas Creek Reach 10 (Conejo Creek (Hill Canyon)-was part of Conejo Crk Reaches 2 & 3, and lower Conejo Crk/Arroyo Conejo N Fk on 1998 303d list)	Chlorpyrifos	List	Do Not Delist
Calleguas Creek Reach 10 (Conejo Creek (Hill Canyon)-was part of Conejo Crk Reaches 2 & 3, and lower Conejo Crk/Arroyo Conejo N Fk on 1998 303d list)	Diazinon	List	Do Not Delist
Compton Creek	Iron	List	Do Not List

Water Body	Pollutant	Original Recommendation	Revised Recommendation
Dominguez Channel Estuary (unlined portion below Vermont Ave)	Benthic Community Effects	List (TMDL still required)	List (being addressed with a U.S. EPA approved TMDL)
Ellsworth Barranca	DDE (Dichlorodiphenyldichloroethylene)	List	Do Not List
Javon Canyon	Benthic Community Effects	List	Do Not List
Javon Canyon	Selenium	List	Do Not List
Legg Lake	Copper	List (being addressed with a U.S. EPA TMDL)	Delist
Legg Lake	Lead	List (being addressed with a U.S. EPA TMDL)	Delist
Los Angeles Harbor – Consolidated Slip	Benthic Community Effects	List (TMDL still required)	List (being addressed with a U.S. EPA Approved TMDL)
Los Angeles River Reach 4 (Sepulveda Dr. to Sepulveda Dam)	Benthic Community Effects	List	Retired (data moved to Reach 5)
Los Angeles River Reach 5 (within Sepulveda Basin)	Benthic Community Effects	N/A	List
Los Sauces Creek	Selenium	List	Do Not List
Las Virgenes Creek	Benthic Community Effects	Do Not Delist (TMDL still required)	Do Not Delist (being addressed with a U.S. EPA approved TMDL)
Madranio Canyon	Benthic Community Effects	List	Do Not List
Madranio Canyon	Copper	List	Do Not List
Madranio Canyon	Selenium	List	Do Not List
Malibu Creek	Benthic Community Effects	Do Not Delist (TMDL still required)	Do Not Delist (being addressed with a U.S. EPA approved TMDL)
Malibu Lagoon	Benthic Community Effects	Do Not Delist (TMDL still required)	Do Not Delist (being addressed with a U.S. EPA approved TMDL)
Ormond Beach Lagoon	Indicator Bacteria	Do Not List	List
Ormond Beach Welands	Nitrogen, Nitrate	N/A	Do Not List
Oxnard Drain	Nitrogen, Nitrate	N/A	List

Water Body	Pollutant	Original Recommendation	Revised Recommendation
Padre Juan Canyon	Benthic Community Effects	List	Do Not List
Padre Juan Canyon	Selenium	List	Do Not List
Peck Road Park Lake	Lead	List	Delist
Port Hueneme Harbor (Back Basins)	Cadmium	List	Do Not List
Rio De Santa Clara/Oxnard Drain No.3	Toxicity	Do Not Delist (TMDL still required)	Do Not Delist (being addressed with a U.S. EPA approved TMDL)
Santa Clara River Estuary	pH	List	Do Not List
Santa Clara River Estuary	Nitrogen, Nitrate	List	Delist
Santa Clara Reach River 3 (Freeman Diversion to A Street)	Benthic Community Effects	List	Do Not List
Santa Clara Reach River 3 (Freeman Diversion to A Street)	E.coli	List	Retired
Santa Clara Reach River 3 (Freeman Diversion to A Street)	Mercury	List	Do Not List
Santa Clara River Reach 5	Benthic Community Effects	List	Do Not List
Santa Clara River Reach 6	Benthic Community Effects	List	Do Not List
Santa Fe Dam Park Lake	Copper	List (being addressed with a U.S. EPA TMDL)	Delist
Santa Fe Dam Park Lake	Lead	List (being addressed with a U.S. EPA TMDL)	Delist
Ventura Harbor: Ventura Keys	Cadmium	List	Do Not List
Ventura Harbor: Ventura Keys	Chlordane	List	Do Not List
Ventura Harbor: Ventura Keys	DDT	List	Do Not List
Ventura River Reach 1 and 2 (Estuary to Weldon Canyon)	Temperature	List	Do Not List
Ventura River Reach 3 (Weldon Canyon to Confl. w/ Coyote Cr)	Benthic Community Effects	List	Do Not List
Ventura River Reach 4 (Coyote Creek to Camino Cielo Rd)	Benthic Community Effects	List	Do Not List
Ventura River Reach 4 (Coyote Creek to Camino Cielo Rd)	Pumping	List	Delist
Ventura River Reach 4 (Coyote Creek to Camino Cielo Rd)	Water Diversion	List	Delist

Table 6 Total 2014/2016 303(d) Listing and Delisting Recommendations

2014 and 2016 CALIFORNIA INTEGRATED REPORT Summary Totals of Regional Board Approved 303(d) Listings and Delistings and State Water Board Recommended Revisions										
Region	2012 303(d) List	2014 and 2016 303(d) List								
	Total 303(d) Listings (Categories 4a, 4b and 5)	Regional Boards Approved 303(d) Lists		State Water Board Recommendations				Miscellaneous Changes*		Total 303(d) Listings (Categories 4a, 4b and 5)
		New Listings	New Delistings	Removal of Regional Board New Listing	Removal of Regional Board New Delisting	New 303(d) Listings	New 303(d) Delistings	Resulting in Listings*	Resulting in Delistings*	
1	185	0	0	0	0	0	0	0	0	185
2	333	24	7	0	0	0	0	6	10	350
3	712	275	47	0	0	0	0	0	24	940
4	823	0	0	0	0	129	62	0	0	890
5	730	269	45	1	0	5	0	0	0	958
6	156	0	0	0	0	0	0	0	0	156
7	68	0	0	0	0	0	0	0	0	68
8	132	28	18	0	3	0	0	0	0	145
9	445	243	17	0	3	2	1	1	0	675
TOTALS	3,584	839	134	1	6	136	63	7	34	4,367

** Additional listings and delistings can be an artifact created from mapping changes such as the splitting of a waterbody into additional segments or the merging of waterbodies into one single waterbody. Original 303(d) listings are copied from old segments to new segments and then delisted from the old segment. This generates more listings and delistings that should not be included in important counts of 2014 and 2016 new listings and delistings*

B. 2014 and 2016 Integrated Report Category and Beneficial Use Support Rating Determination

The 2014 and 2016 California Integrated Report places each California assessed water segment into one of five non-overlapping categories based on the overall beneficial use support of the water segment. These categories, described below, are based on the U.S. EPA guidance for States' Integrated Reports with recent modifications based on the Listing Policy and the need to accurately represent waterbodies that support assessed beneficial uses (U.S. EPA, 2005a). The modifications made after the 2012 listing cycle are presented in underline and strikeout formatting below.

Category	Definition
1	<u>All assessed beneficial uses are supported and no beneficial uses are known to be impaired</u>. ~~all core beneficial uses are supported~~
<u>2</u> ~~3~~	There is insufficient information to determine beneficial use support.
<u>3</u> ~~2~~	<u>There is insufficient data and/or information to make a beneficial use support determination but information and/or data indicates beneficial uses may be potentially threatened.</u> ~~at least one core beneficial use is supported and none are known to be impaired.~~
4	At least one beneficial use is not supported but a TMDL is not needed.
4a	A TMDL has been developed and approved by U.S.EPA for any waterbody-pollutant combination and the approved implementation plan is expected to result in full attainment of the water quality standard within a reasonable, specified time frame.
4b	Another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified time frame.
4c	The non-attainment of any applicable water quality standard for the waterbody segment is the result of pollution and is not caused by a pollutant.
5	At least one beneficial use is not supported and a TMDL is needed. TMDL requirement status is defined in our database as follows: **5A** = TMDL still required, **5B** = being addressed by U.S.EPA approved TMDL, and **5C** = being addressed by action other than a TMDL. These are **not** separate categories.

The categories were refined in order to identify and protect waterbodies that support designated beneficial uses in accordance with the U.S. EPA's Long Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program (U.S. EPA, 2013).

Water Board staff assesses waterbody - pollutant combinations based on the most protective beneficial use rather than for each designated "core" beneficial use. If a waterbody is meeting the pollutant criteria for protection of the most sensitive beneficial use(s), then that same waterbody is assumed to meet the less stringent criteria for the protection of the other designated core beneficial uses. That assessment process allows for a more efficient use of staff resources, but inadvertently resulted in no waterbodies in California being placed into the previous definition of Category 1 because staff does not access all core beneficial uses where the most sensitive use is supported. The lack of Category 1 waterbodies inaccurately represented California's overall water quality by giving the impression that California has no waters that support all designated beneficial uses, when in fact over 400 waterbodies are supporting the most sensitive designated beneficial use.

The change in the definition of Category 1 allowed for the inclusion of the minimally disturbed data "reference sites" that were identified in the development of the California Stream Condition Index (CSCI) to be placed into Category 1. Reference sites are the core of California's biological and habitat assessment program and set the benchmark for biological conditions expected when human activity in the landscape is absent or minimal. Hundreds of waterbodies around the State passed several screening criteria and were identified as reference waterbodies for the purposes of developing the CSCI. The CSCI is a biological scoring tool that helps aquatic resource managers translate complex data about benthic macroinvertebrates found living in a stream into an overall measure of stream health. The CSCI score is calculated by comparing the expected condition with actual (observed) results. CSCI scores range from 0 (highly degraded) to greater than 1 (equivalent to reference). CSCI scoring of biological condition are as follows: ≥0.92 = likely intact condition, 0.91 to 0.80 = possibly altered condition, 0.79 to 0.63 = likely altered condition, ≤0.62 = very likely altered condition (Rehn, A.C., R.D. Mazor and P.R. Ode, 2015).

The CSCI is an improvement over the previously developed Regional Indices of Biological Integrity (IBIs) as it is applicable statewide, accounts for a much wider range of natural variability, and provides equivalent scoring thresholds in all regions of the state. During this cycle, some data were assessed using the Regional IBIs as the CSCI was not yet available during the time when some of the data were assessed. In an effort to incorporate the CSCI into this reporting cycle, bioassessment data that were collected as part of our SWAMP program and had originally been scored using the IBIs were reevaluated using the new CSCI. Although it was not feasible to reevaluate all the non-SWAMP IBI scored data in this cycle, the CSCI will now be used in the future for water quality assessment purposes statewide over the regional IBIs.

Table 7 lists the reference waterbodies (along with waterbodies with bioassessment data showing a CSCI score of 0.92 or higher) placed into Category 1 during the 2014 and 2016 Integrated Report cycle.

Table 7 CSCI Reference Sites added to Integrated Report Category 1

Water Body Name	Waterbody ID	Region
Morses Gulch Creek	CAR2013001220080624164407	2
Ritchie Creek	CAR2065002020110629213026	2
Alamo Pintado Creek	CAR3144003119990222112600	3
Coche Creek	CAR3145106020160721053459	3
Coon Creek	CAR3102501019990225101818	3
Laguna Creek (San Benito County)	CAR3055001520080604165438	3
Little Sur River	CAR3080002319980825130201	3
Lopez Canyon Creek	CAR3103101020160721054466	3
Manzana Creek	CAR3122003020160721055032	3

Nacimiento River (above Nacimiento Reservoir) Prewitt Creek	CAR30981175200201241155513 CAR30800061200806051658 49	3 3
Rattlesnake Canyon Creek	CAR31230010201607210528 31	3
San Antonio River (above San Antonio Reservoir)	CAR30981228200201241340 39	3
Sisquoc River	CAR31210030200201241445 28	3
Soberanes Creek	CAR30800122008060515481 6	3
Swanson Canyon Creek	CAR30520010200201241501 37	3
Tassajara Creek	CAR30960030201607210517 56	3
Waddell Creek (Santa Cruz)	CAR30411011200201241531 34	3
West Fork Santa Cruz Creek, unnamed tributary	CAR31451060201607210552 02	3
Willow Creek (tributary to Tassajara Creek)	CAR30960030201607210537 30	3
Agua Blanca Creek and its tributaries (above Lake Piru)	CAR40342000201701170501 77	4
Bear Canyon and its tributaries	CAR41232000201701130275 36	4
Bear Creek and its tributaries	CAR40543000201701170510 76	4
Lion Canyon and its tributaries	CAR40332020201701170526 26	4
North Fork San Gabriel River and its Tributaries	CAR40543000201701130269 96	4
Piedra Blanca Creek and it's Tributaries	CAR40332020201701170485 80	4
Piedra Blanca Creek and it's Tributaries	CAR40332020201701170485 80	4
Santa Paula Creek and it's Tributaries	CAR40321000201701170438 21	4
Sisar Creek and its Tributaries	CAR40322000201701170425 28	4
Southern Tributary to Sespe Creek (Between Potrero John Creek and Munson Creek)	CAR40332020201701170417 82	4
Susanna Canyon and East Fork Susanna Canyon	CAR40543000201701130276 42	4
Thacher Creek and its Tributaries	CAR40232000201701170412 55	4
Tributary to East Fork San Gabriel River	CAR40543000201701130269 04	4
Tributary to Lockwood Creek	CAR40342000201701180291 40	4
Tributary to North Fork Matilija Creek	CAR40220010201701180328 82	4
Tributary to South Fork Santa Clara River	CAR40351000201701130257 65	4
Upper North Fork Matilija Creek and its tributaries	CAR40220010201701170410 50	4
West Fork Coyote Creek and its Tributaries	CAR40220030201701170414 77	4
West Fork San Gabriel River and its Tributaries	CAR40543000201701130273 58	4
Dye Creek	CAR50962011201108110325 20	5
Antelope Creek, South Fork	CAR50963022201108152244 25	5
Oregon Creek (Yuba and Sierra Counties)	CAR51741012201102090958 56	5
Jamison Creek (Plumas County)	CAR51833040200901140835 09	5
Mill River (Modoc County)	CAR52653024200901081643 26	5
Lincoln Creek (Sierra County)	CAR51754010201108200723 19	5
Sulphur Creek (Plumas and Sierra Counties)	CAR51833021200901081627 26	5
Jamison Creek (Plumas County)	CAR51833040200901140835 09	5
Grizzly Creek (Plumas County)	CAR51842040201108152303 07	5
Rice Creek, North Arm	CAR51844010201108142238 46	5
Indian Creek (headwaters to Antelope Lake, Plumas County)	CAR51853044200205021513 00	5

Fitzhugh Creek, Lower (Modoc County) Lassen Creek (Modoc County)	CAR5265204220090113145748 CAR5271002120101024215504	5 5
Tuolumne River, South Fork	CAR5368002120110814223454	5
Grizzly Creek (Madera County)	CAR5374001320110815230706	5
Bishop Creek (Mariposa County)	CAR5374004320110815001928	5
Tenaya Creek	CAR5376003120110814220649	5
Nelder Creek (Madera County)	CAR5393101120090105144343	5
Mill Flat Creek	CAR5523416720110820071513	5
Kings River, South Fork (Woods Creek to Bubbs Creek)	CAR5523422020110820072657	5
Kaweah River, Middle Fork (Confl w Kaweah River East Fork to Dome Creek)	CAR5534302320050608154640	5
Bear Creek (Tulare County)	CAR5551202020110815004208	5
Deer Creek (San Bernadino County)	CAR8017200020110720154721	8
Barton Creek, East Fork	CAR8017200020110808234451	8
Plunge Creek	CAR8015200020170124048001	8
Barton Creek	CAR8017200020110808235243	8
Lytle Creek, Middle Fork	CAR8014100020110808233846	8
South Fork Santa Ana River	CAR8017200020170124048397	8
Fuller Mill Creek (Riverside County)	CAR8022100020110720160726	8
Herkey Creek	CAR8022200020110809101415	8
Strawberry Creek (San Bernardino County)	CAR8015200020111230144506	8
Mill Creek Reach 2	CAR8015800019990211110827	8
Tributary to Santiago Creek, Reach 1	CAR8011200020170124048623	8
Lytle Creek, Middle Fork	CAR8014100020110808233846	8
Kitchen Creek	CAR9116000020011025105327	9
Wilson Creek (San Diego County)	CAR9113000020090204021246	9
Pine Valley Creek (Lower)	CAR9113000020110816114851	9
Pine Valley Creek (Lower)	CAR9113000020110816114851	9
Indian Creek (San Diego County)	CAR9114100020110828154029	9
San Diego River (Upper)	CAR9073100020011025102439	9
Fry Creek	CAR9033100020081223081859	9
Roblar Creek	CAR9022100020081223075955	9

Beneficial Use Support Rating Determination
Beneficial use support ratings are the basis for determining the Integrated Report category for each water segment assessed. Three possible beneficial use support ratings are used in California's 2014 and 2016 Integrated Report. They are Fully Supporting, Not Supporting, and Insufficient Information. These are the standard use support ratings designed by U.S. EPA for the Integrated Report.

The steps that ultimately lead to determining an overall use support rating for a water segment are described below and in Table 8. An example is portrayed in Figure 1 as well.

Step 1: Regional Water Board staff determines the number of exceedances of each pollutant in a monitoring dataset LOE, by comparing pollutant levels to applicable WQO, WQC, or evaluation guidelines.

Step 2: Regional Water Board staff then collects all LOEs for each pollutant assessed for the water segment and determines, based on the Listing Policy, whether or not the number of exceedances constitute a 303(d) listing, no listing, delisting, or no delisting.

Step 3: Regional Water Board staff then determines use support ratings based on the findings in Step 2. In general, most of the Regional Water Board staff used the following approach in determining use support ratings when assessing monitoring data:

- The use is supported if, based on the Listing Policy, pollutants do not exceed standards with a frequency that cause a 303(d) listing.
- The use is not supported if, based on the Listing Policy, pollutants exceed standards with a frequency that cause a 303(d) listing.
- Use ratings of “Insufficient Information” are given when it cannot be determined if a use is supported or not supported. This usually occurs when, based on the Listing Policy, the data have poor quality assurance; there are not enough samples in a dataset; there are no existing numerical criteria, objective, or evaluation guideline; or the information alone cannot support an assessment.

State Water Board staff encouraged the Regional Boards to employ an extra condition used in the 2012 Listing Cycle in determining whether a beneficial use is "supported." This condition is that a monitoring dataset must also consist of at least 26 samples for conventional pollutants, and at least 16 samples for toxic pollutants, before a use could be called “supported.” The sample size condition was derived from the number of samples required in the Listing Policy to run the binomial test, which is used to calculate the number of exceedances per sample size that would cause a 303(d) listing.

Step 4: The CalWQA database applies a set of rules that deduce the use support rating of each water segment from the collection of LOEs. These rules are shown in Table 8.

Step 5: The CalWQA database applies the same rules in Table 8 to deduce a water segment’s overall use support rating from the collection of all individual use support ratings.

Figure 1 is an example of how beneficial use support ratings can be deduced for individual uses of a water segment, and how individual use support ratings can be used to deduce one overall use support rating for the water segment.

Figure 1 Example of Determining Individual and Overall Beneficial Use Support Ratings for One Water Segment

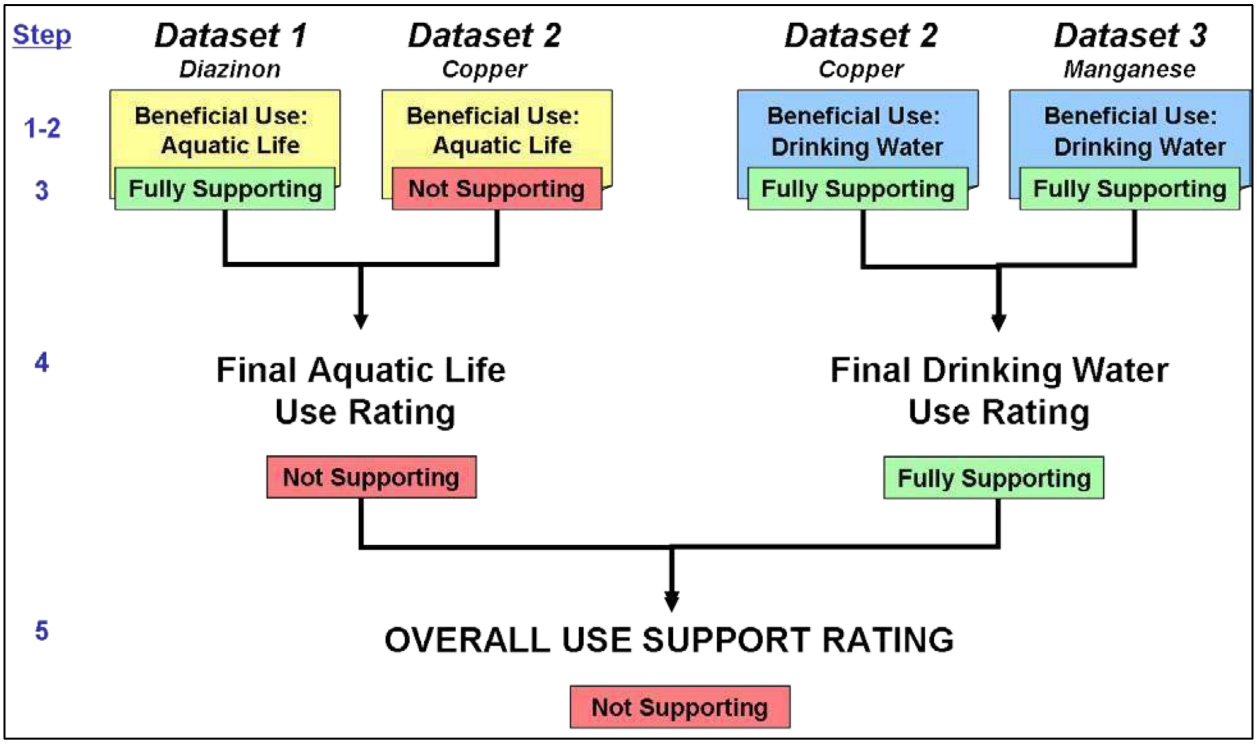

Table 8 Rules for Deducing Final Beneficial Use Support Ratings

RATING 1		RATING 2		FINAL RATING
Fully Supporting	+	Fully Supporting	→	FULLY SUPPORTING
Fully Supporting	+	Not Supporting	→	NOT SUPPORTING
Fully Supporting	+	Insufficient Information	→	FULLY SUPPORTING
Not Supporting	+	Insufficient Information	→	NOT SUPPORTING
Not Supporting	+	Not Supporting	→	NOT SUPPORTING
Insufficient Information	+	Insufficient Information	→	INSUFFICIENT INFORMATION

Public Review and Board Approval

Categories 1, 2, 3, and 4c are informational and do not require State Water Board approval. They will be submitted as part of the 2014 and 2016 California Integrated Report to the U.S. EPA for their biennial report to Congress. Categories 4a, 4b, and 5 are what California considers the Section 303(d) List of Impaired Waters. This 303(d) List of Impaired waters was reviewed by the public and is required to be approved by the State Water Board. A Statewide Category 5 list will be submitted to the U.S. EPA for final approval. The U.S. EPA's 303(d) List of Impaired Waters consists only of Category 5 waterbodies.

Public Participation
On June 9, 2017, the State Water Board provided public notice of a public hearing and public comment on the Draft 303(d) List portion of the 2014 and 2016 California Integrated Report. State Water Board staff provided written responses to comments.

IV. Information Management

California Water Quality Assessment (CalWQA) Database
All data LOEs, listing decisions/determinations, and beneficial use support ratings for assessed California waterbodies are stored in the Water Boards' CalWQA database. This database was developed in 2007 for the purpose of storing detailed water quality assessment information. The database is designed so that this information can be exported to the U.S. EPA's Assessment Database at the end of each assessment cycle.

References
Data and information used in LOEs come from a variety of sources. References are included to help track the sources from which the data and information summarized in the LOEs were derived. Copies of referenced documents are included as part of the administrative record.

Administrative Record
The administrative record contains all records used to develop the 2014 and 2016 California Integrated Report. Records are any documents produced, received, owned, or used by the Water Boards regardless of media, physical form, or characteristics. An index of the references is presented in Appendix L of this Staff Report.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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San Francisco, CA 94105-3901

APR 06 2018

Eileen Sobeck
Executive Director
California State Water Resources Control Board
P.O. Box 100
Sacramento CA, 95812-0100

Subject: California 2014-2016 CWA Section 303(d) List of Impaired Waters

Dear Ms. Sobeck:

I am pleased to approve the subject list of impaired waters, including all water quality limited segments (WQLSs) and associated pollutants identified by the State Water Resources Control Board (State Board) as requiring a total maximum daily load under CWA section 303(d). In addition, EPA concurs with the State Board's delisting of 191 WQLSs based on approved TMDLs. The legal requirements and the rationale for the actions are detailed in Enclosure 1.

EPA previously conveyed the desirability of evaluating temperature data developed by the California Department of Fish and Wildlife (CDFW) and the California Department of Water Resources (CDWR) in order to assess impacts to impaired fish migration and related beneficial uses in the Delta and San Joaquin River (Enclosure 2). EPA recognizes the challenges of working with voluminous continuous monitoring data and appreciates the constructive discussions our staffs have had on this issue. EPA appreciates the State Board's consideration of reviewing the temperature data "off cycle" so that any possible additional listings could be included in the next review of WQLSs. To assist the State Board, EPA encloses (Enclosure 3) a synthesis of the CDFW and CDWR temperature data for your consideration.

I value the collaboration between our two agencies and look forward to continuing our partnership to protect California's waters. If you have any questions, please contact me at (415) 972-3337, or have your staff contact Janet Hashimoto, Manager of the Water Quality Assessment Section, at (415) 972-3452.

Sincerely,

Tomás Torres April 6, 2018
Director, Water Division

Enclosures

cc: Karen Larsen, DWQ
Rebecca Fitzgerald, DWQ
Jessie Maxfield, DWQ

Enclosure 1

EPA Review of California's 2014-16 CWA Section 303(d) List
Submitted February 5, 2018

Purpose

The purpose of this document is to describe the rationale for the EPA's approval of California's 2014-16 list of water quality limited segments requiring a Total Maximum Daily Load (TMDL) under Clean Water Act Section 303(d). The following sections identify those key elements to be included in the list submittal based on the Clean Water Act and EPA regulations (see 40 CFR 130. 7). EPA carefully reviewed the State's submittal including the listing decisions, the assessment methodology used by the State in developing its list, and supporting data and information. EPA's review of California's list is based on EPA's analysis of whether the State reasonably considered existing and readily available water quality-related data and information, and reasonably identified waters required to be listed.

This review describes the basis for EPA's decision to approve the State's listings of water quality limited segments requiring a TMDL identified in the State's 2014-2016 Integrated Report, (see "Category 5: 2014 and 2016 California 303(d) List of Water Quality Limited Segments"). The portion of the California Integrated Report which EPA defines as the 303(d) List are the waters and pollutants California identifies as "5A: TMDL still required."

Statutory and Regulatory Background

Identification of WQLSs for Inclusion in the List

CWA Section 303(d)(1) directs each state to identify those waters within its boundaries for which effluent limitations required by Section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard (WQS), and to establish a priority ranking for addressing such waters, taking into account the severity of the pollution and the uses to be made of such waters. The 303(d) listing requirements apply to both waters impaired by point sources and waters impaired by nonpoint sources of pollution.

The EPA regulations provide that a state does not need to list WQLSs where the following types of controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the Clean Water Act, (2) more stringent effluent limitations required by federal, State or local authority, and (3) other pollution control requirements required by State, local, or federal authority. See 40 CFR 130.7(b)(1).

In developing its list, each state is required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum: (1) waters identified as partially meeting or not meeting designated uses or as threatened in the state's most recent CWA Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any CWA Section 319 nonpoint source assessment submitted to the EPA. See 40 CFR 130.7(b)(5). The EPA's 2006 assessment and listing guidance describes additional types of water quality-related data and information that should be assembled and evaluated for developing state lists.

Consideration of Existing and Readily Available Water Quality-Related Data and Information

The EPA regulations at 40 CFR 130.7(b)(6) require each state to include, as part of their submittals to the EPA, documentation to support decisions to rely or not rely on particular data and information, and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; and (3) any other reasonable information requested by the EPA.

Priority Ranking

The EPA regulations at 40 CFR 130.7(b)(4) require each state to prioritize waters on its list for TMDL development, and to identify those WQLSs targeted for TMDL development in the next two years. In prioritizing and targeting waters, each state must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. See 303(d)(1)(A). A state may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs, vulnerability of particular waters as aquatic habitats, recreational, economic, and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. See 57 FR 33040, 33044-45 (July 24, 1992), and EPA 1991.

Analysis of Submittal from the State of California

Identification of WQLSs

The EPA has reviewed the State's submittals and concludes that the State developed the 2014-16 List in compliance with CWA Section 303(d) and 40 CFR 130.7. The EPA's review is based on its analysis of whether the State reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed.

California used its 2012 Section 303(d) List and 305(b) Report as its starting point, and based its 2014-16 Section 303(d) submittal on its analysis of readily available data and information to determine whether additions to or deletions from the 2012 List were necessary. California's approach, wherein previously listed waters remain as WQLSs unless the existing and readily available water quality-related data no longer indicate impairment, is consistent with federal requirements. The EPA finds it was reasonable for California to include most of the previously listed waters on the 2014-16 List.

The State also made efforts to clarify the geographic extent of waterbody segments between the 2012 Section 303(d) List and 305(b) Report and the 2014-16 Water Quality Integrated Report. These clarifications reflect changes in waterbody names, changes in extent of impairment or the splitting of a waterbody into one or more segments. See 2014-16 Water Quality Integrated

Report, Appendix J and Miscellaneous Changes Appendix K. The State updated its web map application to display assessment data and results addressed in the 2014-16 Integrated Report[1]. This California 2014-16 Integrated Report Web Map Application was assembled to make publicly available information about the waterbodies and sample locations assessed in the California 2014-16 Integrated Report.

Assembly of Data and Information

The EPA's review found the data compilation process was clear and provided an adequate basis for water body assessments. The State Board staff devoted considerable effort to assembling new data and information for the 2014-16 Water Quality Integrated Report and development of the 303(d) list. Staff compiled data and information from multiple sources, including each of the data and information categories identified at 40 CFR 130.7(b)(5). The State issued public notice soliciting data and information from the public on January 14, 2010, with submittals requested by August 30, 2010.

Additionally, the solicitation notice was emailed to an extensive emailing list, and posted on the State Board's website. Overall, the State considered data and information submitted during the comment period including: fish advisories; USEPA databases; existing and readily available water quality data and information reported by local, State and federal agencies, citizen groups, academic institutions and the public; and other sources of data and information that were readily available to staff. EPA finds the State's approach to assembling readily available information to be reasonable. EPA's review found the data compilation process was sufficiently clear and consistent with federal listing requirements, and a sufficient basis for water body assessments.

Listing Methodology

The submittal summarizes the listing methodology used by California to develop the 2014-16 Water Quality Integrated Report and 303(d) list, and specifies explicit factors for making listing and delisting decisions for different pollutant types based on different kinds of data. Data are evaluated using the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy)[2].

California's 2014-16 Water Quality Integrated Report includes a list of water segments where a water quality standard is not met or expected to be met, but an impairment is being addressed by an EPA approved TMDL. See 2014-16 Water Quality Integrated Report, Appendix B, Approved TMDL List. EPA understands this list to include water segments and pollutant pairs which the State has identified as impaired but is not requiring a new or revised TMDL at this time (Appendix C. Category 4a) and water segments where the implementation of other pollutant control measures is expected to attain water quality (Appendix D. Category 4b).

The EPA reviewed the various assessments and concludes the State's assessments are consistent with federal listing requirements and applicable water quality standards.

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[1] www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml
[2] www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/020315_8_amendment_clean_version.pdf

Public Comments

The State Board and Regional Boards sought public input at several points in the process of developing the 2014-16 Water Quality Integrated Report including:

- The State Board sent a Notice of Public Solicitation of Water Quality Data and Information for the Integrated Report on January 19, 2010. The deadline for submittal of the data was extended from June 30 to August 30, 2010.
- The Regional Boards for the San Francisco, Central Coast, Los Angeles, Central Valley, Santa Ana and San Diego Regions provided advanced notice and opportunity to the public to submit written comments, responded in writing to those written comments, and considered oral testimony in 2016 and 2017.
- The State Board solicited public comments on the list on June 9, 2017 with comments due by July 10, 2017. The response to comments is posted on the State Board website.
- The State Board held a Public Hearing on the list on October 3, 2017.
- The 2014-16 303(d) List was approved by the State Board on October 3, 2017 (Resolution No. 2017-0059).

Conclusions

The EPA Finds that California Properly Added 806 New WQLSs to the 2014-2016 List

Based on all the existing and readily available data, California identified 974 WQLSs in Category 5, which are waterbodies with an impairment for at least one beneficial use in the Integrated Report (Table 1) but only 806 of these WQLSs require a TMDL and are added to the 2014-16 List. Of the 974 WQLSs, 113 WQLSs already have TMDLs in place (see Appendix, Table A1). These 113 WQLSs would normally be in Category 4a but California keeps these waterbodies on the impaired waterbodies list as 5b until all impairments are addressed. 55 WQLSs are being addressed by another program (see Appendix Table A2). These would normally be in Category 4b, but California keeps these waterbodies on the impaired list as 5c. Of the 55 WQLSs addressed by another program, 30 WQLSs for trash are being addressed by the State's Trash Policy and 24 WQLSs for pesticides are being addressed by actions of the Central Valley Regional Board including Resolution No. R5-2014-0041) and 1 WQLS for nitrate was removed because a State action removed the source of the problem.

The EPA Finds That California Demonstrated Good Cause for Delisting 191 WQLSs

EPA reviewed California's rationale for its decision to delist and not include on its 2014-16 List several waters that were included on its 2012 Section 303(d) List. Of the 191 WQLSs that were removed from the 2012 List, 142 of WQLSs were removed due to improved water quality, 48 WQLSs were removed due to TMDL development (4a) and 35 WQLSs were removed because a State action removed the source of the problem (4b). The State demonstrated to EPA's satisfaction that these WQLSs do not require TMDLs or TMDLs were completed. See, 40 CFR 130. 7(b)(6)(iv).

Table 1 Summary of WQLSs added to the 2014-16 Integrated Report.

Pollutant Class	San Francisco RWQCB 2	Central Coast RWQCB 3	Los Angeles RWQCB 4	Central Valley RWQCB 5	Santa Ana RWQCB 8	San Diego RWQCB 9	Pollutant Totals
Pesticides	2	65	36	83	7	32	**225**
Bacteria	10	61	14	27	5	65	**182**
Nutrient-related		54	21	46	1	55	**177**
Toxicity	3	29	13	41	9	15	**110**
Metals	9	14	11	48	1	24	**107**
Benthic Community Effects		5	5		5	28	**43**
Trash			11			19	**30**
Misc.		47	17	28	1	7	**100**
Totals by Regional Board	**24**	**275**	**128**	**273**	**29**	**245**	**974**

Table 2. Summary of WQLSs removed from the 2014-16 List (Delistings)

Pollutant Class	San Francisco RWQCB 2	Central Coast RWQCB 3	Los Angeles RWQCB 4	Central Valley RWQCB 5	Santa Ana RWQCB 8	San Diego RWQCB 9	Pollutant Totals
Bacteria	7	11	19	4	9	5	**55**
Pesticides		14	5	24	4	1	**48**
Metals		3	19	12	2	3	**39**
Nutrient-related		10	11	2		4	**27**
Toxicity		3	1	1			**5**
Turbidity		2				1	**3**
Benthic community effects			1			1	**2**
Electrical conductivity				2			**2**
Pumping			2				**2**
Temperature		2					**2**
Water			2				**2**
Fish			1				**1**
Hydromodification			1				**1**
Sedimentation		1					**1**
Specific-conductivity		1					**1**
Totals by Regional Board	**7**	**47**	**62**	**45**	**15**	**15**	**191**

Priority Ranking and Scheduling

The State's submittal includes a priority ranking for the TMDL completion for those waters requiring a TMDL, using estimated dates for TMDL completion or completion of other actions to achieve water quality. See 2014-16 Water Quality Integrated Report, Appendix A. EPA finds that the priority ranking for TMDL development meets the requirements related to priority setting in 40 CFR 130.7(b). The EPA is not acting on these priorities as federal regulations do not require the EPA approval of priority rankings or schedules.

Administrative Record Supporting This Action

In support of this decision to approve WQLSs to California's 2014-16 List, the EPA reviewed the materials submitted by California with its listing decisions. The administrative record supporting EPA's decision to approve the State's inclusion of the waters and pollutants identified on the State's 303(d) List include the 2014-16 Water Quality Integrated Report, Appendix A, Category 5 List, EPA guidance concerning preparation of Section 303(d) lists, EPA's past comments on California's listing methodology and draft lists, and EPA's decision letter and its enclosures.

The EPA is aware that the State compiled and considered additional materials (e.g., raw data and water quality analysis reports) as part of its list development process that were not included in the materials submitted to the EPA. It is unnecessary for the EPA to consider all the materials considered by the State to determine that the State complied with the applicable federal listing requirements. Federal regulations do not require the State to submit all data and information considered as part of the submittal. See 40 CFR 130.7(b)(6)(ii). However, at the EPA's request, the State did provide additional materials, such as raw data and other relevant information. The EPA determined that the materials submitted by the State provide sufficient documentation to support the decision to approve the 2014-16 List.

Public comments received on the Draft 2014-16 Water Quality Integrated Report, and State Water Board Staff responses to comments, are provided on the State Board web page[3]. EPA reviewed the State's responses to comments received on the Final 2014-16 Water Quality Integrated Report. EPA found the State's responses to public comments reasonable and in accordance with federal listing requirements.

[3] www. waterboards. ca. gov/water_issues/programs/tmdl/docs/integrated_report_responsetocomments. pdf

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Other Documents

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EPA, 2009. Information Concerning 2010 Clean Water Act Sections 303(d), 305(b) and 314 Integrated Reporting and Listing Decisions. Suzanne Schwartz, Director, Office of Wetlands, Oceans and Watersheds, May 5, 2009.

APPENDICES

Table A1. WQLS in Category 5 with existing TMDL (5b). EPA considers these to be Category 4a.

Region	Water Body Name	Pollutant(s)
2	Calabazas Creek (Santa Clara County)	Diazinon
2	Lakeshore Park Beach (Marina Lagoon, San Mateo County)	Indicator Bacteria
2	Miller Point (Tomales Bay)	Indicator Bacteria
3	Alisal Creek (Monterey County)	Ammonia
3	Alisal Slough (Monterey County)	Ammonia
3	Alisal Slough (Monterey County)	Diazinon
3	Blanco Drain	Toxicity
3	Blosser Channel	Diazinon
3	Blosser Channel	Chlorpyrifos
3	Bradley Canyon Creek	Chlorpyrifos
3	Bradley Channel	Diazinon
3	Bradley Channel	Escherichia coli (E. coli)
3	Bradley Channel	Malathion
3	Chorro Creek	Sodium
3	Chorro Creek	Total Dissolved Solids
3	Chualar Creek	Oxygen, Dissolved
3	Chualar Creek, South Branch	Ammonia
3	Greene Valley Creek (Santa Barbara County)	Malathion
3	La Brea Creek	Fecal Coliform
3	Main Street Channel	Oxygen, Dissolved
3	Main Street Channel	Escherichia coli (E. coli)
3	Main Street Channel	Malathion
3	Merrit Ditch	Diazinon
3	Millers Canal	Nitrate
3	Moro Cojo Slough	Nitrate
3	Natividad Creek	Diazinon
3	Nipomo Creek	Escherichia coli (E. coli)
3	Orcutt Creek	Escherichia coli (E. coli)
3	Orcutt Creek	Malathion
3	Orcutt Creek	DDE
3	Orcutt Creek	Cyfluthrin
3	Orcutt Creek	Cyhalothrin, Lambda
3	Orcutt Creek	DDD
3	Oso Flaco Creek	Chlorpyrifos
3	Oso Flaco Creek	Malathion
3	Oso Flaco Lake	Endrin
3	Oso Flaco Lake	Toxicity
3	Oso Flaco Lake	Fecal Coliform
3	Oso Flaco Lake	Escherichia coli (E. coli)
3	Oso Flaco Lake	DDT
3	Pajaro River	Diazinon
3	Pajaro River Estuary	Diazinon
3	Salinas River Lagoon (North)	Chlorpyrifos
3	Salinas River Lagoon (North)	Toxicity
3	San Lorenzo River	Fecal Coliform
3	Santa Maria River	Diazinon
3	Santa Maria River	Cypermethrin

3	Santa Maria River	Malathion
3	Santa Maria River	DDD
3	Santa Maria River	DDE
3	Santa Maria River Estuary	Chlorpyrifos
3	Santa Maria River Estuary	DDE
3	Santa Maria River Estuary	Toxicity
3	Santa Maria River Estuary	DDD
3	Santa Maria River Estuary	Diazinon
3	Santa Maria River Estuary	Malathion
3	Santa Maria River Estuary	Oxygen, Dissolved
3	Struve Slough	Fecal Coliform
3	Tembladero Slough	Oxygen, Dissolved
3	Trout Creek Gulch	Fecal Coliform
3	Unnamed tributary to Orcutt Creek	Toxicity
3	Unnamed tributary to Orcutt Creek	Toxicity
3	Unnamed tributary to Orcutt Creek	Chlorpyrifos
3	Unnamed tributary to Orcutt Creek	Chlorpyrifos
3	Unnamed tributary to Orcutt Creek	Diazinon
3	Unnamed tributary to Orcutt Creek	Diazinon
3	Unnamed tributary to Orcutt Creek	Ammonia
3	Unnamed tributary to Orcutt Creek	Ammonia
3	Unnamed tributary to Orcutt Creek	Nitrate
3	Unnamed tributary to Orcutt Creek	Nitrate
3	Valencia Creek	Fecal Coliform
3	Watsonville Slough	Fecal Coliform
4	Balboa Lake	Ammonia
4	Bull Creek (Los Angeles County)	Ammonia
4	Calleguas Creek Reach 9A (was lower part of Conejo Creek Reach 1 on 1998 303d list)	Nitrogen, Nitrite
4	Compton Creek	Zinc
4	Dominguez Channel Estuary (unlined portion below Vermont Ave)	Copper
4	Duck Pond Agricultural Drains/Mugu Drain/Oxnard Drain No 2	DDD
4	Duck Pond Agricultural Drains/Mugu Drain/Oxnard Drain No 2	DDE
4	Duck Pond Agricultural Drains/Mugu Drain/Oxnard Drain No 2	Chlorpyrifos
4	Echo Park Lake	Chlordane
4	Echo Park Lake	Dieldrin
4	Fox Barranca (tributary to Calleguas Creek Reach 6)	Chlordane
4	Fox Barranca (tributary to Calleguas Creek Reach 6)	DDT
4	Fox Barranca (tributary to Calleguas Creek Reach 6)	DDE
4	Honda Barranca	DDE
4	Honda Barranca	DDD
4	Honda Barranca	Chlorpyrifos
4	Honda Barranca	DDT
4	Honda Barranca	Chlordane
4	Los Angeles River Reach 3 (Figueroa St. to Riverside Dr.)	Indicator Bacteria
4	Los Angeles River Reach 6 (Above Sepulveda Flood Control Basin)	Copper
4	Rio De Santa Clara/Oxnard Drain No. 3	DDD
4	Rio De Santa Clara/Oxnard Drain No. 3	DDE
4	Rio Hondo Reach 3 (above Spreading Grounds)	Indicator Bacteria
4	San Gabriel River Estuary	Indicator Bacteria
4	Santa Clara River Reach 3 (Freeman Diversion to A Street)	Indicator Bacteria
4	Wildlife Lake	Ammonia
8	San Diego Creek Reach 1	DDT
9	Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at patrol dock	Indicator Bacteria

9	Pacific Ocean Shoreline, Laguna Beach HSA, at Broadway Creek	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 1000 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 10000 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 2000 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 3000 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 4000 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 5000 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, 7500 feet south of outfall	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, at South Doheny State Park Campground	Indicator Bacteria
9	Pacific Ocean Shoreline, Lower San Juan HSA, at surfzone outfall at Doheny State Beach	Indicator Bacteria
9	Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach at Pier	Indicator Bacteria
9	Pacific Ocean Shoreline, San Clemente HA, at South Capistrano Beach at Beach Road	Indicator Bacteria
9	Pacific Ocean Shoreline, San Diego HU, at Stub Jetty, south of the San Diego River outlet, near Cape May Avenue	Indicator Bacteria

Table A2. WQLS in Category 5 with a program to achieve water quality (5C). EPA considers these to be 4b.

Region	Water Body Name	Decision Pollutant(s)
3	San Antonio Creek (San Antonio Watershed, Rancho del las Flores Bridge at Hwy 135 to downstream at Railroad Bridge)	Nitrate
4	Hueneme Drain	Trash
4	J Street Drain (Ventura County)	Trash
4	Ormond Beach Wetlands	Trash
4	Oxnard Drain	Trash
4	Sanjon Barranca Creek	Trash
4	Santa Clara River Reach 1 (Estuary to Hwy 101 Bridge)	Trash
4	Santa Clara River Reach 3 (Freeman Diversion to A Street)	Trash
4	Santa Clara River Reach 5 (Blue Cut gaging station to West Pier Hwy 99 Bridge) (was named Santa Clara River Reach 7 on 2002 303(d) list)	Trash
4	Santa Clara River Reach 10 (Sespe Creek, from confl with Santa Clara River Reach 3 to above gaging station - 500 ft downstream from Little Sespe Cr)	Trash
4	Santa Clara River Reach 4A (A Street, Fillmore to Piru Creek)	Trash
4	Santa Paula Creek Reach 1 (confluence w Santa Clara River to Diverson Dam)	Trash
5	Cottonwood Creek (S Madera County)	Diuron
5	Dry Creek (Madera County)	Diuron
5	Dry Creek (Madera County)	Diazinon
5	Dry Creek (tributary to Tuolumne River at Modesto, E Stanislaus County)	Diuron
5	Hospital Creek (San Joaquin and Stanislaus Counties)	Chlorpyrifos
5	Hospital Creek (San Joaquin and Stanislaus Counties)	Diuron
5	Hospital Creek (San Joaquin and Stanislaus Counties)	Methyl Parathion
5	Ingram Creek (from confluence with Hospital Creek to Hwy 33 crossing)	Chlorpyrifos
5	Ingram Creek (from confluence with Hospital Creek to Hwy 33 crossing)	Diuron
5	Littlejohns Creek	Chlorpyrifos
5	Lone Tree Creek	Diazinon
5	Main Drain (Kern County)	Diuron
5	Orestimba Creek (above Kilburn Road)	Diuron
5	Pine Creek (Butte County)	Chlorpyrifos
5	Ramona Lake	Diuron
5	Salt Slough (Mud Slough to Sand Dam, Merced County)	Chlorpyrifos
5	San Joaquin River (Bear Creek to Mud Slough)	Diuron
5	Sand Creek (tributary to Marsh Creek, Contra Costa County; partly in Delta Waterways, western portion)	Diazinon

5	Snake River (Butte and Sutter Counties)	Chlorpyrifos
5	Temple Creek	Chlorpyrifos
5	Ulatis Creek (Solano County)	Diuron
5	Walker Creek (Glenn County)	Chlorpyrifos
5	Willow Slough Bypass (Yolo County)	Chlorpyrifos
5	Willow Slough Bypass (Yolo County)	Diuron
9	Mission Bay Shoreline, at Enchanted Cove	Trash
9	Pacific Ocean Shoreline, Batiquitos HSA, at Moonlight State Beach (Cottonwood Creek outlet)	Trash
9	Pacific Ocean Shoreline, Coronado HA, at G Ave, Central Beach	Trash
9	Pacific Ocean Shoreline, Imperial Beach Pier	Trash
9	Pacific Ocean Shoreline, Loma Alta HSA, at Loma Alta Creek mouth	Trash
9	Pacific Ocean Shoreline, Los Monos HSA, Carlsbad State Beach at Tamarack Ave	Trash
9	Pacific Ocean Shoreline, Mission San Diego HSA, at Ocean Beach pier at Narrangaset	Trash
9	Pacific Ocean Shoreline, Point Loma HA, at Sunset Cliffs and Froude Street	Trash
9	Pacific Ocean Shoreline, Rancho Santa Fe HSA, at Powerhouse Park	Trash
9	Pacific Ocean Shoreline, San Diego HU, at Stub Jetty, south of the San Diego River outlet, near Cape May Avenue	Trash
9	Pacific Ocean Shoreline, San Elijo HSA, at Cardiff State Beach at parking lot entrance	Trash
9	Pacific Ocean Shoreline, San Luis Rey HU, Oceanside Pier at Pier View Way	Trash
9	Pacific Ocean Shoreline, Scripps HA, at Belmont Park at Mission Beach (near San Fernando Place)	Trash
9	Pacific Ocean Shoreline, Scripps HA, at Crystal Pier	Trash
9	Pacific Ocean Shoreline, Scripps HA, at North Lane at Windansea Beach	Trash
9	Pacific Ocean Shoreline, Scripps HA, at Pacific Beach Drive, Pacific Beach	Trash
9	Pacific Ocean Shoreline, Scripps HA, at Tourmaline Surf Park, Pacific Beach	Trash
9	Pacific Ocean Shoreline, Scripps HA, at Vallecitos Court at La Jolla Shores Beach	Trash
9	Pacific Ocean Shoreline, Torrey Pines State Beach, at North Beach Entrance parking lot	Trash

Table A3. WQLS with an existing TMDL and no other impairments(4a). Does not include WQLSs in Table A1.

Region	Water Body Name	Pollutant(s)
3	Alisal Slough (Monterey County)	Oxygen, Dissolved
3	Blanco Drain	Oxygen, Dissolved
3	Clear Creek (San Benito County)	Mercury
3	San Antonio Creek (Rancho del las Flores Bridge at Hwy 135 to RR Bridge)	Chlorpyrifos
3	San Luis Obispo Creek (below Osos Street)	Nutrients
3	Struve Slough	Bacteria
3	Watsonville Slough	Bacteria
4	Abalone Cove Beach	Bacteria
4	Ballona Creek	Selenium
4	Bluff Cove Beach	Bacteria
4	Cabrillo Beach (Outer)	Bacteria
4	Calleguas Creek Reach 10 (Conejo Creek (Hill Canyon)-was part of Conejo Crk Reaches 2 & 3, and lower Conejo Crk/Arroyo Conejo N Fk on 1998 303d list)	Endosulfan (tissue)
4	Calleguas Creek Reach 12 (was Conejo Creek/Arroyo Conejo North Fork on 1998 303d list)	Ammonia
4	Coyote Creek	Lead
4	Dominguez Channel (lined portion above Vermont Ave)	Diazinon
4	Dominguez Channel Estuary (unlined portion below Vermont Ave)	Zinc (sediment)
4	Hermosa Beach	Bacteria
4	Lake Sherwood	Ammonia
4	Lake Sherwood	Organic Enrichment/ Low Oxygen
4	Leo Carillo Beach (South of County Line)	Bacteria
4	Lincoln Park Lake	Lead

4	Long Point Beach	Bacteria
4	Los Angeles River Reach 3 (Figueroa St. to Riverside Dr.)	Lead
4	Los Angeles River Reach 4 (Sepulveda Dr. to Sepulveda Dam)	Copper
4	Los Angeles River Reach 4 (Sepulveda Dr. to Sepulveda Dam)	Ammonia
4	Los Angeles River Reach 4 (Sepulveda Dr. to Sepulveda Dam)	Lead
4	Los Angeles/Long Beach Inner Harbor	Bacteria
4	Malaga Cove Beach	Bacteria
4	Manhattan Beach	Bacteria
4	Nicholas Canyon Beach	Bacteria
4	Point Dume Beach	Bacteria
4	Point Fermin Park Beach	Bacteria
4	Portuguese Bend Beach	Bacteria
4	Robert H. Meyer Memorial Beach	Bacteria
4	Royal Palms Beach	Bacteria
4	San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam	Bacteria
4	Santa Clara River Reach 3 (Freeman Diversion to A Street)	Ammonia
5	Elk Grove Creek	Chlorpyrifos
5	Marsh Creek (Marsh Creek Reservoir to San Joaquin River; partly in Delta Waterways)	Diazinon
5	San Joaquin River (Bear Creek to Mud Slough)	Chlorpyrifos
5	San Joaquin River (Merced River to Tuolumne River)	Boron
5	San Joaquin River (Stanislaus River to Delta Boundary)	Electrical Conductivity
8	Newport Bay, Lower (entire lower bay, including Rhine Channel, Turning Basin and South Lido Channel to east end of H-J Moorings)	Chlorpyrifos
8	Newport Bay, Upper (Ecological Reserve)	Chlorpyrifos
8	San Diego Creek Reach 1	Pesticides
9	Pacific Ocean Shoreline, Scripps HA, at Avenida de la Playa at La Jolla Shores Beach	Bacteria
9	Pacific Ocean Shoreline, Scripps HA, at La Jolla Cove	Bacteria
9	Pacific Ocean Shoreline, Scripps HA, at Ravina	Bacteria

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 3, 2016

Joseph Simi
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

Re: Proposed Revisions to the 303(d) List of Impaired Water Bodies and Integrated Assessment Report for the Central Valley Region

Dear Mr. Simi:

EPA reviewed the Clean Water Act Sections 305(b) and 303(d) 2014 Integrated Report for the Central Valley Region Draft Staff Report, dated September 2016 and have a few comments. We request the State consider further analysis of several waterbodies and additional listings where data show impairment.

Temperature Assessments Discard Many Impaired Waters

The Staff Report indicates that of 189 new waterbody evaluations for temperature, elevated temperatures were found in 39 yet only one was recommended for listing. The State states in the Staff Report that most of these were waterbodies that had surface grab samples only in summer months at the edges of swimming holes and would be unrepresentative of temperature conditions. However, in reviewing the lines of evidence, there are many waterbodies that are well mixed lotic systems where a surface grab sample showing exceedances of temperature thresholds would still be representative of most of the water column and suggest a temperature impairment for the waterbody as a whole. There are several waterbodies, such as segments of the Sacramento River that have substantial data collected under the Irrigated Lands Regulatory Program indicating impairment. Additionally, for many of these waterbodies continuous monitoring stations with existing data published by a sister State Agency, Department of Water Resources in publically available databases (e.g. California Data Exchange Center (CDEC) found at www.cdec.water.ca.gov and the California Water Data Library http://www.water.ca.gov/waterdatalibrary/) are available to confirm impairments initially identified by the already analyzed grab sample data.

EPA also notes that the thresholds selected in the Staff Report for this listing cycle, 21°C and 24°C for rainbow trout and steelhead respectively, are much warmer than the temperatures recommended in EPA's *2003 Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards.*

Existing Numeric Temperature Criteria Do Not Appear to be Utilized as Thresholds

EPA notes that in the Lines of Evidence for river segments that have more protective numeric standards than the thresholds utilized for comparison to the narrative objective, the more protective numeric standard was not used. Table III-4 and III-4A in the Sacramento and San Joaquin River Basin Plan identifies specific objectives for Deer Creek and the Sacramento River. As an example, 56°F (13.3°C) is a numeric objective for Sacramento River between Keswick Dam and Hamilton City but the line of evidence for this segment appears to have been compared to a 21°C threshold.

Continuous Monitoring Data in the Delta is "Readily Available Information"
In implementing section 303(d) of the Clean Water Act the State is required to assess all "readily available data and information"[1] when putting together a list of impaired waters. Federal policy[2] does not define this as narrowly as California has chosen to interpret it. EPA does not believe all readily available information were included in the development of the proposed list of impaired waters. California appears to have discarded all the continuous data reported in CDEC and the California Water Data Library. However, EPA notes this data is used by the State Board to implement water management decisions and is used by the Central Valley Regional Board in developing TMDLs.

The omission of continuous monitoring information is particularly notable in the Delta where 24 continuous monitoring stations are identified in Table 7 of the 2006 Bay-Delta Plan as stations to assess compliance with water quality objectives[3] and are not assessed for this Integrated Report. It has resulted in illogical listing decisions such as the listing of the Stockton Deep Water Ship Channel for temperatures unsuitable to support migration of cold water species, but none of the surrounding waters are listed as impaired. The Draft Staff Report also has inconsistent assessments for dissolved oxygen and salinity in the 2006 Bay-Delta Plan when there is an abundance of publically available data identifying broader impairments. These data should be assessed and incorporated into the final Staff Report.

The broader issue of incorporating readily available continuous monitoring data, not just from the Delta but across the State, should be addressed in the next listing cycle. These data are not readily incorporated into the California Environmental Data Exchange Network (CEDEN) but are collected at a great cost and effort by the State and other agencies and should be assessed against water quality objectives to accurately report the condition of California's waters to the public.

[1] In developing Section 303(d) lists, states are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or as threatened, in the state's most recent CWA Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any CWA Section 319 nonpoint assessment submitted to EPA. See 40 CFR § 130.7(b)(5).
[2] See pp. 30-32 of the Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act (IRG). https://www.epa.gov/sites/production/files/2015-10/documents/2006irg-report.pdf
[3] "This Plan requires, and the permits and license of the DWR and the USBR include conditions for, a monitoring program to provide baseline information and determine compliance with water quality objectives." pp 41 of the 2006 Bay-Delta Plan

Monitoring Data Collected by CDFW for San Joaquin River Restoration Has been Overlooked
A multi-agency effort has been underway to restore the San Joaquin River since 2008. The upper restoration reaches have had temperature data collected since well before the data cutoff of 2010 and continue to be intensely scrutinized for suitability for salmonid reintroduction. These data are collected by the California Department of Fish and Wildlife (CDFW) and are an attachment to this letter.

The Salmon Protection Objective Should be Assessed
EPA notes that despite readily available data and information the Staff Report does not assess the Salmon Protection Objective found in Table 3 of the *Water Quality Control Plan for the San Francisco Bay/Sacramento- San Joaquin Delta Estuary* (2006 Bay-Delta Plan)

> Water quality conditions shall be maintained, together with other measures in the watershed, sufficient to achieve a doubling of natural production of chinook salmon from the average production of 1967-1991, consistent with the provisions of State and federal law.

This objective was adopted in the Water Quality Control Plan due to its inclusion in the Central Valley Project Improvement Act (CVPIA). Pursuant to CVPIA, US Fish and Wildlife Service has developed numeric targets to achieve this goal that are included in Table 1 and Appendix B-1 of the Restoration Plan for the Anadromous Fish Recovery Program. These can be accessed at the following website and are also included as an Appendix to this letter:
https://www.fws.gov/cno/fisheries/CAMP/Documents/Final_Restoration_Plan_for_the_AFRP.pdf
California collects the data used to assess progress towards these targets for many of these tributaries. CDFW publishes this information at this website:
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=84381&inline=1

And existing program summary describing how all of the data are collected can be found here:
https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3491&inline

The listing for Salmon Protection would be consistent with the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List. Section 3.9 states that a water segment should be listed "if the water segment exhibits significant degradation of biological populations as compared to reference site(s) and is associated with water or sediment concentration of pollutants including but not limited to chemical concentrations, temperature, dissolved oxygen or trash". There are readily available data collected by a sister State agency (CDFW) to assess the Salmon Protection objective.

If you have any questions, please contact Valentina Cabrera at 415-972-3434 or cabrera-stagno.valentina@epa.gov or Terry Fleming at 415-972-3462 or fleming.terrence@epa.gov.

Sincerely,

Janet Hashimoto

Janet Hashimoto
Chief, Water Quality Assessment Section

Appendix: Table 1 and Appendix B-1 from the Restoration Plan for the Anadromous Fish Recovery Program

Table 1. Target production levels for anadromous fish in Central Valley rivers and streams.

Species	Target
Chinook salmon, all races[a]	990,000
Fall run	750,000
Late-fall run	68,000
Winter run	110,000
Spring run	68,000
Steelhead[b]	13,000
Striped bass[c]	2,500,000
American shad[d]	4,300
White sturgeon	11,000
Green sturgeon	2,000

Preliminary estimated production targets for chinook salmon. Data for rivers without a race designatio are for fall-run chinook salmon.

Race and river	Production targets
All races combined[a]	990,000
Fall run	750,000
Late-fall run	68,000
Winter run	110,000
Spring run	68,000
Sacramento River	
Fall run	230,000
Late-fall run	44,000
Winter run	110,000
Spring run	59,000
Clear Creek	7,100
Cow Creek	4,600
Cottonwood Creek	5,900
Battle Creek	
Fall run	10,000
Late-fall run	550
Paynes Creek	330
Antelope Creek	720
Mill Creek	
Fall run	4,200
Spring run	4,400
Deer Creek	
Fall run	1,500
Spring run	6,500
Miscellaneous creeks	1,100
Butte Creek	
Fall run	1,500
Spring run	2,000
Big Chico Creek	800
Feather River	170,000
Yuba River	66,000
Bear River	450
American River	160,000
Mokelumne River	9,300
Cosumnes River	3,300
Calaveras River Winter run	2,200*
Stanislaus River	22,000
Tuolumne River	38,000
Merced River	18,000

Enclosure 3

EPA Synthesis of Continuous Temperature Data from California Department of Fish and Wildlife and the California Department of Water Resources

This Enclosure summarizes EPA's evaluation of temperature monitoring data in certain water bodies and considers how the indicated temperatures may adversely affect the designated (beneficial) uses for fish habitat, migration, and spawning.

The water bodies under consideration are the San Joaquin River (Friant Dam to Mendota Pool), San Joaquin River (Bear Creek to Mud Slough), San Joaquin River (Mud Slough to Merced River), Delta Waterways (southern portion), Delta Waterways (central portion), Delta Waterways (northern portion), Delta Waterways (western portion), Suisun Bay, and Carquinez Straight.

Applicable water quality standards for these water bodies are established in the Sacramento and San Joaquin River Basin Plan. All the aforementioned segments have the Cold Freshwater Habitat (COLD) designated use and the Migration of Aquatic Organisms (MIGR) designated use for Cold Freshwater Habitat (COLD) with a footnote indicating "salmon and steelhead" (See RWQCB Central Valley, 2009, Table II-1). The San Joaquin River (Friant Dam to Mendota Pool) segment also has the Spawning, Reproduction, and/or Early Development (SPWN) designated use for COLD with a footnote indicating "salmon and steelhead" (See RWQCB Central Valley, 2009, Table II-1, pp. II-7). Additionally, the Sacramento and San Joaquin River Basin Plan addresses temperature with the following narrative and numeric objectives: "The natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Water Board that such alteration in temperature does not adversely affect beneficial uses. … At no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature. … In determining compliance with the water quality objectives for temperature, appropriate averaging periods may be applied provided that beneficial uses will be fully protected." (RWQCB Central Valley Region, 2009, pp. III-8)

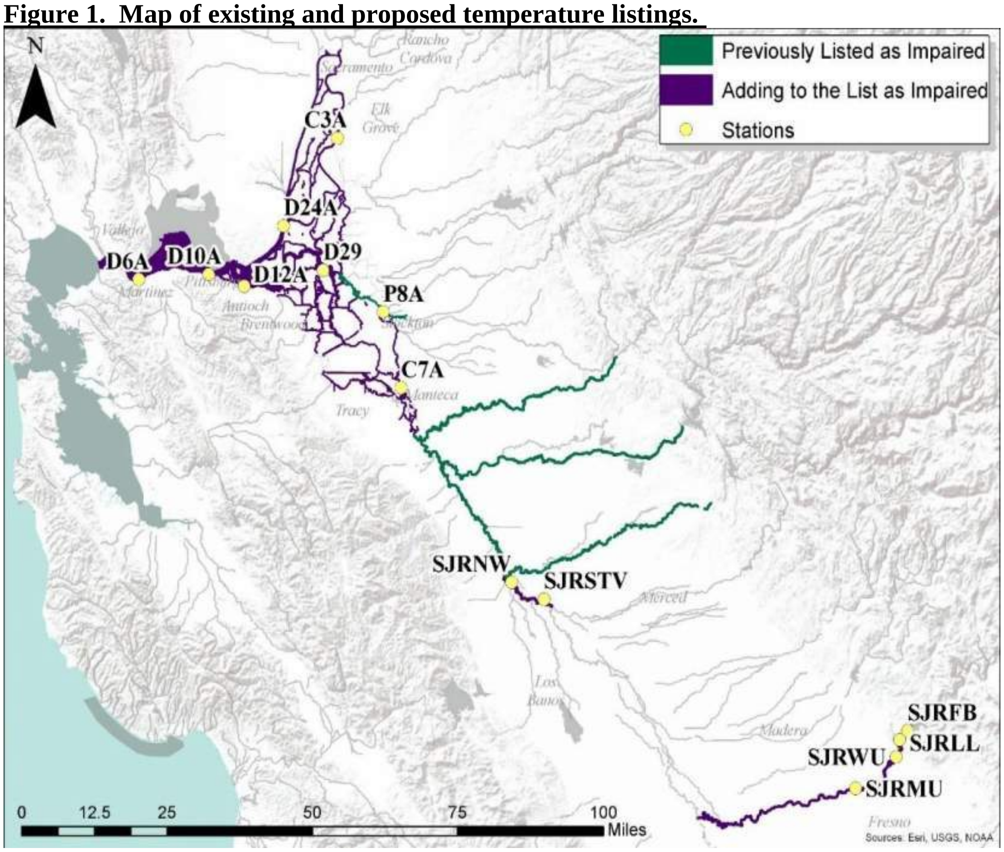
Documentation of the natural receiving water temperature is not readily available so an assessment of whether the migration and spawning uses were being achieved was conducted by comparing the current temperatures to the temperature requirements of salmonid species identified in the EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards (2003a). EPA believes that the Region 10 guidance and its associated Technical Issue Papers provide the most comprehensive compilation of research related to salmonid temperature requirements available. The studies compiled in the guidance and associated papers address the full geographic extent of salmonid populations including California. The recommended numeric criteria to protect coldwater salmonids in this report were recommended for use by California's Department of Fish and Game (now Fish and Wildlife) in their temperature data submittal and subsequent comments for California's 2008-2010 303(d) list and were subsequently utilized by EPA to add water-quality limited segments to that list. Additionally, the guidance's recommended numeric criteria have been used by the National Marine Fisheries Service as thresholds when considering the suitability of expected water temperatures for Central Valley steelhead in the Stanislaus River under the proposed actions in their Biological and Conference Opinion on the

Long-term Operations of the Central Valley and State Water Project (2009). An enormous amount of temperature data has been collected for the subject segments of the San Joaquin River and its tributaries. After review of the data, EPA finds that the subject segments are not attaining the relevant numeric temperature criteria for migration, freshwater habitat and spawning of coldwater salmonids. Observed exceedances are greater than the 10% exceedance threshold for conventional and other pollutants as expressed in Table 3.2 of the State Listing Policy. A summary of the water body specific findings is included in the following section.

Data Used by EPA

EPA Region 9 has reviewed continuous temperature data collected by the California Department of Fish and Wildlife (CDFW) for the San Joaquin River restoration project from 2002 to 2010 and data from the Department of Water Resources (DWR) from January 1, 1995 to August 30, 2010 from the sampling sites shown in Figure 1 and Table 1.

Figure 1. Map of existing and proposed temperature listings.



The Region 10 guidance includes recommended temperature criteria for salmon and trout based on different life stages. The recommended temperature for salmon and trout adult migration is <20°C as a 7-day average daily maximum (7DADM) and this was applied to all delta segments and the lower two reaches of the San Joaquin River. In the upper San Joaquin River (Friant Dam to Mendota Pool) multiple life stages were assessed. For the migration life stage and the Steelhead summer rearing life stage the Salmon and Trout Migration plus Non-Core Juvenile Rearing recommendation was utilized and is <18°C 7DADM. For spawning, the Salmon and Trout Spawning, Egg Incubation, and Fry Emergence recommendation was utilized and is <13°C 7DADM. For juvenile rearing the Salmon/Trout "Core" Juvenile Rearing recommendation was utilized and is

<16°C 7DADM. The evaluation thresholds and seasons during which they were applied are summarized below in Table 2.

Table 1. Waterbodies evaluated for listing

Waterbody	Size	Site Location	Site Code	Source
San Joaquin River (Friant Dam to Mendota Pool)	70 miles	SJR Friant Bridge	SJRFB	CDFW
		SJR Lost Lake	SJRLL	CDFW
		SJR Willow Unit	SJRWU	CDFW
		SJR Rank Island	SJRRI	CDFW
		SJR Sportsman Club	SJRSC	CDFW
		SJR Milburn Unit	SJRMU	CDFW
		SJR Gravely Ford	SJRGF	CDFW
San Joaquin River (Bear Creek to Mud Slough)	14 mile	SJR Stevenson Bridge	SJRSTV	CDFW
San Joaquin River (Mud Slough to Merced River)	3 miles	SJR Newman Waste Water	SJRNW	CDFW
Delta Waterways (southern portion)	3,125 acres	San Joaquin River @ Mossdale	C7A	DWR
Delta Waterways (central portion)	11,425 acres	San Joaquin River @ Prisoners Point	D29	DWR
Delta Waterways (northern portion)	6,975 acres	Sacramento River @ Hood	C3A	DWR
Delta Waterways (western portion)	14,524 acres	San Joaquin River @ Antioch Ship Channel	D12A	DWR
		Sacramento River @ Rio Vista	D24A	DWR
Suisun Bay	25,335 acres	Sacramento River @ Mallard Island	D10A	DWR
Carquinez Straight	5,657 acres	Sacramento River @ Martinez	D6A	DWR

EPA evaluated a fifteen-year period of DWR data. The 7DADM measurement was calculated by eliminating any calculations with less than 7 consecutive measurements and by reviewing only the data rated as good with a "G" data quality flag by DWR. The CDFW data was similarly evaluated, however, the available data only went back as far as 2002. We assessed the number of valid 7DADM for the seasonal periods noted in Table 2 and then noted how many of those exceeded the thresholds in Table 2. Results are provided below in Table 3. These data were then evaluated for potential impairments using the binomial Table 3-2 from the California 303d listing policy and all segments were found to be impaired. It should be noted that the most upstream site in the San Joaquin River (Friant Dam to Mendota Pool) segment did not show impairment for any life stage whereas at least one life stage was impaired in the three downstream sites.

Table 2. Evaluation thresholds used for listing

Waterbody	Life Stage	Season	7DADM Threshold
San Joaquin River (Friant Dam to Mendota Pool)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<18ºC
	Spawning	October 1 – December 15	<13ºC
	Juvenile Rearing	March 15 – June 15	<16ºC
	Steelhead Summer Rearing	June 15 – September 15	<18ºC
San Joaquin River (Bear Creek to Mud Slough)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
San Joaquin River (Mud Slough to Merced River)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
Delta Waterways (southern portion)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
Delta Waterways (central portion)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
Delta Waterways (northern portion)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
Delta Waterways (western portion)	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
Suisun Bay	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC
Carquinez Straight	Migration	March 15 – June 15 (smolts) September 1 – October 31 (adults)	<20ºC

Table 3. Waterbodies proposed for temperature listings (bolded and *italicized* values in the last column exceed the listing thresholds for listing)

Waterbody	Site Code	Start Date	End Date	Life Stage	# of calculable 7DADMs in appropriate season	#7DADM in appropriate season which exceed
San Joaquin River (Friant Dam to Mendota Pool)	SJRFB	5/30/2002	8/1/2010	Migration	629	0
				Spawning	382	31
				Juvenile Rearing	352	0
				Steelhead Summer Rearing	400	0
	SJRLL	5/30/2002	8/1/2010	Migration	1082	0
				Spawning	501	***203***
				Juvenile Rearing	737	0
				Steelhead Summer Rearing	543	1
	SJRWU	7/8/2007	6/10/2010	Migration	457	2
				Spawning	228	***115***
				Juvenile Rearing	274	44
				Steelhead Summer Rearing	256	38
	SJRRI	8/19/2008	8/31/2010	Migration	308	44
				Spawning	152	***63***
				Juvenile Rearing	186	***47***
				Steelhead Summer Rearing	199	***89***
	SJRSC	6/4/2002	8/31/2010	Migration	439	***155***
				Spawning	104	***69***
				Juvenile Rearing	290	***180***
				Steelhead Summer Rearing	289	***283***
	SJRMU	7/2/2007	8/1/2010	Migration	431	***263***
				Spawning	160	***122***
				Juvenile Rearing	279	***197***
				Steelhead Summer Rearing	310	***310***
	SJRGF	5/26/2008	8/31/2010	Migration	329	***224***
				Spawning	152	***104***
				Juvenile Rearing	207	***129***
				Steelhead Summer Rearing	264	***264***
San Joaquin River (Bear Creek to Mud Slough)	SJRSTV	8/6/2008	1/19/2010	Migration	215	***123***
San Joaquin River (Mud Slough to Merced River)	SJRNW	9/9/2008	7/13/2009	Migration	146	***90***
Delta Waterways (southern portion)	C7A	1/01/1995	8/30/2010	Migration	1965	***749***
Delta Waterways (central portion)	D29	8/12/2008	8/30/2010	Migration	308	***118***
Delta Waterways (northern portion)	C3A	12/21/1998	8/30/2010	Migration	1492	***431***

Delta Waterways (western portion)	D12A	1/03/2008	8/30/2010	Migration	391	***117***
	D24A	9/23/2008	8/30/2010	Migration	280	***74***
Suisun Bay	D10A	10/06/2008	8/30/2010	Migration	267	***48***
Carquinez Straight	D6A	1/01/1995	8/30/2010	Migration	2016	***563***

REFERENCES

CA, Department of Fish and Wildlife, March 2013. San Joaquin River Restoration Program Stream Temperature Monitoring Study Standard Operating Procedures (SOPs). 57 pages.

EPA, 2003a. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910-B-03-002. Region 10 Office of Water, Seattle, WA.

National Marine Fisheries Service Southwest Region. 2009. Biological and conference opinion on the long-term operations of the Central Valley Project and State Water Project. http://swr. nmfs. noaa. gov/ocap. Html

State of California

STATE WATER RESOURCES CONTROL BOARD

WATER QUALITY CONTROL POLICY

FOR DEVELOPING

CALIFORNIA'S CLEAN WATER ACT SECTION 303(d) LIST

Adopted September 30, 2004
Amended February 3, 2015

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Table of Contents

WATER QUALITY CONTROL POLICY FOR DEVELOPING CALIFORNIA'S CLEAN WATER ACT SECTION 303(d) LIST

1 Introduction

Pursuant to California Water Code section 13191.3(a), this State policy for water quality control (Policy) describes the process by which the State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (Regional Water Boards) will comply with the listing requirements of section 303(d) of the federal Clean Water Act (CWA). The objective of this Policy is to establish a standardized approach for developing California's section 303(d) list in order to achieve the overall goal of achieving water quality standards and maintaining beneficial uses in all of California's surface waters.

CWA section 303(d) requires states to identify waters that do not meet, or are not expected to meet by the next listing cycle, applicable water quality standards after the application of certain technology-based controls and schedule such waters for development of Total Maximum Daily Loads (TMDLs) [40 Code of Federal Regulations (CFR) 130.7(c) and (d)]. The states are required to assemble and evaluate all existing and readily available water quality-related data and information to develop the list [40 CFR 130.7(b)(5)] and to provide documentation for listing or not listing a state's waters [40 CFR 130.7(b)(6)]. The methodology to be used to develop the section 303(d) list [40 CFR 130.7(b)(6)(i)] is established by this Policy and includes:

- California Listing Factors and Delisting Factors;
- The process for gathering and evaluating of readily available data and information; and
- Total Maximum Daily Load (TMDL) scheduling.

This Policy applies only to the listing process methodology used to comply with CWA section 303(d). In order to make decisions regarding standards attainment, this Policy provides guidance for interpreting data and information as they are compared to beneficial uses, existing numeric and narrative water quality objectives, and antidegradation considerations. The Policy shall not be used to:

- determine compliance with any permit or waste discharge requirement provision;
- establish, revise, or refine any water quality objective or beneficial use; or
- translate narrative water quality objectives for the purposes of regulating point sources.

Data and information from water bodies shall be analyzed under the provisions of this Policy using a weight-of-evidence approach. The weight-of-evidence approach shall be used to evaluate whether the evidence is in favor of or against placing waters on or removing waters from the section 303(d) list (section 2). The following steps describe the weight-of-evidence approach:

1. Data and Information Preprocessing: All data and information for existing listings shall be solicited and assembled, as appropriate (sections 6.1.1 and 6.1.2.1). Water body fact sheets (section 6.1.2.2) describing the assessments shall be prepared. Evaluation guidelines (section 6.1.3), if needed, shall be selected and the quality of the data (section 6.1.4) and quantity of data (section 6.1.5) shall be assessed.

2. Data and Information Processing: All data and information shall be evaluated using the decision rules listed in sections 3 or 4, as appropriate, and using applicable implementation factors (including, but not limited to, sections 6.1.2.2 and 6.1.5.1 through 6.1.5.9). The Regional Water Boards shall also develop a schedule for completion of TMDLs (section 5). All other information not addressed under sections 3, 4, 5, or 6, shall be evaluated and presented in fact sheets.

3. Data Assessment: An assessment in favor of or against a list action for a water body-pollutant combination shall be presented in fact sheets. The assessment shall identify and discuss relationships between all available lines of evidence for water bodies and pollutants. This assessment shall be made on a pollutant-by-pollutant (including toxicity) basis. The Regional Water Boards shall approve all decisions to list or delist a water segment (section 6.2).

2 Structure of the CWA Section 303(d) List

This section describes the categories of waters that shall be included in the section 303(d) list. Sections 3 and 4 contain the factors that shall be used to add and remove waters from the list. At a minimum, the California section 303(d) list shall identify waters where standards are not met, pollutants or toxicity contributing to standards exceedance, and the TMDL completion schedule. The section 303(d) list shall contain the following categories:

2.1 Water Quality Limited Segments

Waters shall be placed in this category of the section 303(d) list if it is determined, in accordance with the California Listing Factors that the water quality standard is not attained; the standards nonattainment is due to toxicity, a pollutant, or pollutants; and remediation of the standards attainment problem requires one or more TMDLs.

The water segment shall remain in this category of the section 303(d) list until TMDLs for all pollutants have been completed, U.S. Environmental Protection Agency (U.S. EPA) has approved the TMDLs, and implementation plans have been adopted.

2.2 Water Quality Limited Segments Being Addressed

Water segments shall be placed in this category if the conditions for placement in the water quality limited segments category (section 3) are met and either of the following conditions is met:

1. A TMDL has been developed and approved by U.S. EPA and the approved implementation plan is expected to result in full attainment of the standard within a specified time frame; or

2. The Regional Water Board has determined in fact sheets that an existing regulatory program is reasonably expected to result in the attainment of the water quality standard within a reasonable, specified time frame.

Waters shall only be removed from this category if it is demonstrated in accordance with section 4 that water quality standards are attained.

3 California Listing Factors

The Regional Water Boards and the State Water Board shall use the following factors to develop the California section 303(d) list. Waters meeting the conditions in section 3 exceed water quality standards.

In developing the list, the state shall evaluate all existing readily available water quality-related data and information. Data and information collected during a known spill or violation of an effluent limit in a permit or waste discharge requirement (WDR) may be used in conjunction with other data to demonstrate that there is an exceedance of a water quality standard in the water body. Visual assessments or other semi-quantitative assessments shall also be considered as ancillary lines of evidence to support a section 303(d) listing.

Water segments shall be placed on the section 303(d) list if any of the following conditions are met.

3.1 Numeric Water Quality Objectives and Criteria for Toxicants in Water

Numeric water quality objectives for toxic pollutants, including maximum contaminant levels where applicable, or California/National Toxics Rule water quality criteria are exceeded as follows:

- Using the binomial distribution, waters shall be placed on the section 303(d) list if the number of measured exceedances supports rejection of the null hypothesis as presented in Table 3.1.

3.2 Numeric Water Quality Objectives for Conventional or Other Pollutants in Water

Numeric water quality objectives for conventional pollutants are exceeded as follows:

- Using the binomial distribution, waters shall be placed on the section 303(d) list if the number of measured exceedances supports rejection of the null hypothesis as presented in Table 3.2.

For depressed dissolved oxygen, if measurements of dissolved oxygen taken over the day (diel) show low concentrations in the morning and sufficient concentrations in the afternoon, then it shall be assumed that nutrients are responsible for the observed dissolved oxygen concentrations if riparian cover, substrate composition or other pertinent factors can be ruled out as controlling dissolved oxygen fluctuations. When continuous monitoring data are available, the seven-day average of daily minimum measurements shall be assessed. In the absence of diel measurements, concurrently collected measurements of nutrient concentration shall be assessed using applicable water quality objectives or acceptable evaluation guidelines (section 6.1.3) and using the binomial distribution as described in section 3.1.

3.3 Numerical Water Quality Objectives or Standards for Bacteria Where Recreational Uses Apply

In the absence of a site-specific exceedance frequency, a water segment shall be placed on the section 303(d) list if bacteria water quality standards in California Code of Regulations, Basin Plans, or statewide plans are exceeded using the binomial distribution as described in section 3.2.

If a site-specific exceedance frequency is available, it may be used instead of the ten percent exceedance frequency as described in Table 3.2 or four percent as described in the following paragraph. The site-specific exceedance frequency shall be the number of water quality standard exceedances in a relatively unimpacted watershed (i.e., a reference water segment). To the extent possible and allowed by water quality objectives, the Regional Water Boards shall identify one or more reference beaches or water segments to compare the measurements.

For bacterial measurements from coastal beaches, if water quality monitoring was conducted April 1 through October 31 only, a four percent exceedance percentage shall be used. For bacterial measurements from inland waters, if water quality monitoring data were collected April 1 through October 31 only, a four percent exceedance percentage shall be used if (1) bacterial measurements are indicative of human fecal matter, and (2) there is substantial human contact in the water body. If the exceedance is due to a closure related to a sewage spill, the water segment shall not be placed on the section 303(d) list. Postings that are not backed by water quality data shall not be used to support placement of a water segment on the section 303(d) list. A binomial table specific to listing coastal beaches can be found on the State Water Board's website at:
www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_binomial_tables.xls

3.4 Health Advisories

A water segment shall be placed on the section 303(d) list if a health advisory against the consumption of edible resident organisms, or a shellfish harvesting ban has been issued by the Office of Environmental Health Hazard Assessment (OEHHA), or Department of Health Services and there is a designated or existing fish consumption beneficial use for the segment. In addition, water segment-specific data must be available indicating the evaluation guideline for tissue is exceeded.

3.5 Bioaccumulation of Pollutants in Aquatic Life Tissue

A water segment shall be placed on the section 303(d) list if the tissue pollutant levels in organisms exceed a pollutant-specific evaluation guideline (satisfying the requirements of section 6.1.3) using the binomial distribution as described in section 3.1.

Acceptable tissue concentrations may be based on composite samples measured either as muscle tissue or whole body residues. Residues in liver tissue alone are not considered a suitable measure. Samples can be collected either from transplanted animals or from resident populations.

3.6 Water/Sediment Toxicity

A water segment shall be placed on the section 303(d) list if the water segment exhibits statistically significant water or sediment toxicity using the binomial distribution as described in section 3.1. The segment shall be listed if the observed toxicity is associated with a pollutant or pollutants. Waters may also be placed on the section 303(d) list for toxicity alone. If the pollutant causing or contributing to the toxicity is identified, the pollutant shall be included on the section 303(d) list as soon as possible (i.e., during the next listing cycle). For water segments where adopted narrative sediment quality objectives apply, development of the section 303(d) list shall also be in accordance with section 6.1.3.

Reference conditions may include laboratory controls (using a t-test or other applicable statistical test), the lower confidence interval of the reference envelope, or, for sediments, response less than 90 percent of the minimum significant difference for each specific test organism.

Appropriate reference and control measures must be included in the toxicity testing. Acceptable methods include, but are not limited to, those listed in water quality control plans, the methods used by Surface Water Ambient Monitoring Program (SWAMP), the Southern California Bight Projects of the Southern California Coastal Water Research Project, American Society for Testing and Materials (ASTM), U.S. EPA, the Regional Monitoring Program of the San Francisco Estuary Institute, and the Bay Protection and Toxic Cleanup Program (BPTCP).

Association of pollutant concentrations with toxic or other biological effects should be determined by any one of the following, unless other guidelines apply:

A. Sediment quality guidelines (satisfying the requirements of section 6.1.3) are exceeded using the binomial distribution as described in section 3.1. In addition, using rank correlation, the observed effects are correlated with measurements of chemical concentration in sediments. If these conditions are met, the pollutant shall be identified as "sediment pollutant(s)."

B. For sediments, an evaluation of equilibrium partitioning or other type of toxicological response that identifies the pollutant that may cause the observed impact. Comparison to reference conditions within a watershed or ecoregion may be used to establish sediment impacts.

C. Development of an evaluation (such as a toxicity identification evaluation) that identifies the pollutant that contributes to or caused the observed impact.

3.7 Nuisance

A water segment shall be placed on the section 303(d) list if qualitative assessments of the water segment for nuisance water odor, taste, excessive algae growth, foam, turbidity, oil, trash, and color are associated with numerical water quality data that meets any one of the following:

3.7.1 Nutrient-related

An acceptable nutrient-related evaluation guideline is exceeded using the binomial distribution as described in section 3.1 for excessive algae growth, unnatural foam, odor, and taste. Waters may also be placed on the section 303(d) list when a significant nuisance condition exists as compared to reference conditions, or when nutrient concentrations cause or contribute to excessive algae growth. If listing for nitrogen or phosphorus specifically, the Regional Water Board should consider whether the ratio of these two nutrients indicates which is the limiting agent.

3.7.2 Other Types

An acceptable evaluation guideline is exceeded using the binomial distribution as described in section 3.2 for taste, color, oil sheen, turbidity, litter, trash, and odor not related to nutrients. Water segments may also be placed on the section 303(d) list when there is significant nuisance condition compared to reference conditions.

3.8 Adverse Biological Response

A water segment shall be placed on the section 303(d) list if the water segment exhibits adverse biological response measured in resident individuals as compared to reference conditions and these impacts are associated with water or sediment concentrations of pollutants as described in section 3.6. Endpoints for this factor include reduction in growth, reduction in reproductive capacity, abnormal development, histopathological abnormalities, and other adverse conditions.

Qualitative visual assessments or other semi-qualitative assessments may be used as secondary lines of evidence to support placement on the section 303(d) list. These types of assessments include fish kills or bird kills related to water quality conditions.

For adverse biological response related to sedimentation, the water segment shall be placed on the section 303(d) list if adverse biological response is identified and effects are associated with clean sediment loads in water or with loads stored in the channel. Waters shall be placed on the section 303(d) list if evaluation guidelines (satisfying the conditions of section 6.1.3) are exceeded using the binomial distribution as described in section 3.1.

3.9 Degradation of Biological Populations and Communities

A water segment shall be placed on the section 303(d) list if the water segment exhibits significant degradation in biological populations and/or communities as compared to reference site(s) and is associated with water or sediment concentrations of pollutants including but not limited to chemical concentrations, temperature, dissolved oxygen, and trash. This condition requires diminished numbers of species or individuals of a single species or other metrics when compared to reference site(s). The analysis should rely on measurements from at least two stations. Comparisons to reference site conditions shall be made during similar season and/or hydrologic conditions.

Association of chemical concentrations, temperature, dissolved oxygen, trash, and other pollutants shall be determined using sections 3.1, 3.2, 3.6, 3.7, 6.1.5.9, or other applicable sections.

For population or community degradation related to sedimentation, the water segment shall be placed on the section 303(d) list if degraded populations or communities are identified and effects are associated with clean sediment loads in water or with loads stored in the channel when compared to evaluation guidelines (satisfying the conditions of section 6.1.3) using the binomial distribution as described in section 3.1 or as compared to reference sites.

Bioassessment data used for listing decisions shall be consistent with section 6.1.5.8. For bioassessment, measurements at one stream reach may be sufficient to warrant listing provided that the impairment is associated with a pollutant(s) as described in this section.

3.10 Trends in Water Quality

A water segment shall be placed on the section 303(d) list if the water segment exhibits concentrations of pollutants or water body conditions for any listing factor that shows a trend of declining water quality standards attainment. This section is focused on addressing the antidegradation component of water quality standards and threatened waters as defined in 40 CFR 130.2(j) by identifying trends of declining water quality. Numeric, pollutant-specific water quality objectives need not be exceeded to satisfy this listing factor. In assessing trends in water quality the Regional Water Board shall:

1. Use data collected for at least three years;
2. Establish specific baseline conditions;
3. Specify statistical approaches used to evaluate the declining trend in water quality measurements;
4. Specify the influence of seasonal effects, interannual effects, changes in monitoring methods, changes in analysis of samples, and other factors deemed appropriate;
5. Determine the occurrence of adverse biological response (section 3.8), degradation of biological populations and communities (section 3.9), or toxicity (section 3.6); and

6. Assess whether the declining trend in water quality is expected to not meet water quality standards by the next listing cycle.

Waters shall be placed on the section 303(d) list if the declining trend in water quality is substantiated (steps 1 through 4 above) and impacts are observed (step 5).

3.11 Situation-Specific Weight of Evidence Listing Factor

When all other Listing Factors do not result in the listing of a water segment but information indicates non-attainment of standards, a water segment shall be evaluated to determine whether the weight of evidence demonstrates that a water quality standard is not attained. If the weight of evidence indicates non-attainment, the water segment shall be placed on the section 303(d) list.

When making a listing decision based on the situation-specific weight of evidence, the Regional Water Board must justify its recommendation by:

- Providing any data or information including current conditions supporting the decision;
- Describing in fact sheets how the data or information affords a substantial basis in fact from which the decision can be reasonably inferred;
- Demonstrating that the weight of evidence of the data and information indicate that the water quality standard is not attained; and
- Demonstrating that the approach used is scientifically defensible and reproducible.

TABLE 3.1: MINIMUM NUMBER OF MEASURED EXCEEDANCES NEEDED TO PLACE A WATER SEGMENT ON THE SECTION 303(D) LIST FOR TOXICANTS. *Null Hypothesis: Actual exceedance proportion < 3 percent.* *Alternate Hypothesis: Actual exceedance proportion > 18 percent.* *The minimum effect size is 15 percent.*	
Sample Size	List if the number of exceedances equal or is greater than
2 – 24	2*
25 – 36	3
37 – 47	4
48 – 59	5
60 – 71	6
72 – 82	7
83 – 94	8
95 – 106	9
107 – 117	10
118 – 129	11

*Application of the binomial test requires a minimum sample size of 16. The number of exceedances required using the binomial test at a sample size of 16 is extended to smaller sample sizes.

For sample sizes greater than 129, the minimum number of measured exceedances is established where α and β < 0.2 and where |α - β| is minimized.

α = Excel® Function BINOMDIST(n-k, n, 1 – 0.03, TRUE)
β = Excel® Function BINOMDIST(k-1, n, 0.18, TRUE)
where n = the number of samples,
k = minimum number of measured exceedances to place a water on the section 303(d) list,
0.03 = acceptable exceedance proportion, and
0.18 = unacceptable exceedance proportion.

Expanded tables up to 20,000 samples can be found on the State Water Board website located at:
www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_binomial_tables.xls

TABLE 3.2: MINIMUM NUMBER OF MEASURED EXCEEDANCES NEEDED TO PLACE A WATER SEGMENT ON THE SECTION 303(D) LIST FOR CONVENTIONAL OR OTHER POLLUTANTS.

Null Hypothesis: Actual exceedance proportion < 10 percent.
Alternate Hypothesis: Actual proportion > 25 percent.
The minimum effect size is 15 percent.

Sample Size	List if the number of exceedances equal or is greater than
5 – 30	5*
31 – 36	6
37 – 42	7
43 – 48	8
49 – 54	9
55 – 60	10
61 – 66	11
67 – 72	12
73 – 78	13
79 – 84	14
85 – 91	15
92 – 97	16
98 – 103	17
104 – 109	18
110 – 115	19
116 – 121	20

*Application of the binomial test requires a minimum sample size of 26. The number of exceedances required using the binomial test at a sample size of 26 is extended to smaller sample sizes.

For sample sizes greater than 121, the minimum number of measured exceedances is established where α and β < 0.2 and where $|\alpha - \beta|$ is minimized.

α = Excel® Function BINOMDIST(n-k, n, 1 – 0.10, TRUE)
β = Excel® Function BINOMDIST(k-1, n, 0.25, TRUE)
where n = the number of samples,
k = minimum number of measured exceedances to place a water segment on section 303(d) list,
0.10 = acceptable exceedance proportion, and
0.25 = unacceptable exceedance proportion.

Expanded tables up to 20,000 samples can be found on the State Water Board website located at:
www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_binomial_tables.xls

4 California Delisting Factors

This section provides the methodology for removing waters from the section 303(d) list (including the Water Quality Limited Segments category and Water Quality Limited Segments Being Addressed category).

All listings of water segments shall be removed from the section 303(d) list if the listing was based on faulty data, and it is demonstrated that the listing would not have occurred in the absence of such faulty data. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control procedures, or limitations related to the analytical methods that would lead to improper conclusions regarding the water quality status of the segment.

If objectives or standards have been revised and the site or water meets water quality standards, the water segment shall be removed from the section 303(d) list. The listing of a segment shall be reevaluated if the water quality standard has been changed.

Any interested party may request an existing listing be reassessed under the delisting factors of this Policy. In requesting the reevaluation, the interested party must, using the delisting factors: state the reason(s) the listing is inappropriate and the Policy would lead to a different outcome; and provide the data and information necessary to enable the Regional Water Board and the State Water Board to conduct the review.

Water segments or pollutants shall be removed from the section 303(d) list if any of the following conditions are met.

4.1 Numeric Water Quality Objectives, Criteria, or Standards for Toxicants in Water

Numeric water quality objectives for toxic pollutants, including maximum contaminant levels where applicable, or California/National Toxics Rule water quality criteria are not exceeded as follows:

- Using the binomial distribution, waters shall be removed from the section 303(d) list if the number of measured exceedances supports rejection of the null hypothesis as presented in Table 4.1.
- The binomial distribution cannot be used to support a delisting with sample sizes less than 28.

4.2 Numeric Water Quality Objectives for Conventional or Other Pollutants in Water

Numeric water quality objectives for conventional pollutants are not exceeded as follows:

- Using the binomial distribution, waters shall be removed from the section 303(d) list if the number of measured exceedances supports rejection of the null hypothesis as presented in Table 4.2.
- The binomial distribution cannot be used to support a delisting with sample sizes less than 26.

4.3 Numeric Water Quality Objectives for Bacteria in Water

Numeric water quality objectives or standards for bacteria are not exceeded using the binomial distribution as described in section 4.2. If a site-specific exceedance frequency was used to place the water on the section 303(d) list, then the same exceedance frequency shall be used in the assessment to remove waters from the section 303(d) list. To the extent possible and allowed by water quality objectives, the Regional Water Boards shall identify one or more reference beaches or water segments in a relatively unimpacted watershed to compare the measurements. A binomial table specific to delisting coastal beaches can be found on the State Water Board's website at:
www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_binomial_tables.xls

4.4 Health Advisories

The health advisory used to list the water segment has been removed or the chemical or biological contaminant-specific evaluation guideline for tissue is no longer exceeded.

4.5 Bioaccumulation of Pollutants in Aquatic Life Tissue

Numeric pollutant-specific evaluation guidelines are not exceeded using the binomial distribution as described in section 4.1.

4.6 Water/Sediment Toxicity

Water/Sediment Toxicity or associated water or sediment quality guidelines are not exceeded using the binomial distribution as described in section 4.1.

4.7 Nuisance

The water segment no longer satisfies the conditions for a nuisance listing or associated numerical water or sediment data meets any one of the following:

4.7.1 Nutrient-related

For excessive algae growth, unnatural foam, odor, taste, applicable numerical nutrient-related evaluation guidelines are not exceeded using the binomial distribution as described in section 4.1.

4.7.2 Other Types

Acceptable numerical evaluation guidelines are not exceeded using the binomial distribution as described in section 4.2 for color, oil sheen, turbidity, trash, taste, or odor not related to nutrients. These types of nuisance shall also be removed from the list when there is no significant nuisance condition when compared to reference conditions.

4.8 Adverse Biological Response

Adverse biological response is no longer evident or associated water or sediment numeric pollutant-specific evaluation guidelines are not exceeded using the binomial distribution as described in section 4.1.

4.9 Degradation of Biological Populations and Communities

Biological populations and communities degradation in the water segment is no longer evident as compared to reference site(s) or associated water or sediment numeric pollutant-specific evaluation guidelines are not exceeded using the binomial distribution as described in section 4.1.

4.10 Trends in Water Quality

The factors for assessing trends in water quality (section 3.10) are not substantiated (steps 1 through 4) or impacts are no longer observed (step 5).

4.11 Situation-Specific Weight of Evidence Delisting Factor

When all other Delisting Factors do not result in the delisting of a water segment but information indicates attainment of standards, a water segment shall be evaluated to determine whether the weight of evidence demonstrates that a water quality standard is attained. If the weight of evidence indicates attainment, the water segment shall be removed from the section 303(d) list. If warranted, a listing may be maintained if the weight of evidence indicates a water quality standard is not attained.

When making a delisting decision based on the situation-specific weight of evidence, the Regional Water Board must justify its recommendation by:

- Providing any data or information including current conditions supporting the decision;
- Describing in fact sheets how the data or information affords a substantial basis in fact from which the decision can be reasonably inferred;
- Demonstrating that the weight of evidence of the data and information indicates that the water quality standard is attained; and
- Demonstrating that the approach used is scientifically defensible and reproducible.

TABLE 4.1: MAXIMUM NUMBER OF MEASURED EXCEEDANCES ALLOWED TO REMOVE A WATER SEGMENT FROM THE SECTION 303(D) LIST FOR TOXICANTS.

Null Hypothesis: Actual exceedance proportion > 18 percent.
Alternate Hypothesis: Actual proportion < 3 percent of the samples
The minimum effect size is 15 percent.

Sample Size	Delist if the number of exceedances equal or is less than
28 – 36	2
37 – 47	3
48 – 59	4
60 – 71	5
72 – 82	6
83 – 94	7
95 – 106	8
107 – 117	9
118 – 129	10

For sample sizes greater than 129, the maximum number of measured exceedances allowed is established where α and $\beta < 0.10$ and where $|\alpha - \beta|$ is minimized.

α = Excel® Function BINOMDIST(k, n, 0.18, TRUE)
β = Excel® Function BINOMDIST(n-k-1, n, 1 – 0.03, TRUE)
where n = the number of samples,
k = maximum number of measured exceedances allowed,
0.03 = acceptable exceedance proportion, and
0.18 = unacceptable exceedance proportion.

Expanded tables up to 20,000 samples can be found on the State Water Board website located at:
www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_binomial_tables.xls

TABLE 4.2: MAXIMUM NUMBER OF MEASURED EXCEEDANCES ALLOWED TO REMOVE A WATER SEGMENT FROM THE SECTION 303(D) LIST FOR CONVENTIONAL OR OTHER POLLUTANTS.

Null Hypothesis: Actual exceedance proportion > 25 percent.
Alternate Hypothesis: Actual exceedance proportion < 10 percent.
The minimum effect size is 15 percent.

Sample Size	Delist if the number of exceedances equal or is less than
26 – 30	4
31 – 36	5
37 – 42	6
43 – 48	7
49 – 54	8
55 – 60	9
61 – 66	10
67 – 72	11
73 – 78	12
79 – 84	13
85 – 91	14
92 – 97	15
98 – 103	16
104 – 109	17
110 – 115	18
116 – 121	19

For sample sizes greater than 121, the maximum number of exceedances allowed is established at α and $\beta < 0.2$ and where $|\alpha - \beta|$ is minimized.

α = Excel® Function BINOMDIST(k, n, 0.25, TRUE)
β = Excel® Function BINOMDIST(n-k-1, n, 1 – 0.1, TRUE)
where n = the number of samples,
k = maximum number of measured exceedances allowed,
0.10 = acceptable exceedance proportion, and
0.25 = unacceptable exceedance proportion.

Expanded tables up to 20,000 samples can be found on the State Water Board website located at:
www.waterboards.ca.gov/water_issues/programs/tmdl/docs/303d_binomial_tables.xls

5 TMDL Scheduling

A schedule shall be established by the Regional Water Boards and the State Water Board for waters on the section 303(d) list that identifies the TMDLs that will be established within the current listing cycle and the number of TMDLs scheduled to be developed thereafter.

For water quality limited segments needing a TMDL, RWQCBs shall develop a completion schedule in compliance with federal law and regulation based on, but not limited to, the following criteria:

- Water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns, and size of water body);
- Degree that water quality objectives are not met or beneficial uses are not attained or threatened (such as the severity of the pollution or number of pollutants/stressors of concern) [40 CFR 130.7(b)(4)];
- Degree of impairment;
- Potential threat to human health and the environment;
- Water quality benefits of activities ongoing in the watershed;
- Potential for beneficial use protection and recovery;
- Degree of public concern;
- Availability of funding; and
- Availability of data and information to address the water quality problem.

All water body-pollutant combinations on the section 303(d) list shall be assigned a TMDL schedule date.

6 Policy Implementation

This section provides the State Water Board guidance on implementation of this Policy. The most recently completed section 303(d) list shall form the basis for any subsequent lists.

6.1 Process for Evaluation of Readily Available Data and Information

All readily available data and information shall be evaluated. To develop the section 303(d) list the Regional Water Boards and the State Water Board shall use the following process.

6.1.1 Definition of Readily Available Data and Information

The Regional Water Boards and the State Water Board shall actively solicit all readily available data and information. The Regional Water Boards shall review all readily available data and information that has been submitted in response to the solicitation, including but not limited to data that is submitted by the Regional Water Boards, the State Water Board, and other sources. "Readily available data and information" is data and information that can be submitted to the California Environmental Data Exchange Network (CEDEN) or its successor database, as directed in the notice of solicitation. If CEDEN is unable to accept a particular subset of data and information, the State Water Board or the Regional Water Board will accept that data and information if it meets the formatting and quality assurance requirements detailed in section 6.1.4 of the Policy and the notice of solicitation for the current listing cycle.

6.1.2 Administration of the Listing Process

6.1.2.1 Solicitation of All Readily Available Data and Information

In its notice of solicitation, the State Water Board shall identify the database in which data and information shall be submitted and which Regional Water Boards shall administer the listing process for that listing cycle and whether the State Water Board will administer a particular Regional Water Board's listing process, pursuant to section 6.2, for that region. If a Regional Water Board is "off cycle" pursuant to the State Water Board's notice of solicitation, that Regional Water Board or State Water Board may administer the process for one or more water segments that would result in a direct listing change from the previous listing cycle pursuant to section 6.2. In accordance with the listing cycle, the State Water Board and the Regional Water Boards shall seek all readily available data and information on the quality of surface waters of the State. Readily available data and information shall be solicited from any interested party, including but not limited to, private citizens, public agencies, state and federal governmental agencies, non-profit organizations, and businesses possessing data and information regarding the quality of the Region's waters.

Though the State Water Board and the Regional Water Boards must specifically solicit all readily available data and assessment information, the State Water Board and the Regional Water Board may place emphasis in the solicitation on the data and information generated since the last listing cycle. For the purposes of this solicitation, information means any documentation describing the water quality condition of a surface water body. Data are considered a subset of information that consists of reports detailing measurements of specific environmental characteristics. The data and information may pertain to physical, chemical, and/or biological conditions of the State's waters or watersheds.

Information solicited should contain the following:

- The name of the person or organization providing the information;
- The name of the person certifying the completeness and accuracy of the data and information and a statement describing the standards exceedance;
- Mailing address, telephone numbers, and email address of a contact person for the information provided;
- A copy of all information provided. The submittal must specify the software used to format the information and provide definitions for any codes or abbreviations used;
- Bibliographic citations for all information provided; and
- If computer model outputs are included in the information, provide bibliographic citations and specify any calibration and quality assurance information available for the model(s) used.

Data solicited should contain the following:

- Data in electronic form, spreadsheet, database, or ASCII formats. The submittal should use the SWAMP data format and should define any codes or abbreviations used in the database.
- Metadata for the field data, i.e., when measurements were taken, locations, number of samples, detection limits, and other relevant factors.
- Metadata for any Geographical Information System data must be included. The metadata must detail all the parameters of the projection, including datum.
- A copy of the quality assurance procedures.
- A copy of the data.
- Data from citizen volunteer water quality monitoring efforts require the name of the group and indication of any training in water quality assessment completed by members of the group. Data submitted by citizen monitoring groups should meet the data quality assurance procedures as detailed in section 6.1.4.
- For photographic documentation, adhere to the guidelines detailed in section 6.1.4.

Data and information previously submitted to the Regional Water Boards, such as Discharge Monitoring Reports, need not be solicited if the data and information remain available to the Regional Water Boards.

6.1.2.2 Regional Water Board Fact Sheet Preparation

When data and information are available, the Regional Water Board shall prepare a standardized fact sheet for each water and pollutant combination that is proposed for inclusion in or deletion from the section 303(d) list. Fact sheets shall present a description of the line(s) of evidence used to support each component of the weight of evidence approach. Fact sheets shall be prepared for all data and information solicited. If the data and information reviewed indicate standards are attained, a single fact sheet may address multiple water and pollutant combinations.

The fact sheets shall contain the following:

A. Region
B. Type of water body (Bay and Harbors, Coastal Shoreline, Estuary, Lake/Reservoir, Ocean, Rivers/Stream, Saline Lake, Tidal Wetlands, Freshwater Wetland)
C. Name of water body segment (including Calwater watershed)
D. Pollutant or type of pollution that appears to be responsible for standards exceedance
E. Medium (water, sediment, tissue, habitat, etc.)

F. Water quality standards (copy applicable water quality standard, objective, or criterion from appropriate plan or regulation) including:
   1. Beneficial use affected
   2. Numeric water quality objective/water quality criteria plus metric (single value threshold, mean, median, etc.) or narrative water quality objective plus guideline(s) used to interpret attainment or non-attainment
   3. Antidegradation considerations (if applicable to situation)
   4. Any other provision of the standard used
G. Brief Watershed Description (e.g., land use, precipitation patterns, or other factors considered in the assessment)
H. Summary of data and/or information
   1. Spatial representation, area that beneficial use is affected or determined to be supported, including a map, any site specific information, and reference condition
   2. Temporal representation
   3. Age of data and/or information
   4. Effect of seasonality and events/conditions that might influence data and/or information evaluation (e.g., storms, flow conditions, laboratory data qualifiers, etc.)
   5. Number of samples or observations
   6. Number of samples or observations exceeding guideline or standard
   7. Source of or reference for data and/or information
I. For numeric data include:
   1. Quality assurance assessment
J. For non-numeric data include:
   1. Types of observations
   2. Perspective on magnitude of problem
   3. Numeric indices derived from qualitative data
K. Potential source of pollutant (the source category should be identified as specifically as possible)
L. Program(s) addressing the problem, if known
M. Data evaluation as required by sections 3 or 4 of this Policy
N. Recommendation
O. TMDL schedule (developed only for the section 303(d) list as required by section 5 of this Policy).

6.1.3 Evaluation Guideline Selection Process

Narrative water quality objectives shall be evaluated using evaluation guidelines. When evaluating narrative water quality objectives or beneficial use protection, the Regional Water Boards and the State Water Board shall identify evaluation guidelines that represent standards attainment or beneficial use protection. The guidelines are not water quality objectives and shall only be used for the purpose of developing the section 303(d) list.

To select an evaluation guideline, the Regional Water Board or the State Water Board shall:

- Identify the water body, pollutants, and beneficial uses;
- Identify the narrative water quality objectives or applicable water quality criteria;
- Identify the appropriate interpretive evaluation guideline that potentially represents water quality objective attainment or protection of beneficial uses. If this Policy requires evaluation values to be used as one line of evidence, the evaluation value selected shall be used in concert with the other required line(s) of evidence to support the listing or delisting decision.

Depending on the beneficial use and narrative standard, the following considerations shall be used in the selection of evaluation guidelines:

1. <u>Sediment Quality Guidelines for Marine, Estuarine, and Freshwater Sediments</u>:

A. If sediment quality objectives apply, the Regional Water Boards shall use the methods and procedures that were adopted to interpret the objective and any provisions adopted to develop the section 303(d) list.

B. If no applicable sediment quality objectives apply, or insufficient data exists to interpret sediment quality objectives, the Regional Water Boards may select sediment quality guidelines that have been published in the peer-reviewed literature or by state or federal agencies. Acceptable guidelines include selected values (e.g., effects range-median, probable effects level, probable effects concentration), and other sediment quality guidelines. Only those sediment guidelines that are predictive of sediment toxicity shall be used (i.e., those guidelines that have been shown in published studies to be predictive of sediment toxicity in 50 percent or more of the samples analyzed).

2. <u>Evaluation Guidelines for Protection from the Consumption of Fish and Shellfish</u>: The Regional Water Boards may select evaluation guidelines published by U.S. EPA or OEHHA. Maximum Tissue Residue Levels (MTRLs) and Elevated Data Levels (EDLs) shall not be used to evaluate fish or shellfish tissue data.

3. <u>Evaluation Guidelines for Protection of Aquatic Life from Bioaccumulation of Toxic Substances</u>: The Regional Water Boards may select the evaluation values for the protection of aquatic life published by the National Academy of Science.

For other parameters, evaluation guidelines may be used if it can be demonstrated that the evaluation guideline is:

- Applicable to the beneficial use
- Protective of the beneficial use
- Linked to the pollutant under consideration
- Scientifically-based and peer reviewed
- Well described
- Identifies a range above which impacts occur and below which no or few impacts are predicted. For non-threshold chemicals, risk levels shall be consistent with comparable water quality objectives or water quality criteria.

The Regional Water Boards shall assess the appropriateness of the guideline in the hydrographic unit. Justification for the alternate evaluation guidelines shall be referenced in the water body fact sheet.

6.1.4 Data Quality Assessment Process

Even though all data and information must be considered, the quality of the data used in the development of the section 303(d) list shall be of sufficient high quality to make determinations of water quality standards attainment. Data supported by a Quality Assurance Project Plan (QAPP) pursuant to the requirements of 40 CFR 31.45 are acceptable for use in developing the section 303(d) list.

The data from major monitoring programs in California and published U.S. Geological Survey (USGS) reports are considered of adequate quality. The major programs include SWAMP, the Southern California Bight Projects of the Southern California Coastal Water Research Project, U.S. EPA's Environmental Monitoring and Assessment Program, the Regional Monitoring Program of the San Francisco Estuary Institute, and the BPTCP.

Numeric data are considered credible and relevant for listing purposes if the data set submitted meets the minimum quality assurance/quality control requirements outlined below. A QAPP or equivalent documentation must be available containing, at a minimum, the following elements:

- Objectives of the study, project, or monitoring program;
- Methods used for sample collection and handling;
- Field and laboratory measurement and analysis;
- Data management, validation, and recordkeeping (including proper chain of custody) procedures;
- Quality assurance and quality control requirements;
- A statement certifying the adequacy of the QAPP (plus name of person certifying the document); and
- A description of personnel training.

A site-specific or project-specific sampling and analysis plan for numeric data should also be available containing:

- Data quality objectives or requirements of the project;
- A statement that data quality objectives or requirements were achieved;
- Rationale for the selection of sampling sites, water quality parameters, sampling frequency and methods that assure the samples are spatially and temporally representative of the surface water and representative of conditions within the targeted sampling timeframe; and
- Documentation to support the conclusion that results are reproducible.

The Regional Water Boards shall make a finding in the fact sheets on the availability of the QAPP (or equivalent), adequacy of data collection, analysis practices, and adequacy of the data verification process (including the chain of custody, detection limits, holding times, statistical treatment of data, precision and bias, etc). If any data quality objectives or requirements in the QAPP are not met, the reason for not meeting them and the potential impact on the overall assessment shall be documented.

Data without rigorous quality control can be used in combination with high quality data and information. If the data collection and analysis is not supported by a QAPP (or equivalent) or if it is not possible to tell if the data collection and analysis were supported by a QAPP (or equivalent), then the data and information should not be used by itself to support listing or delisting of a water segment. All data of whatever quality can be used as part of a weight of evidence determination (sections 3.11 or 4.11).

For narrative and qualitative submittals, the submission must:

- describe events or conditions that indicate impacts on water quality;

- provide linkage between the measurement endpoint (e.g., a study that may have been performed for some other purpose) and the water quality standard of interest;
- be scientifically defensible;
- provide analyst's credentials and training; and
- be verifiable by the State Water Board or the Regional Water Board.

For photographic documentation, the submission must:

- identify the date;
- identify location on a general area map;
- either mark location on a USGS 7.5 minute quad map along with quad sheet name or provide location latitude/longitude;
- provide a thorough description of photograph(s);
- describe the spatial and temporal representation of the photographs;
- provide linkage between photograph-represented condition and condition that indicates impacts on water quality;
- provide photographer's rationale for area photographed and camera settings used; and
- be verifiable by the State Water Board and the Regional Water Board.

6.1.5 Data Quantity Assessment Process

Before determining if water quality standards are exceeded, the Regional Water Boards have wide discretion establishing how data and information are to be evaluated, including the flexibility to establish water segmentation, as well as the scale of spatial and temporal data and information that are to be reviewed. The following considerations shall be documented in each water body fact sheet.

6.1.5.1 Water Body Specific Information

Data used to assess water quality standards attainment should be actual data that can be quantified and qualified. Information that is descriptive, estimated, modeled, or projected may be used as ancillary lines of evidence for listing or delisting decisions. In order to be used in developing the lists:

- Data must be measured at one or more sites in the water segment;
- If applicable and available, environmental conditions in a water body or at a site must be taken into consideration (e.g., effects of seasonality, events such as storms, the occurrence of wildfires, land use practices, etc.); and
- The fact sheet shall contain a description of readily available pertinent factors such as the depth of water quality measurements, flow, hardness, pH, the extent of tidal influence, and other relevant sample- and water body-specific factors.

6.1.5.2 Spatial Representation

Samples should be representative of the water body segment. To the extent possible, samples should represent statistically or in a consistent targeted manner the segment of the water body.

Samples collected within 200 meters of each other should be considered samples from the same station or location. However, samples less than 200 meters apart may be considered to be spatially independent samples if justified in the water body fact sheet.

6.1.5.3 Temporal Representation

Samples should be representative of the critical timing that the pollutant is expected to impact the water body. Samples used in the assessment must be temporally independent. If the majority of samples were collected on a single day or during a single short-term natural event (e.g., a storm, flood, or wildfire), the data shall not be used as the primary data set supporting the listing decision.

Documentation should include the time of day in which the sample was taken, and, to the extent possible, the critical season for the pollutant and applicable water quality standard. In general, samples should be available from two or more seasons or from two or more events when effects or water quality objective exceedances would be expected to be clearly manifested.

Sampling ephemeral waters, during a specific season, or during human-caused events (except spills) should be used to assess significant pollutant-related exceedances of water quality standards. Timing of the sampling should include the critical season for the pollutant and applicable water quality standard. If the implementation of a management practice(s) has resulted in a change in the water body segment, only recently collected data [since the implementation of the management measure(s)] should be considered. The water quality fact sheet should describe the significance of the sample timing.

6.1.5.4 Aggregation of Data by Reach/Area

At a minimum, data shall be aggregated by the water body segments as defined in the Basin Plans. In the absence of a Basin Plan segmentation system, the Regional Water Boards should define distinct reaches based on hydrology and relatively homogeneous land use.

If available data suggest that a pollutant may cause an excursion above a water quality objective, the Regional Water Board should, to the extent information is readily available, identify land uses, subwatersheds, tributaries, or dischargers that could be contributing the pollutant to the water body. The Regional Water Boards should identify stream reaches or lake/estuary areas that may have different pollutant levels based on significant differences in land use, tributary inflow, or discharge input. Based on these evaluations of the water body setting, the Regional Water Boards should aggregate the data by appropriate reach or area.

Data must be measured at one or more sites in the water segment in order to place a water segment on the section 303(d) list.

6.1.5.5 Quantitation of Chemical Concentrations

When available data are less than or equal to the quantitation limit and the quantitation limit is less than or equal to the water quality standard, the value will be considered as meeting the water quality standard, objective, criterion, or evaluation guideline.

When the sample value is less than the quantitation limit and the quantitation limit is greater than the water quality standard, objective, criterion, or evaluation guideline, the result shall not be used in the analysis.

The quantitation limit includes the minimum level, practical quantitation level, or reporting limit.

6.1.5.6 Evaluation of Data Consistent with the Expression of Numeric Water Quality Objectives, Water Quality Criteria, or Evaluation Guidelines

If the water quality objectives, criteria, or guidelines state a specific averaging period and/or mathematical transformation, the data should be evaluated in a consistent manner prior to conducting any statistical analysis for placement of the water on the section 303(d) list. If sufficient data are not available for the stated averaging period, the available data shall be used to represent the averaging period.

To be considered temporally independent, samples collected during the averaging period shall be combined and considered one sampling event. For data that is not temporally independent (e.g., when multiple samples are collected at a single location on the same day), the measurements shall be combined and represented by a single resultant value. For dissolved oxygen measurements, the minimum value shall be used to determine compliance with the water quality objective. For pH measurements, the minimum or maximum values of the data set shall be used to determine compliance with the water quality objective.

If the averaging period is not stated for the standard, objective, criterion, or evaluation guideline, then the samples collected less than 7 days apart shall be averaged.

6.1.5.7 Binomial Model Statistical Evaluation

Once data have been summarized, the Regional Water Boards shall determine if standards are exceeded. The Regional Water Boards shall determine for each averaging period which data points exceed water quality standards. The number of measurements that exceed standards shall be reported in the water body fact sheet.

When numerical data are evaluated, all of the following steps shall be completed:

A. For each data point representing the averaging period, the Regional Water Board shall answer the question: Are water quality standards met?

B. If the measurement is greater than the water quality standard, objective, criterion, or evaluation guideline, then the standard is exceeded.

C. Sum the number of samples exceeding the standard, objective, criterion, or evaluation guideline.

D. Sum the total number of measurements (sample population).

E. Compare the result to the appropriate table (i.e., Tables 3.1, 3.2, 4.1, or 4.2).

F. Report the result of this comparison in the water body fact sheet.

6.1.5.8 Evaluation of Bioassessment Data

When evaluating biological data and information, the Regional Water Boards shall evaluate all readily available data and information and shall:

- Identify appropriate reference sites within water segments, watersheds, or ecoregions. Document methods for selection of reference sites.
- Evaluate bioassessment data at reference sites using water segment-appropriate method(s) and index period(s). Document sampling methods, index periods, and Quality Assurance/Quality Control procedures for the habitat being sampled and question(s) being asked.

- Evaluate bioassessment data from other sites, and compare to reference conditions. Evaluate physical habitat data and other water quality data, when available, to support conclusions about the status of the water segment.
- Calculate biological metrics for reference sites and develop Index of Biological Integrity if possible.

6.1.5.9 Evaluation of Temperature Data

Temperature water quality objectives shall be evaluated as described in sections 6.1.5.1 through 6.1.5.7. When "historic" or "natural" temperature data are not available, alternative approaches shall be employed to assess temperature impacts.

In the absence of necessary data to interpret numeric water quality objectives, recent temperature monitoring data shall be compared to the temperature requirements of aquatic life in the water segment. In many cases, fisheries, particularly salmonids, represent the beneficial uses most sensitive to temperature. Information on current and historic conditions and distribution of sensitive beneficial uses (e.g., fishery resources) in the water segment is necessary, as well as recent temperature data reflective of conditions experienced by the most sensitive life stage of the aquatic life species. If temperature data from past (historic) periods corresponding to times when the beneficial use was fully supported are not available, information about presence/absence or abundance of sensitive aquatic life species shall be used to infer past (historic) temperature conditions if loss of habitat, diversions, toxic spills, and other factors are also considered.

Determination of life stage temperature requirements of sensitive aquatic life species shall be based on peer-reviewed literature. Similarly, evaluation of temperature data shall be based on temperature metrics reflective of the temperature requirements for the sensitive aquatic life species, including but not limited to, the maximum weekly average temperature and upper lethal limit.

6.2 Approval of the Regional Water Board's List

At a public hearing, the Regional Water Board shall consider and approve each proposed list change as documented in water body fact sheets. Advance notice and opportunity for public comment shall be provided. The Regional Water Board shall develop written responses to all comments. After consideration of all testimony, the Regional Water Boards shall approve a resolution in support of their recommendations for the section 303(d) list. The Regional Water Boards shall submit to the State Water Board the water body fact sheets, responses to comments, documentation of the hearing process, and identify all data and information considered. Requests for review of specific listing recommendations made by a Regional Water Board must be submitted to the State Water Board no later than 30 days after the date of the Regional Water Board's approval.

At its election, the State Water Board may administer the listing process for each listing cycle. If the State Water Board administers and considers a region's proposed list on behalf of a Regional Water Board, the State Water Board shall adopt the list at a public hearing. Such consideration and adoption shall occur after the State Water Board provides advance notice in the affected region and opportunity for public comment and responds to all comments. The State Water Board's recommendations on behalf of a Regional Water Board shall be consolidated into the statewide list submitted to U.S. EPA with the supporting fact sheets without further consideration.

6.3 Approval of Statewide List

The Regional Water Boards propose region-specific recommendations for the section 303(d) list. The State Water Board may receive public comments concerning those listing recommendations that are timely requested for review pursuant to section 6.2 and may make changes to the recommendations prior to submitting the section 303(d) list to U.S. EPA. Because U.S. EPA may change the State Water Board's recommended section 303(d) list, the section 303(d) list is only effective upon U.S. EPA's final approval.

The State Water Board shall evaluate the Regional Water Board's developed water body fact sheets for completeness, consistency with this Policy, and consistency with applicable law. The State Water Board shall assemble the fact sheets and consolidate the approved Regions' lists, into a statewide section 303(d) list.

The State Water Board Executive Director or the State Water Board shall approve the section 303(d) list. Before the Executive Director or the State Water Board approves the section 303(d) list, the State Water Board shall provide advance notice and opportunity for public comment. Public comment shall be limited to listing recommendations that are timely requested for review pursuant to section 6.2 unless the Executive Director or the State Water Board elects to consider recommendations on other waters. Upon approval by the Executive Director or State Water Board, the statewide section 303(d) list and supporting fact sheets shall be submitted to U.S. EPA for approval as required by the Clean Water Act.

7 Definitions

α (Alpha) is the statistical error of rejecting a null hypothesis that is true. This type of error is also called Type I error.

ALTERNATE HYPOTHESIS is a statement or claim that a statistical test is set up to establish.

β (Beta) is the statistical error of failing to reject a null hypothesis that is not true. This type of error is also called Type II error.

BINOMDIST is an Excel® function that is used to calculate the cumulative binomial distribution.

BINOMIAL DISTRIBUTION is a mathematical distribution that describes the probabilities associated with the possible number of times particular outcomes will occur in series of observations (i.e., samples). Each observation may have only one of two possible results (e.g., standard exceeded or standard not exceeded).

BIOACCUMULATION is the process by which a chemical is taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

BIOASSESSMENT is an assessment of biological community information along with measures of the physical/habitat quality to determine, in the case of water quality, the integrity of a water body of interest.

CONVENTIONAL POLLUTANTS include dissolved oxygen, pH, and temperature.

DIEL measurements pertain to measurements taken over a 24-hour period of time.

EFFECT SIZE is maximum magnitude of exceedance frequency that is tolerated.

LISTING CYCLE refers to the two-year cycle that the State Water Board submits its section 303(d) list to U.S. EPA for approval.

NULL HYPOTHESIS is a statement used in statistical testing that has been put forward either because it is believed to be true or because it is to be used as a basis for argument, but has not been proved.

RANK CORRELATION is the association between paired values of two variables that have been replaced by their ranks within their respective samples (e.g., chemical measurements and response in a toxicity test).

REFERENCE CONDITION refers to the characteristics of water body segments least impaired by human activities. As such, reference conditions can be used to describe attainable biological or habitat conditions for water body segments with common watershed/catchment characteristics within defined geographical regions.

STATISTICAL SIGNIFICANCE occurs when it can be demonstrated that the probability of obtaining a difference by chance only is relatively low.

TOXICANTS include priority pollutants, metals, chlorine, and nutrients.

TOXICITY IDENTIFICATION EVALUATION (TIE) is a technique to identify the unexplained cause(s) of toxic events. TIE involves selectively removing classes of chemicals through a series of sample manipulations, effectively reducing complex mixtures of chemicals in natural waters to simple components for analysis. Following each manipulation the toxicity of the sample is assessed to see whether the toxicant class removed was responsible for the toxicity.

WATER QUALITY LIMITED SEGMENT is any segment of a water body where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after application of technology-based effluent limitations required by CWA sections 301(d) or 306.

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Supporting Information

Regional Board 2 - San Francisco Bay Region

Water Body Name:	Pacific Ocean at Fort Funston
Water Body ID:	**CAC2021001020110713001240**
Water Body Type:	**Coastal & Bay Shoreline**

DECISION ID **66036** **Region 2**

Pacific Ocean at Fort Funston

Pollutant:	**Indicator Bacteria**
Final Listing Decision:	**Do Not List on 303(d) list (TMDL required list)**
Last Listing Cycle's Final Listing Decision:	New Decision
Revision Status	Revised
Impairment from Pollutant or Pollution:	Pollutant

Regional Board Conclusion:

This pollutant is being considered for placement on the CWA section 303(d) List under section 3.3 of the Listing Policy. Under section 3.3 a single line of evidence is necessary to assess listing status.

Six lines of evidence are available in the administrative record to assess this pollutant. Five of the thirty samples exceed the enterococcus single sample maximum objective. However, these data are not temporally representative of water quality at Fort Funston. The water is sampled only during and after combined sewer discharge events. Four of the five exceedances occurred on days with heavy rainfall in San Francisco (Dec 12 2006 with 2.32 inches, Jan 4 2008 with 1.96 inches, and Feb 16-17 2009 in which 3.84 inches fell). The Listing Policy discourages use of data collected during short-term natural events as the primary data set supporting a listing decision.

Based on the readily available data and information, the weight of evidence indicates that there is not sufficient justification for placing this water segment-pollutant combination on the CWA section 303(d) List.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used does not satisfy the data quantity requirements of section 6.1.5 of the Policy as explained above (data collected during combined sewer discharge events).
3. Five of the thirty samples exceed the enterococcus single sample maximum objective and this exceeds the allowable frequency listed in Table 3.2 of the Listing

	Policy. 4. Four of the five exceedances occurred during heavy rain days and likely combined sewer discharge events and are thus not temporally representative of water quality at this location. 5. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.
Regional Board Decision Recommendation:	After review of the available data and information, RWQCB staff concludes that the water body-pollutant combination should not be placed on the section 303(d) list. The readily available data and information is insufficient to determine, with the power and confidence of the Listing Policy, the applicable beneficial use support rating.
State Board Review of Regional Board Conclusion and Recommendation:	
State Board Decision Recommendation:	After review of this Regional Board decision, SWRCB staff recommend the decision be approved by the State Board.

Line of Evidence (LOE) for Decision ID 66036, Indicator Bacteria **Region 2**

Pacific Ocean at Fort Funston

LOE ID:	90901
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	30
Number of Exceedances:	5
Data and Information Type:	PATHOGEN MONITORING
Data Used to Assess Water Quality:	Water Board staff assessed BeachWatch data for Pacific Ocean at Fort Funston to determine beneficial use support and results are as follows: 5 of 30 samples exceed the criterion for Enterococci.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (SWRCB 2009) states that the single sample maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Fort Funston was

	collected at 1 monitoring site [Fort Funston]
Temporal Representation:	Data was collected over the time period 1/9/2005-4/5/2010. These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
Environmental Conditions:	These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 66036, Indicator Bacteria **Region 2**

Pacific Ocean at Fort Funston

LOE ID:	90696
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	5
Number of Exceedances:	1
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	One of the 5 geomeans exceeded the objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for entercoccus states that the entercoccus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at the Fort Funston site.
Temporal Representation:	Samples were collected from January 2005 to April 2010. These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
Environmental Conditions:	These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
QAPP Information:	The samples were collected for the Beach Watch program.

QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 66036, Indicator Bacteria **Region 2**

Pacific Ocean at Fort Funston

LOE ID:	90535
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	5
Number of Exceedances:	1
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	One of the 5 geomeans exceeded the total coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for total coliform states that the total coliform density shall not exceed 1,000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at station Fort Funston.
Temporal Representation:	Samples were collected from January 2005 to April 2010. These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
Environmental Conditions:	These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 66036, Indicator Bacteria **Region 2**

Pacific Ocean at Fort Funston

LOE ID:	90857
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water

Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 30
Number of Exceedances: 3

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Fort Funston to determine beneficial use support and results are as follows: 3 of 30 samples exceed the criterion for Coliform, Total.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (2009) single sample maximum states that total coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Fort Funston was collected at 1 monitoring site [Fort Funston]
Temporal Representation: Data was collected over the time period 1/9/2005-4/5/2010. These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
Environmental Conditions: These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 66036, Indicator Bacteria **Region 2**

Pacific Ocean at Fort Funston

LOE ID: 90796

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 30
Number of Exceedances: 4

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Fort

	Funston to determine beneficial use support and results are as follows: 4 of 30 samples exceed the criterion for Coliform, Fecal.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Fort Funston was collected at 1 monitoring site [Fort Funston]
Temporal Representation:	Data was collected over the time period 1/9/2005-4/5/2010. These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
Environmental Conditions:	These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 66036, Indicator Bacteria **Region 2**

Pacific Ocean at Fort Funston

LOE ID:	90534
Pollutant:	Fecal Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	5
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 5 geomeans exceeded the fecal coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at station Fort Funston.
Temporal Representation:	Samples were collected from January 2005 to April 2010.These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
Environmental Conditions:	These data were collected during or just after storm events when combined sewer discharges were known to occur. Therefore, these data are not temporally representative of water quality conditions relevant to assessing protection of REC1.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

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Supporting Information

Regional Board 2 - San Francisco Bay Region

Water Body Name:	Pacific Ocean at Ocean Beach
Water Body ID:	**CAC2021000020161017061298**
Water Body Type:	**Coastal & Bay Shoreline**

DECISION ID **65990** **Region 2**

Pacific Ocean at Ocean Beach

Pollutant:	**Indicator Bacteria**
Final Listing Decision:	**Do Not List on 303(d) list (TMDL required list)**
Last Listing Cycle's Final Listing Decision:	New Decision
Revision Status	Revised
Impairment from Pollutant or Pollution:	Pollutant

Regional Board Conclusion:

This pollutant is being considered for placement on the CWA section 303(d) List under section 3.3 of the Listing Policy. Under section 3.3 a single line of evidence is necessary to assess listing status.

Thirty lines of evidence are available in the administrative record to assess this pollutant. Sixty-eight of nine hundred sixty-three samples exceed the enterococcus geometric mean objective.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification against placing this water segment-pollutant combination on the CWA section 303(d) List.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.
3. Sixty-eight of nine hundred sixty-three samples exceed the enterococcus geometric mean objective objective and this does not exceed the allowable frequency listed in Table 3.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

Regional Board Decision Recommendation:

After review of the available data and information, RWQCB staff concludes that the water body-pollutant combination should not be placed on the section 303(d) list because applicable water quality standards are not being exceeded.

State Board Review of Regional Board Conclusion and Recommendation:

State Board Decision Recommendation: After review of this Regional Board decision, SWRCB staff recommend the decision be approved by the State Board.

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95839

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 29
Number of Exceedances: 10

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Vicente St) to determine beneficial use support and results are as follows: 10 of 29 samples exceed the criterion for Enterococci.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Vicente St) was collected at 1 monitoring site [Ocean Beach, at Vicente St.]
Temporal Representation: Data was collected over the time period 1/9/2005-1/21/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95847

Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	318
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 318 geomeans exceeded the total coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for total coliform states that the total coliform density shall not exceed 1,000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at station Ocean Beach, at Sloat Blvd.
Temporal Representation:	Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95835
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	6
Number of Exceedances:	2
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Two of the 6 geomeans exceeded the total coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for total coliform states that the total coliform density shall not exceed 1,000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Pacheco St.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95841

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 3
Number of Exceedances: 2

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Two of the 3 geomeans exceeded the total coliform objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for total coliform states that the total coliform density shall not exceed 1,000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Vicente St.
Temporal Representation: Samples were collected approximately five times a year from January 2005 to January 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95823
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	318
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 318 geomeans exceeded the total coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for total coliform states that the total coliform density shall not exceed 1,000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at station Ocean Beach, at Balboa St.
Temporal Representation:	Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95829
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	318
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 318 geomeans exceeded the total coliform objective.

Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for total coliform states that the total coliform density shall not exceed 1,000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Lincoln Ave.
Temporal Representation: Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95826

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 326
Number of Exceedances: 10

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Lincoln Way) to determine beneficial use support and results are as follows: 10 of 326 samples exceed the criterion for Coliform, Total.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (2009) single sample maximum states that total coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Lincoln Way) was collected at 1 monitoring site [Ocean Beach, at Lincoln Ave.]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.

Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95837

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 29
Number of Exceedances: 5

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Vicente St) to determine beneficial use support and results are as follows: 5 of 29 samples exceed the criterion for Coliform, Total.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (2009) single sample maximum states that total coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Vicente St) was collected at 1 monitoring site [Ocean Beach, at Vicente St.]
Temporal Representation: Data was collected over the time period 1/9/2005-1/21/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95820

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 323
Number of Exceedances: 5

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Balboa St) to determine beneficial use support and results are as follows: 5 of 323 samples exceed the criterion for Coliform, Total.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (2009) single sample maximum states that total coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Balboa St) was collected at 1 monitoring site [Ocean Beach, at Balboa St.]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95844

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 323
Number of Exceedances: 2

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Sloat Blvd) to determine beneficial use support and results are as follows: 2 of 323 samples exceed the criterion for Coliform, Total.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (2009) single sample maximum states that total

	coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Sloat Blvd) was collected at 1 monitoring site [Ocean Beach, at Sloat Blvd.]
Temporal Representation:	Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions:	Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95831
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	29
Number of Exceedances:	3
Data and Information Type:	PATHOGEN MONITORING
Data Used to Assess Water Quality:	Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Pacheco St) to determine beneficial use support and results are as follows: 3 of 29 samples exceed the criterion for Coliform, Total.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (2009) single sample maximum states that total coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Pacheco St) was collected at 1 monitoring site [Ocean Beach, at Pacheco St.]
Temporal Representation:	Data was collected over the time period 1/9/2005-1/19/2010.
Environmental Conditions:	Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95848
Pollutant:	Fecal Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	318
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 318 geomeans exceeded the fecal coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at station Ocean Beach, at Sloat Blvd.
Temporal Representation:	Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95836
Pollutant:	Fecal Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	6
Number of Exceedances:	1

Data and Information Type: Not Specified
Data Used to Assess Water Quality: One of the 6 geomeans exceeded the fecal coliform objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Pacheco St.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95824

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 318
Number of Exceedances: 0

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Zero of the 318 geomeans exceeded the fecal coliform objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Balboa St.
Temporal Representation: Samples were collected approximately once a week from January 2005 to September 2010.

Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95830
Pollutant:	Fecal Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	318
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 318 geomeans exceeded the fecal coliform objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at station Ocean Beach, at Lincoln Ave.
Temporal Representation:	Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95842
Pollutant:	Fecal Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation

Number of Samples: 3
Number of Exceedances: 1

Data and Information Type: Not Specified
Data Used to Assess Water Quality: One of the 3 geomeans exceeded the fecal coliform objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Vicente St.
Temporal Representation: Samples were collected approximately five times a year from January 2005 to January 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95821

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 323
Number of Exceedances: 10

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Balboa St) to determine beneficial use support and results are as follows: 10 of 323 samples exceed the criterion for Coliform, Fecal.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:

Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Balboa St) was collected at 1 monitoring site [Ocean Beach, at Balboa St.]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95832

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 29
Number of Exceedances: 6

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Pacheco St) to determine beneficial use support and results are as follows: 6 of 29 samples exceed the criterion for Coliform, Fecal.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Pacheco St) was collected at 1 monitoring site [Ocean Beach, at Pacheco St.]
Temporal Representation: Data was collected over the time period 1/9/2005-1/19/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95845

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 323
Number of Exceedances: 8

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Sloat Blvd) to determine beneficial use support and results are as follows: 8 of 323 samples exceed the criterion for Coliform, Fecal.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Sloat Blvd) was collected at 1 monitoring site [Ocean Beach, at Sloat Blvd.]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95827

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 326
Number of Exceedances: 16

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Lincoln Way) to determine beneficial use support and results are

	as follows: 16 of 326 samples exceed the criterion for Coliform, Fecal.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Lincoln Way) was collected at 1 monitoring site [Ocean Beach, at Lincoln Ave.]
Temporal Representation:	Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions:	Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95838
Pollutant:	Fecal Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	29
Number of Exceedances:	8
Data and Information Type:	PATHOGEN MONITORING
Data Used to Assess Water Quality:	Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Vicente St) to determine beneficial use support and results are as follows: 8 of 29 samples exceed the criterion for Coliform, Fecal.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Vicente St) was collected at 1 monitoring site [Ocean Beach, at Vicente St.]

Temporal Representation: Data was collected over the time period 1/9/2005-1/21/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95822

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 318
Number of Exceedances: 18

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Eighteen of the 318 geomeans exceeded the enterococcus objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for enterococcus states that the enterococcus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Balboa St.
Temporal Representation: Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95846

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 318
Number of Exceedances: 15

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Fifteen of the 318 geomeans exceeded the enterococcus objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for enterococcus states that the enterococcus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Sloat Blvd.
Temporal Representation: Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95840

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 3
Number of Exceedances: 3

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Three of the 3 geomeans exceeded the enterococcus objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for enterococcus states that the enterococcus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Vicente St.
Temporal Representation: Samples were collected from January 2005 to January 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95834

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 6
Number of Exceedances: 1

Data and Information Type: Not Specified
Data Used to Assess Water Quality: One of the 6 geomeans exceeded the enterococcus objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for enterococcus states that the enterococcus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Pacheco St.
Temporal Representation: Samples were collected approximately fives times a year from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95828

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water

Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 318
Number of Exceedances: 31

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Thirty-one of the 318 geomeans exceeded the enterococcus objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for enterococcus states that the enterococcus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at station Ocean Beach, at Lincoln Ave.
Temporal Representation: Samples were collected approximately once a week from January 2005 to September 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID: 95819

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 323
Number of Exceedances: 17

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Balboa St) to determine beneficial use support and results are as follows: 17 of 323 samples exceed the criterion for Enterococci.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample

	maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Balboa St) was collected at 1 monitoring site [Ocean Beach, at Balboa St.]
Temporal Representation:	Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions:	Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95833
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	29
Number of Exceedances:	6
Data and Information Type:	PATHOGEN MONITORING
Data Used to Assess Water Quality:	Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Pacheco St) to determine beneficial use support and results are as follows: 6 of 29 samples exceed the criterion for Enterococci.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (SWRCB 2009) states that the single sample maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Pacheco St) was collected at 1 monitoring site [Ocean Beach, at Pacheco St.]
Temporal Representation:	Data was collected over the time period 1/9/2005-1/19/2010.
Environmental Conditions:	Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95843
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	323
Number of Exceedances:	15
Data and Information Type:	PATHOGEN MONITORING
Data Used to Assess Water Quality:	Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Sloat Blvd) to determine beneficial use support and results are as follows: 15 of 323 samples exceed the criterion for Enterococci.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	California Ocean Plan (SWRCB 2009) states that the single sample maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Data for this line of evidence for Pacific Ocean at Ocean Beach (at Sloat Blvd) was collected at 1 monitoring site [Ocean Beach, at Sloat Blvd.]
Temporal Representation:	Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions:	Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 65990, Indicator Bacteria **Region 2**

Pacific Ocean at Ocean Beach

LOE ID:	95825
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	326

Number of Exceedances: 23

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Pacific Ocean at Ocean Beach (at Lincoln Way) to determine beneficial use support and results are as follows: 23 of 326 samples exceed the criterion for Enterococci.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Ocean Beach (at Lincoln Way) was collected at 1 monitoring site [Ocean Beach, at Lincoln Ave.]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Final California 2014 and 2016 Integrated Report (303(d) List/305(b) Report)

Supporting Information

Regional Board 2 - San Francisco Bay Region

Water Body Name:	Pacific Ocean at Baker Beach
Water Body ID:	**CAX20340010200201151535 23**
Water Body Type:	**Coastal & Bay Shoreline**

DECISION ID **34385** **Region 2**

Pacific Ocean at Baker Beach

Pollutant:	**Indicator Bacteria**
Final Listing Decision:	**Delist from 303(d) list (TMDL required list)**
Last Listing Cycle's Final Listing Decision:	List on 303(d) list (TMDL required list)(2012)
Revision Status	Revised
Reason for Delisting:	Applicable WQS attained; reason for recovery unspecified
Impairment from Pollutant or Pollution:	Pollutant

Regional Board Conclusion:

This pollutant is being considered for removal from the CWA section 303(d) List under section 4.3 of the Listing Policy. Under section 4.3 a single line of evidence is necessary to assess listing status.

Sixteen lines of evidence are available in the administrative record to assess this pollutant. Two hundred fourteen of thirteen hundred sixty-five samples exceed the enterococcus geometric mean objective.

Based on the readily available data and information, the weight of evidence indicates that there is sufficient justification for removing this water segment-pollutant combination on the CWA section 303(d) List.

Notice that in LOE 3445 from 2006, the exceedances and samples for geometric mean enterococcus were added to the exceedances and samples for the SSM enterococcus. This is in error. There are 42 exceedances in 331 samples for the SSM entero, and 62 exceedances in 273 samples for the geomean entero indicator. When these exceedances and samples are added to the newer data for each indicator, the frequency of exceedance is less than that required according to Table 4.2 of the Listing Policy.

This conclusion is based on the staff findings that:
1. The data used satisfies the data quality requirements of section 6.1.4 of the Policy.
2. The data used satisfies the data quantity requirements of section 6.1.5 of the Policy.

3. Two hundred fourteen of thirteen hundred sixty-five samples exceed the enterococcus geometric mean objective and this is less than the allowable frequency listed in Table 4.2 of the Listing Policy.
4. Pursuant to section 3.11 of the Listing Policy, no additional data and information are available indicating that standards are not met.

Regional Board Decision Recommendation: After review of the available data and information, RWQCB staff concludes that the water body-pollutant combination should be removed from the section 303(d) list because applicable water quality standards for the pollutant are not being exceeded.

State Board Review of Regional Board Conclusion and Recommendation:

State Board Decision Recommendation: After review of this Regional Board decision, SWRCB staff recommend the decision be approved by the State Board.

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90682

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 390
Number of Exceedances: 0

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Zero of the 390 geomeans exceeded the objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for total coliform states that the coliform density shall not exceed 1000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at the Baker Beach, Upper Parking Lot site.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID:	90679
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	317
Number of Exceedances:	0
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Zero of the 317 geomeans exceeded the objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for total coliform states that the coliform density shall not exceed 1000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at the Baker Beach, Opposite Seacliff 2 Pumping Station site.
Temporal Representation:	Samples were collected from January 2005 to August 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID:	90676
Pollutant:	Total Coliform
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	385
Number of Exceedances:	133

Data and Information Type: Not Specified
Data Used to Assess Water Quality: One hundred and thirty three of the 385 geomeans exceeded the objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for total coliform states that the coliform density shall not exceed 1000 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at the Baker Beach, Lobos Creek at Lower Parking Lot site.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90870

Pollutant: Total Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 1107
Number of Exceedances: 43

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Baker Beach to determine beneficial use support and results are as follows: 43 of 1107 samples exceed the criterion for Enterococci.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (2009) single sample maximum states that total coliform density shall not exceed 10,000 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Baker Beach was collected at 3 monitoring sites [Baker Beach, Opposite Seacliff 2 Pumping Station, Baker Beach, Upper Parking Lot, Baker Beach, Lobos Creek at Lower Parking Lot]

Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.

Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.

QAPP Information: The samples were collected for the Beach Watch program.

QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 3445

Pollutant: Indicator Bacteria
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: Total

Beneficial Use: Water Contact Recreation

Number of Samples: 604
Number of Exceedances: 104

Data and Information Type: PATHOGEN MONITORING

Data Used to Assess Water Quality: Available data indicate sufficient exceedances of bacterial indicator objectives. There were 42 out of 331 exceedances of the single sample maximum for enterococci, and 62 out of 273 exceedances of the geomean for enterococci (USEPA, 2007).

Data Reference: Placeholder reference 2006 303(d)

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: Title 17 C.C.R. Section 7958 states: Based on a single sample, the density of bacteria in water from each sampling station at a public beach or public water contact sports area shall not exceed:
(A) 1,000 total coliform bacteria per 100 milliliters, if the ratio of fecal/total coliform bacteria exceeds 0.1; or
(B) 10,000 total coliform bacteria per 100 milliliters; or
(C) 400 fecal coliform bacteria per 100 milliliters; or
(D) 104 enterococcus bacteria per 100 milliliters.

Based on the mean of the logarithms of the results of at least five weekly samples during any 30-day sampling period, the density of bacteria in water from any sampling station at a public beach or public water contact sports area, shall not exceed:
(A) 1,000 total coliform bacteria per 100 milliliters; or
(B) 200 fecal coliform bacteria per 100 milliliters; or
(C) 35 enterococcus bacteria per 100 milliliters. (DHS, 1999)

Objective/Criterion Reference: Placeholder reference 2006 303(d)

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Includes Lobos Creek, Horseshoe Cove NW and NE.
Temporal Representation: 10/16/2002-10/26/2005
Environmental Conditions:
QAPP Information: Data record: 2002-2005, San Francisco County Health Dept.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90683

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 390
Number of Exceedances: 0

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Zero of the 390 geomeans exceeded the objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. San Francisco Bay Basin Water Quality Control Plan.
Objective/Criterion Reference: Water Quality Control Plan (Basin Plan) San Francisco Bay Basin (Region 2)

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at the Baker Beach, Upper Parking Lot site.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the beach watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90894

Pollutant: Enterococcus
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 1107
Number of Exceedances: 102

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Baker Beach to determine beneficial use support and results are as follows: 102 of 1107 samples exceed the criterion for Enterococci.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for Enterococcus shall not exceed 104 MPN/100 mL.
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Baker Beach was collected at 3 monitoring sites [Baker Beach, Opposite Seacliff 2 Pumping Station, Baker Beach, Upper Parking Lot, Baker Beach, Lobos Creek at Lower Parking Lot]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90677

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 385
Number of Exceedances: 1

Data and Information Type: Not Specified
Data Used to Assess Water Quality: One of the 385 geomeans exceeded the objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. San Francisco Bay Basin Water Quality Control Plan.

Objective/Criterion Reference: Water Quality Control Plan (Basin Plan) San Francisco Bay Basin (Region 2)

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at the Baker Beach, Lobos Creek at Lower Park Lot site.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the beach watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90853

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 1107
Number of Exceedances: 28

Data and Information Type: PATHOGEN MONITORING
Data Used to Assess Water Quality: Water Board staff assessed BeachWatch data for Baker Beach to determine beneficial use support and results are as follows: 28 of 1107 samples exceed the criterion for fecal coliform.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: California Ocean Plan (SWRCB 2009) states that the single sample maximum for fecal coliform shall not exceed 400 MPN/100 mL
Objective/Criterion Reference: California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Data for this line of evidence for Pacific Ocean at Baker Beach was collected at 3 monitoring sites [Baker Beach, Opposite Seacliff 2 Pumping Station, Baker Beach, Upper Parking Lot, Baker Beach, Lobos Creek at Lower Parking Lot]
Temporal Representation: Data was collected over the time period 1/4/2005-8/25/2010.
Environmental Conditions: Staff is not aware of any special conditions that might affect interpretation of the data.
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID:	90681
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	390
Number of Exceedances:	16
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Sixteen of the 390 geomeans exceeded the objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for entercoccus states that the entercoccus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at the Baker Beach, Upper Parking Lot site.
Temporal Representation:	Samples were collected from January 2005 to August 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID:	90680
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	317
Number of Exceedances:	15
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	Fifteen of the 317 geomeans exceeded the objective.

Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for entercoccus states that the entercoccus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at the Baker Beach, Opposite Seacliff 2 Pumping Station site.
Temporal Representation:	Samples were collected from January 2005 to August 2010.
Environmental Conditions:	
QAPP Information:	The samples were collected for the Beach Watch program.
QAPP Information Reference(s):	

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID:	90675
Pollutant:	Enterococcus
LOE Subgroup:	Pollutant-Water
Matrix:	Water
Fraction:	None
Beneficial Use:	Water Contact Recreation
Number of Samples:	385
Number of Exceedances:	121
Data and Information Type:	Not Specified
Data Used to Assess Water Quality:	One hundered and twenty one of the 385 geomeans exceeded the objective.
Data Reference:	Data for Region 2 Beach Watch.
SWAMP Data:	Non-SWAMP
Water Quality Objective/Criterion:	The geometric mean standard for entercoccus states that the entercoccus density shall not exceed 35 per 100 mL. Water Quality Control Plan for Ocean Waters 2009.
Objective/Criterion Reference:	California Ocean Plan Water Quality Control Plan Ocean Waters of California 2009
Evaluation Guideline:	
Guideline Reference:	
Spatial Representation:	Samples were collected at the Baker Beach, Lobos Creek at Lower Parking Lot site.
Temporal Representation:	Samples were collected from January 2005 to August 2010.

Environmental Conditions:
QAPP Information: The samples were collected for the Beach Watch program.
QAPP Information Reference(s):

Line of Evidence (LOE) for Decision ID 34385, Indicator Bacteria **Region 2**

Pacific Ocean at Baker Beach

LOE ID: 90678

Pollutant: Fecal Coliform
LOE Subgroup: Pollutant-Water
Matrix: Water
Fraction: None

Beneficial Use: Water Contact Recreation

Number of Samples: 317
Number of Exceedances: 0

Data and Information Type: Not Specified
Data Used to Assess Water Quality: Zero of the 317 geomeans exceeded the objective.
Data Reference: Data for Region 2 Beach Watch.

SWAMP Data: Non-SWAMP

Water Quality Objective/Criterion: The geometric mean standard for fecal coliform states that the fecal coliform density shall not exceed 200 per 100 mL. San Francisco Bay Basin Water Quality Control Plan.
Objective/Criterion Reference: Water Quality Control Plan (Basin Plan) San Francisco Bay Basin (Region 2)

Evaluation Guideline:
Guideline Reference:

Spatial Representation: Samples were collected at the Baker Beach, Opposite Seacliff 2 Pumping Station site.
Temporal Representation: Samples were collected from January 2005 to August 2010.
Environmental Conditions:
QAPP Information: The samples were collected for the beach watch program.
QAPP Information Reference(s):

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

RESOLUTION No. R2-2016-0021

Amending the Water Quality Control Plan for the San Francisco Bay Basin to Establish a Total Maximum Daily Load and Implementation Plan for Bacteria in San Francisco Bay Beaches

WHEREAS, the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), finds that:

1. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Resources Control Board (State Water Board), State Office of Administrative Law (OAL) and the United States Environmental Protection Agency (U.S. EPA), where required.

2. The Basin Plan may be amended in accordance with Water Code section 13240, et seq. The proposed Basin Plan amendment complies with this section.

3. Aquatic Park Beach (San Francisco); Jackrabbit, Sunnydale Cove, and Windsurfer Circle beaches (Candlestick Point, San Francisco); Crissy Field Beach (San Francisco); Parkside Aquatic and Lakeshore Park beaches (Marina Lagoon, City of San Mateo); and China Camp and McNears beaches (Marin County) have been identified under federal Clean Water Act section 303(d) as impaired water bodies due to bacteria. These beaches are collectively referred to as San Francisco Bay Beaches herein.

4. Under Clean Water Act section 303(d), the Water Board is required and authorized to establish the total maximum daily load (TMDL) for those pollutants identified as causing impairment of waters on the 303(d) list. Additionally, under Water Code section 13242, the Water Board is authorized to develop an implementation program to achieve water quality objectives.

5. A Basin Plan amendment has been prepared in accordance with Water Code section 13240 that will establish the TMDL and Implementation Plan to reduce bacteria-related risks to humans and protect water contact and non-contact beneficial uses at San Francisco Bay Beaches.

6. The Basin Plan amendment includes requirements to implement wasteload allocations for urban runoff through municipal stormwater NPDES permits. The Water Board intends to establish permit requirements to attain the wasteload allocations through implementation of best management practices in lieu of numeric limits, because the wasteload allocations are not designed to be directly implemented as numeric limits.

7. The Basin Plan amendment, including specifications on its physical placement in the Basin Plan, is set forth in Exhibit A hereto.

8. The scientific basis for the regulatory elements of the proposed Basin Plan amendment was subjected to an independent, external peer review by Professor Patricia Holden and Professor Peter Strom, pursuant to the requirements of Health and Safety Code section 57004.

9. On January 15, 2016, the Water Board publicly noticed the proposed Basin Plan amendment and distributed the proposed Basin Plan amendment, supporting Staff Report, and Environmental Checklist for public review and comment in accordance with applicable State and federal environmental laws and regulations.

10. The process of basin planning has been certified by the Secretary for Resources as exempt from the requirement of the California Environmental Quality Act (CEQA) (Pub. Res. Code § 21080.5) to prepare an Environmental Impact Report or Negative Declaration.

11. The Basin Plan amendment package includes a Staff Report, an Environmental Checklist, an assessment of the potential environmental impacts of the Basin Plan amendment, and a discussion of alternatives and cumulative impacts. The Basin Plan amendment, Environmental Checklist, Staff Report, and supporting documentation serve as a substitute environmental document under the Water Board's certified regulatory program.

12. The Water Board has duly considered the Environmental Checklist, Staff Report, and supporting documentation with respect to environmental impacts and finds that the proposed Basin Plan amendment will not have a significant impact on the environment. The Water Board further finds, based on consideration of the record as a whole, that there is no potential for significant adverse effect, either individually or cumulatively, on wildlife as a result of the proposed Basin Plan Amendment.

13. The Water Board has also considered the environmental analysis in the Staff Report and the Environmental Checklist of the reasonably foreseeable methods of compliance with the Basin Plan amendment, including economic impacts.

14. The Water Board has carefully considered all comments and testimony received, including responses thereto, on the Basin Plan amendment, as well as all of the evidence in the administrative record.

15. The Basin Plan amendment must be submitted for review and approval by the State Water Board, OAL, and U.S. EPA. Once approved by the State Water Board, the amendment is submitted to OAL and U.S. EPA. The Basin Plan amendment will become effective upon approval by OAL and U.S. EPA.

NOW, THEREFORE BE IT RESOLVED THAT:

1. The Water Board adopts the Basin Plan amendment as set forth in Exhibit A hereto.
2. The Executive Officer is directed to forward copies of the Basin Plan amendment to the State Water Board in accordance with the requirements of Water Code section 13245.

3. The Water Board requests that the State Water Board approve the Basin Plan amendment in accordance with the requirements of Water Code sections 13245 and 13246 and forward it to OAL and U.S.EPA for approval.
4. If, during the approval process, Water Board staff, the State Water Board, or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes and shall inform the Water Board of any such changes.
5. Because the Basin Plan amendment will involve no potential for significant adverse effect, either individually or cumulatively, on wildlife, the Executive Officer is directed to sign a CEQA Filing Fee No Effect Determination Form and to submit the exemption in lieu of payment of the California Department of Fish and Wildlife CEQA filing fee.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on April 13, 2016.

Digitally signed by Bruce H. Wolfe
DN: cn=Bruce H. Wolfe, o=SWRCB, ou=Region 2, email=bwolfe@waterboards.ca.gov, c=US
Date: 2016.04.14 13:25:34 -07'00'

BRUCE H. WOLFE
Executive Officer

Attachment:

Exhibit A – Basin Plan Amendment to Establish a Total Maximum Daily Load and Implementation Plan for Bacteria in San Francisco Bay Beaches

Appendix C

Staff Report

April 13, 2016

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Total Maximum Daily Load for Bacteria at San Francisco Bay Beaches

Staff Report
For Proposed Basin Plan Amendment

California Regional Water Quality Control Board
San Francisco Bay Region

April 13, 2016

San Francisco Bay Regional Water Quality Control Board

1515 Clay Street, Suite 1400

Oakland, CA 94612

Telephone: (510) 622-2300

Fax: (510) 622-2460

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/SFbaybeachespathogens.shtml

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1 INTRODUCTION

This report presents the supporting documentation for a proposed amendment of the San Francisco Bay Basin Water Quality Control Plan (Basin Plan) to address impairment of San Francisco Bay beaches by bacteria and other pathogens (e.g., viruses) associated with fecal contamination, hereinafter referred to as bacteria. The Basin Plan amendment would establish:

(1) Numeric targets for indicator bacteria densities (concentrations) based on current Basin Plan water quality objectives. Attainment of targets will protect the health of water contact recreational users of the beaches;

(2) Total Maximum Daily Loads (TMDL) and allocations that will achieve the targets; and

(3) Implementation plans for bacteria.

This TMDL addresses bacteria impaired beaches in San Francisco Bay east of the Golden Gate Bridge. The impaired beaches include:

- Aquatic Park Beach, San Francisco
- Jackrabbit, Sunnydale Cove, and Windsurfer Beaches in Candlestick Point State Recreation Area, San Francisco
- Crissy Field Beach, San Francisco
- Parkside Aquatic and Lakeshore Beaches on Marina Lagoon, City of San Mateo
- China Camp Beach, Marin County
- McNears Beach, Marin County

China Camp Beach and McNears Beach are on the list of impaired water bodies because levels of only one bacterial indicator in waters at these beaches, total coliform, exceeds the Basin Plan's water quality objective. Waters at the other beaches exceed the bacterial indicator for Enterococcus and other bacterial indicators.

Figure 1.1 shows all the beaches located along San Francisco Bay that are monitored for bacteria under section 115880 of the California Health and Safety Code. The CWA Section 303(d)-listed beaches highlighted; based on current data the remaining beaches are not impaired. This report contains the results of analyses of bacteria impairment assessments, sources and loadings, linkage analyses, proposed acceptable bacterial load allocations, and implementation actions.

1.1 Regulatory Background

The CWA requires California to adopt and enforce water quality standards to protect all water bodies within the State. The Basin Plan delineates these standards for the Region. The standards include beneficial uses of waters in the Region, numeric and narrative water quality objectives to protect those uses, provisions to enhance and protect existing water quality (antidegradation), and other plans and policies necessary to implement water quality objectives. CWA Section 303(d)[1] requires states to compile a list of "impaired" water bodies that do not meet water quality standards and to establish a TMDL for the pollutant that causes impairment. The proposed TMDL and implementation plan are designed to resolve existing bacterial impairment in San Francisco Bay beaches.

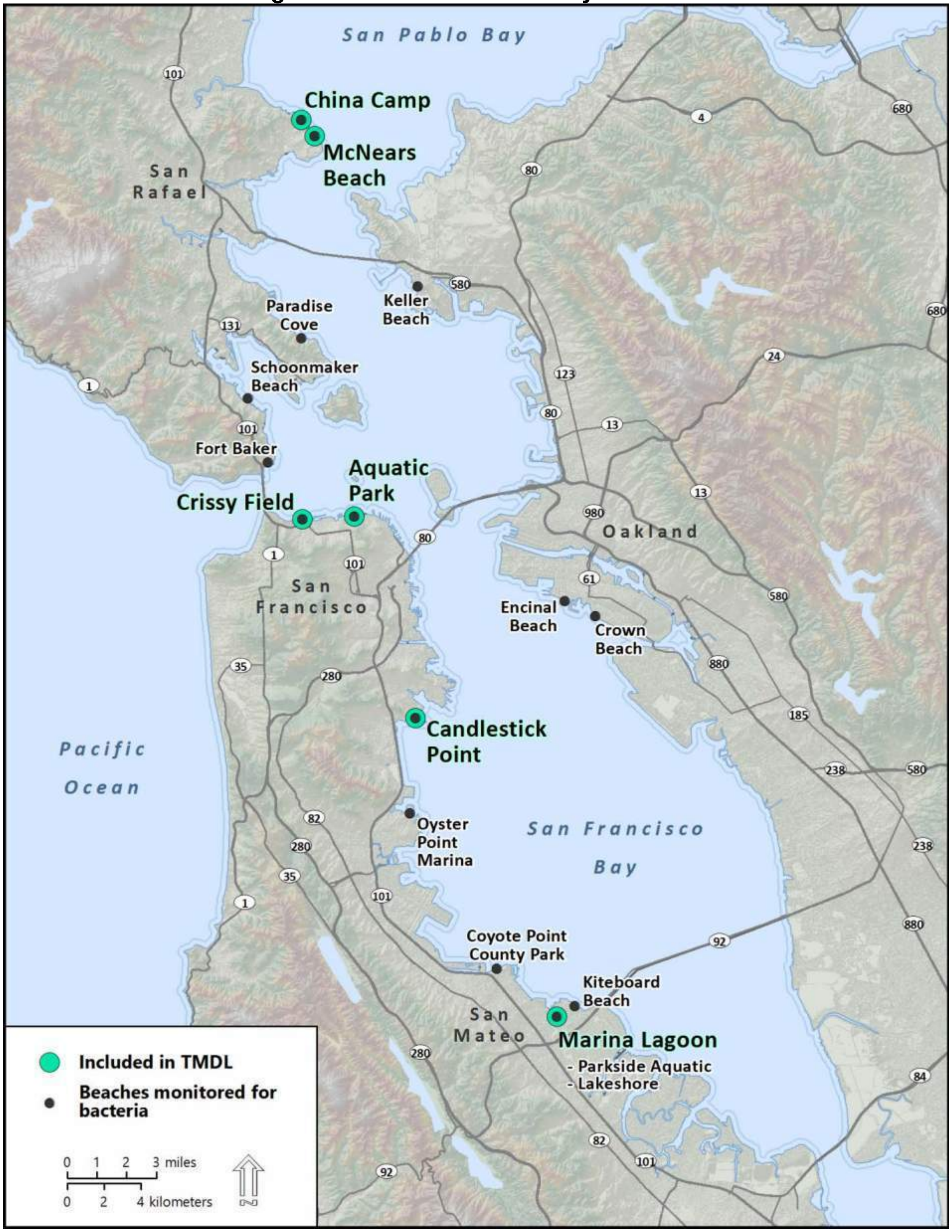
A TMDL specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates the acceptable pollutant load to point and nonpoint sources. A TMDL is defined as the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources, and natural background that will enable the water body to assimilate pollutant loads, without exceedance of water quality objectives. The TMDL must take into account seasonal variations and include a margin of safety to address uncertainty in the analysis. In addition, the Water Board must develop a water quality management plan ("implementation plan") to implement the TMDL. Finally, TMDLs must be included in the State's water quality management plan (i.e., the Basin Plan).

The U.S. Environmental Protection Agency (U.S. EPA) has oversight authority for the CWA 303(d) program and is required to review and either approve or disapprove the state's 303(d) list and each TMDL developed by the state.

In addition, the scientific basis of the Basin Plan amendment must undergo external scientific peer review pursuant to section 57004, subdivision (b) of the California Health and Safety Code. The "scientific basis" of a Basin Plan amendment is the portion of the amendment that uses "empirical data or other scientific findings, conclusions or assumption" to establish "a regulatory level, standard, or other requirements for the protection of public health or the environment" (Cal. Health & Safety Code § 57004(a)(2)). The scientific basis of the San Francisco Bay Beaches Bacteria TMDL, as presented in this Staff Report, has undergone evaluation by two peer reviewers whose comments were considered in finalizing this staff report and the proposed Basin Plan amendment.

[1] 33 U.S.C. § 1313(d).

Figure 1.1 San Francisco Bay Beaches



1.2 Document Organization

The process for establishing a TMDL includes compiling and considering available data and information, conducting analyses relevant to defining the impairment problem, identifying sources, and allocating responsibility for actions to resolve the impairment. This report is organized into sections that reflect the key elements of the TMDL and the new implementation provisions for bacterial water quality objectives, as follows:

- Section 2 presents background information about the physical settings of Aquatic Park, Candlestick Point, Crissy Field, Marina Lagoon, China Camp and McNears Beaches.
- Section 3 presents the problem definition that the project is based on and defines the project, why it is necessary, and its objectives.
- Section 4 presents the applicable water quality standards.
- Section 5 presents results of past and recent bacterial water quality studies.
- Section 6 presents the proposed numeric targets.
- Section 7 provides our understanding of the potential sources of loading of bacteria to each of the San Francisco Bay Beaches.
- Section 8 presents the proposed pollutant load and wasteload allocations to identified pollutant sources.
- Section 9 presents the linkage analysis, which describes the relationship between indicator bacteria sources, load allocations, and the proposed targets.
- Section 10 presents the implementation plan, which includes actions and requirements deemed necessary to resolve the water quality impairment.
- Section 11 presents the Regulatory Analyses, including the California Environmental Quality Act (CEQA) analysis and CEQA checklist and a consideration of economics.
- Section 12, References, lists all the information sources cited and relied upon in preparation of this report.

2 DESCRIPTION OF IMPAIRED BEACHES

This section provides descriptions of the general characteristics, surrounding land use, and recreational usage of each of the San Francisco Bay beaches for which recreational uses are impaired currently by excessive concentrations of fecal indicator bacteria (FIB).

2.1 Aquatic Park Beach

Aquatic Park Beach is located in San Francisco, within the San Francisco Maritime National Historic Park. The beach lies within a horseshoe-shaped cove bounded by Hyde Street Pier on the east and the fishing pier on the west. Other features within this National Park include historic ships, such as the Balclutha on Hyde Street Pier and the Bathhouse building, which was built by the Works Progress Administration in the 1930s.

Situated between Fisherman's Wharf and Crissy Field Park, Aquatic Park is a highly popular location for strolling, sunning, and swimming. In addition, the beach is used year-round by swimming and rowing clubs. Land use in the Aquatic Park Beach watershed is intensely urban.

Aquatic Park Beach, National Park Service Photo

2.2 Candlestick Point Beaches

Candlestick Point State Recreation Area is located at the southeastern tip of San Francisco, adjacent to Candlestick Stadium. The State purchased the land in 1973 and soon after turned it into a state recreation area, making Candlestick Point Park the first urban state recreation area in California. The park contains a fishing pier and three beaches: Jackrabbit Beach, Windsurfer Circle, and Sunnydale Cove (sometimes identified as Hermit's Cove). Windsurfer Circle is, as its name suggests, a popular area for windsurfing due to its strong winds. The area adjacent to Candlestick Point State Recreational Area has a mix of urban industrial and commercial land uses and is currently undergoing extensive redevelopment. The future use of the former Candlestick Stadium site is expected to be a mix of residential and commercial uses.

Candlestick Stadium, left, and Sunnydale Cove, www.kayaker.net

As required by its National Pollutant Discharge Elimination System (NPDES) permit for discharges of treated wastewater, the San Francisco Public Utility Commission (SFPUC) conducts recreational-use studies to quantify, to the extent possible, the number of people using areas near its outfalls for water contact recreation and non-contact recreation. Results of a study of Candlestick Point beaches conducted between October 2009 and September 2011, shown in Table 2.1, provide an idea of the recreational usage at the three beaches.

Table 2.1 Estimated Annual Recreational Users - Candlestick Point Beaches[a]

Beach	Water-Contact Users (REC-1)	Non-Contact Users (REC-2)	Total Users	Activities
Sunnydale Cove	210	261	471	Walking, jogging and fishing
Windsurfer Circle	5,698	529	6,227	Fishing at nearby pier accounted for 65% of all REC1; Site also had 87% of all windsurfers observed during study
Jackrabbit	456	770	1,226	Walking/jogging followed by sitting/sunbathing; 75% of all wading observed during study

[a] Source: SFPUC 2012

2.3 Crissy Field Beach

Crissy Field Beach, also called Crissy Beach, is a highly popular two-mile long beach located within the Golden Gate National Recreation Area and the Presidio, a National Historic Landmark District and former U.S. Army base. After the U.S. Army transferred the base to the National Park Service in 1994, Congress created the Presidio Trust, a federal corporation, to manage building leasing, operation and maintenance for the interior area of the Presidio. This interior, or upland, area contains the San Francisco National Cemetery, restaurants, a hotel, museums, office space, retail stores, a water treatment facility, roads and highway, and residences, in addition to high-use park trails and open space. The National Park Service remains responsible for the remaining coastal areas and a few other sites.

Upland Presidio looking toward Crissy Beach, http://www.nps.gov/goga/parkmgmt/upload/pip-web.pdf

Crissy Field Beach, http://commons.wikimedia.org

The beach is highly popular year round for strolling, playing, boardsailing and general recreation. Swimming and wading occur, but can be limited by cold water temperatures and strong tidal currents.

2.4 Marina Lagoon Beaches

Marina Lagoon covers approximately 169 acres, ranges from 300 to 400 feet wide, and averages a depth of 6 feet at mid-channel during the summer. It flows from its inlet at the Belmont city limits, where a concrete slide gate structure controls inflow from O'Neill Slough, to its outlet into Seal Slough, a distance of about four miles (City of San Mateo 2013a). It is not uncommon to see the entire distance of Marina Lagoon labeled as Seal Slough on maps.

Marina Lagoon is a tidal slough that has been diked and dredged. It now serves as a flood control basin and aesthetic amenity. Marina Lagoon is lowered by three feet in elevation during the winter to allow for stormwater runoff (Scheidt 2015). The City of San Mateo manages maintenance of the lagoon under a five-year renewable permit from the U.S. Army Corps of Engineers, which is currently in the renewal stage.

Recreational uses of Marina Lagoon include swimming, wading, kayaking, motor boating, waterskiing, and wakeboarding. More than 300 private residences, most of which have boat docks, border the Lagoon (City of San Mateo 2012).

Water Board staff photos

Two public beaches are located on the Lagoon (shown on Figure 5.6):

- Lakeshore Park, located at 1500 Marina Court, has beach access to the Lagoon as well as picnic areas, a playground, basketball courts, and a baseball diamond.
- Parkside Aquatic Park, with a sandy beach for swimming, is located at the end of Seal Street. This park offers kayaks, sailboats and stand up paddle surfboards for rent, as well as a boat ramp.

2.5 China Camp Beach

China Camp Beach is located within China Camp State Park, on the southwest shore of San Pablo Bay (Figure 1.1) in San Rafael. A Chinese shrimp-fishing village thrived on this site in the 1880s, populated by nearly 500 people from Canton, China. In its prime, there were three general stores, a marine supply store and a barber shop. Today, the beach offers year-round wading, swimming, kayaking, and boating, with the greatest usage during the warmer months. China Camp Beach is home to China Camp Village, which consists of a small museum, snack shop, restrooms, and a year-round residence. Other surrounding land uses include the park road and open space.

China Camp Beach and village www.parks.ca.gov

Water Board staff photo

2.6 McNears Beach

Just south of China Camp, McNears Beach is located in San Rafael along San Pablo Bay within the 55-acre McNears Beach Park, a popular park operated by Marin County Parks (Figure 1.1). The one-mile long beach is used for swimming, wading, fishing, kayaking and canoeing. In addition to the beach, McNears Beach Park offers adult and toddler swimming pools, tennis courts, grassy play areas, and a fishing pier, as well as shower/changing rooms and restrooms. Dogs are not permitted in the park.

McNears Beach and Park, Water Board staff photos

3 PROJECT DEFINITION

This section presents the problem statement upon which the proposed Basin Plan amendment project is based. It also presents the project definition and objectives by which the project is evaluated under the California Environmental Quality Act (CEQA).

3.1 Problem Statement

San Francisco Bay Beaches are impaired due to fecal indicator bacteria concentrations that exceed water quality objectives. Fecal indicator bacteria include fecal coliform, total coliform and Enterococcus, which are types of bacteria that indicate the potential for fecal contamination and a potential risk of pathogen-induced illness to humans. Pathogens pose potential health risks, including gastrointestinal, respiratory, eye, ear, nose, throat, and skin diseases, to people who recreate in contaminated waters. Because specific illness-inducing pathogens are difficult to measure in water, we infer the presence of pathogens from high concentrations of fecal indicator bacteria.

This TMDL addresses beaches in San Francisco Bay east of the Golden Gate Bridge, including:

- Aquatic Park Beach, San Francisco
- Jackrabbit, Sunnydale Cove, and Windsurfer Beaches in Candlestick Point State Recreation Area, San Francisco
- Crissy Field Beach, San Francisco
- Parkside Aquatic and Lakeshore Beaches on Marina Lagoon, City of San Mateo
- China Camp Beach, Marin County
- McNears Beach, Marin County

3.2 Project Definition

The project is the adoption of a proposed Basin Plan Amendment to: (1) establish a TMDL and an implementation plan for indicator bacteria at San Francisco Bay Beaches; and, (2) establish a framework for achieving water quality objectives at other San Francisco Bay beaches at which bacteria standards are exceeded in the future. The Water Board is obligated under CWA §303(d) to develop a TMDL for these water bodies to address their impairment. The following components form the basis of the proposed regulatory provisions and define the project:

- Numeric targets for indicator bacteria concentrations in the water column;
- Density-based total maximum daily bacteria-indicator loads to the beaches;
- Allocation of the density-based total maximum daily bacteria-indicator load among the categorical source categories at each beach;
- A plan to implement the TMDL that includes actions to reduce sources of fecal contamination to achieve load allocations at each of the Beaches; and
- A monitoring program to evaluate progress in meeting the numeric targets.

3.3 Project Objectives

The objectives of the proposed Basin Plan amendment are consistent with the mission of the Water Board and the requirements of the CWA and Water Code. The objectives are to:

- Comply with the CWA requirement to adopt a TMDL for Section 303(d)-listed water bodies;
- Protect existing recreational uses at San Francisco Bay Beaches;
- Attain the water quality objectives for Enterococcus protective of water contact recreation at San Francisco Bay Beaches, as quickly as feasible;
- Set numeric targets to attain relevant water quality standards at San Francisco Bay Beaches;
- Avoid imposing regulatory requirements that are more stringent than necessary to meet numeric targets and attain water quality standards; and
- Complete implementation of needed fecal contamination abatement measures in as short a time as is feasible.

4 WATER QUALITY STANDARDS

This section identifies applicable laws and regulations, including applicable water quality objectives, beneficial uses of the water bodies covered by this TMDL, and water quality standards.

4.1 Use of Fecal Indicator Bacteria in Water Quality Standards

Microorganisms that have the potential to cause disease are called pathogens. A subset of pathogens, called human pathogens, is capable of causing human diseases. More than 100 types of human pathogens can occur in a water body polluted by fecal matter (Havelaar 1993), and detecting these organisms is costly and time consuming. Fecal indicator organisms are easier to identify and enumerate in water samples than the broad range of pathogens in human and animal feces, and thus FIB are commonly used to assess microbial water quality for recreational uses.

FIB themselves do not necessarily impair water quality; rather they are intended to indicate the presence of fecal contamination, which presents a potential human health risk for those who recreate in the water. FIB include bacteria from animal and environmental sources as well as human sources. Animal sources include domestic pets, wild animals and rodents, and livestock; environmental sources include biofilms in storm sewers, naturally occurring soil bacteria and decaying kelp; and human sources include sanitary sewer overflows, combined sewer overflows and others. Human sources of bacteria are expected to pose a greater health risk than animal or environmental sources (U.S. EPA 2007). However, U.S. EPA states:

> *Contamination of recreational waters with feces from warm-blooded animals poses a risk of zoonotic*[2] *infection of humans with some of the pathogens in those waters. Although the risk and severity of human illness due to contamination with animal feces and zoonotic pathogens is most likely lower than the risk and severity of illness from treated or untreated human sewage, currently available data are insufficient to quantify the differences.* (U.S. EPA 2009)

While FIB are not necessarily human pathogens, they are abundant in wastes from warm-blooded animals and are easily detected in the environment. The detection of FIB indicates that the environment is contaminated with fecal waste and that human pathogens may be present. Commonly used bacterial indicators of fecal contamination include total coliform, fecal coliform, *E. coli*, and Enterococcus.

- Total coliform include several genera of bacteria commonly found in the intestines of warm-blooded animals. However, many types of coliform bacteria grow naturally in the environment – that is, outside the bodies of warm-blooded animals. As discussed further below, the U.S. EPA no longer recommends total coliform be used as FIB.

[2] Indicates a disease that normally exists in animals but that can infect humans.

- Fecal coliform are a subset of total coliform and are more specific than total coliform to wastes from warm-blooded animals, but not necessarily to humans. As discussed further below, the U.S. EPA no longer recommends fecal coliform be used as FIB.
- *E. coli* are a subset of fecal coliform and are thought to be more closely related to the presence of human pathogens than fecal coliform (U.S. EPA 2002).
- Enterococcus represents a different bacterial group from coliform. It is regarded to be a good indicator of fecal contamination from warm-blooded animal sources, especially in salt water (*ibid.*).

Epidemiology studies conducted in the 1950s and 1960s found an association between fecal coliform bacteria and human illness, which forms the basis for why these particular FIB are used in water quality objectives. More recent scientific studies, however, have found that in marine waters Enterococcus is most closely associated with human illness and that the other bacterial indicators of fecal contamination listed above are not (e.g., Cabelli 1982). This is discussed further in Sections 4.2.2 and 6.1.

4.2 Water Quality Standards

Under the authority of the CWA, the Water Board has established water quality standards for bacteria. Water quality standards consist of the following elements: 1) beneficial uses of the water body in question; 2) narrative and/or numeric water quality objectives to protect those beneficial uses; and 3) the state of California's antidegradation policy, which requires continued maintenance of existing high-quality waters. These three elements are described below.

4.2.1 Beneficial Uses

The Basin Plan designates beneficial uses for each water body in the Region. The designated beneficial uses of San Francisco Bay that are impaired by FIB include the following:

- IND – industrial service supply
- COMM – commercial sport fishing
- SHELL – shellfish harvesting
- EST – estuarine habitat
- MIGR – fish migration
- RARE – preservation of rare and endangered species
- SPWN – fish spawning
- WILD – wildlife habitat
- REC-1 – water contact recreation
- REC-2 – noncontact water recreation
- NAV – navigation

The observed elevated concentrations of fecal indicator bacteria at San Francisco Bay beaches pose a potential health risk to individuals recreating in these water bodies. Specifically, the REC-1 and REC-2 beneficial uses, described in Table 4.1, could be negatively impacted.

Table 4.1 Beneficial Uses of San Francisco Bay Beaches Relevant to Bacteria TMDL

Designated Beneficial Uses	Description
Water Contact Recreation (REC-1)	Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.
Non-contact Water Recreation (REC-2)	Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beach combing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

While a possibility of impairment of the shellfish harvesting beneficial use could exist, the fecal indicator bacteria data upon which this TMDL is based were collected at locations where people wade and swim at the beaches, and there is no evidence of shellfish collection at these beaches. Further data are needed to determine if SHELL beneficial uses are in fact impaired. The goal of this TMDL is to restore and protect REC-1 and REC-2 beneficial uses at San Francisco Bay beaches. SHELL beneficial uses will be addressed in a separate TMDL project and/or water quality standards action at a later date.

4.2.2 Water Quality Objectives

The Basin Plan contains bacteria water quality objectives (WQOs), shown in Table 4.2, to protect REC-1 and REC-2 uses. WQOs for REC-2 are less stringent than those for REC-1; therefore, attainment of REC-1 objectives through the implementation of the TMDL will also meet the water quality objectives for REC-2.

Table 4.2 Basin Plan's Recreational Water Quality Objectives for Bacteria

Beneficial Use	Fecal Coliform (MPN[a]/100 mL)	Total Coliform (MPN/100 mL)	Enterococci (MPN/100mL)
Water Contact Recreation (REC-1)	Geometric mean[b] < 200 90th percentile < 400	Median < 240 No sample > 10,000	Geometric mean[b] < 35 No sample > 104
Non-contact Water Recreation (REC-2)	Mean < 2000 90^{th} percentile < 4000	No objective	No objective

a. Most Probable Number (MPN) is a statistical representation of the results of the standard coliform test
b. Based on a minimum of five consecutive samples equally spaced over a 30-day period

The Basin Plan also contains U.S. EPA bacteriological criteria for REC-1, and, of these, the criteria for Enterococcus in salt water are applicable and used in this TMDL:

- Enterococcus geometric mean < 35 colonies/100 mL; and
- Enterococcus single sample maximum < 104 colonies/100 mL.

As shown in Table 4.2, the Basin Plan WQOs currently include fecal coliform, total coliform and Enterococcus. However, scientific studies have shown that, in marine waters, Enterococcus is more closely associated with human illness than are the other FIB. U.S. EPA has recommended States adopt WQOs for bacteria in marine waters based only on Enterococcus; therefore, the State of California has begun the process of adopting new WQOs based on U.S. EPA's recommendations, as further described below.

CWA section 304 requires U.S. EPA to develop criteria recommendations to aid states in developing water quality standards. In 2012, U.S. EPA issued new recommended Recreational Water Quality Criteria for bacteria indicators, reflecting the latest scientific knowledge and epidemiological investigations conducted at nine beaches from 2003 to 2009 (U.S. EPA 2012). Results of these investigations reaffirmed an association of Enterococcus and Escherichia coli (*E.coli)* with gastrointestinal illness and found total and fecal coliform not highly associated with illness. The U.S. EPA recommended criteria for marine waters are shown in Table 4.3.

Table 4.3 U.S.EPA 2012 Recommended Recreational Water Quality Criteria

Indicator	Recommendation 1[a] Estimated Illness Rate 36/1000		Recommendation 2[a] Estimated Illness Rate 32/1000	
	Geometric mean (cfu/100 mL)[b]	Statistical Threshold Value (cfu/100 mL)	Geometric mean (cfu/100 mL)	Statistical Threshold Value (cfu/100 mL)
Enterococci (marine & fresh water)	35	130	30	110

[a]Individual states select level of protectiveness when they adopt the Recreational Water Quality Criteria
[b]Colony forming units per 100 milliliters of sample
Duration: The water body geomean and Statistical Threshold Value should be evaluated over a 30-day interval.
Frequency: The selected geometric mean should not be exceeded in any 30-day interval, nor should there be greater than a 10 percent excursion frequency of the selected Statistical Threshold Value in the same 30-day interval

The U.S. EPA recommendations are not regulations themselves; states may either adopt the criteria or develop updated criteria using other scientifically defensible methods. The State Water Resources Control Board (State Water Board) has begun the process of amending the statewide Water Quality Control Plans for (1) Inland Surface Waters, Enclosed Bays and Estuaries and (2) Ocean Waters of California to include new water quality standards for bacteria, and is incorporating EPA's recommendations into these standards. As CWA §304(a) criteria, these new standards will be used in all CWA programs, including TMDLs.

4.2.3 Antidegradation

The Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies, which are intended to protect beneficial uses and maintain the water quality necessary to sustain them. The federal antidegradation policy, found in the Code of Federal Regulations, title 40, section 131.12, requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy through State Water Board Resolution 68-16, "Statement of Policy with Respect to Maintaining High Quality of

Waters in California," which is deemed to incorporate the federal antidegradation policy where the federal policy applies under federal law. Resolution 68-16 requires that existing water quality be maintained unless degradation is consistent with the maximum benefit to the citizens of California. The proposed TMDL is not expected to degrade water quality, but instead to improve water quality by reducing the incidences of FIB exceedances.

5 BEACH WATER QUALITY DATA

Beach water quality data are generated through three types of efforts: Beach monitoring programs required by the California Health and Safety Code; monitoring required by NPDES permits issued to publically owned wastewater treatment facilities; and special monitoring studies.

California law (Health and Safety Code section 115880 et. seq.) requires local health officers to conduct weekly bacterial testing, between April 1 and October 31, of waters adjacent to public beaches that have more than 50,000 visitors annually and are near storm drains that flow in the summer. Local health officers are required to test for three indicator organisms: total coliform, fecal coliform, and Enterococcus. If any one of these indicator organisms exceeds standards established by the State Department of Public Health, the county health officer is required to post warning signs at the beach. In the case of extended exceedances, the officer must make a determination whether to close that beach.

Wastewater NPDES permits may require dischargers to monitor for fecal indicator bacteria at beaches that could be affected by sewage discharges. For example, the wastewater permit issued to the San Francisco Public Utility Commission's (SFPUC) Southeast Wastewater Treatment Plant requires monitoring of beaches that could be impacted by combined sewer overflows, which can occur when heavy rains overload the SFPUC's system of combined sanitary and stormwater sewers (SFBRWQCB 2013).

Special monitoring studies at beaches may include bacteria source tracking studies, which focus on determining whether the bacteria are from human versus animal sources, and where the source is located in relation to the beach. For example, Stanford University researchers collected samples at San Francisco beaches and processed them for DNA to determine if human markers were present in the samples.

5.1 Data Evaluation

Bacteria data from each beach are compared to water quality objectives in Tables 4.2 to determine exceedance rates of the WQOs. To provide a complete evaluation of available data, staff has included WQOs for each FIB, not just the more applicable Enterococcus objectives. For total coliform, the geometric means are compared to the water quality objective for the median (Table 4.2), in order to use a consistent evaluation method. Because the bacteria data sets are large and exhibit very little skewing, the geometric means and medians are substantially identical measures of central tendency.

Each total coliform, fecal coliform, and Enterococcus datum is compared to the associated single-sample objective, and all values exceeding the standard are counted as an exceedance. The number of exceedances is divided by the number of samples to determine the percent exceedance.

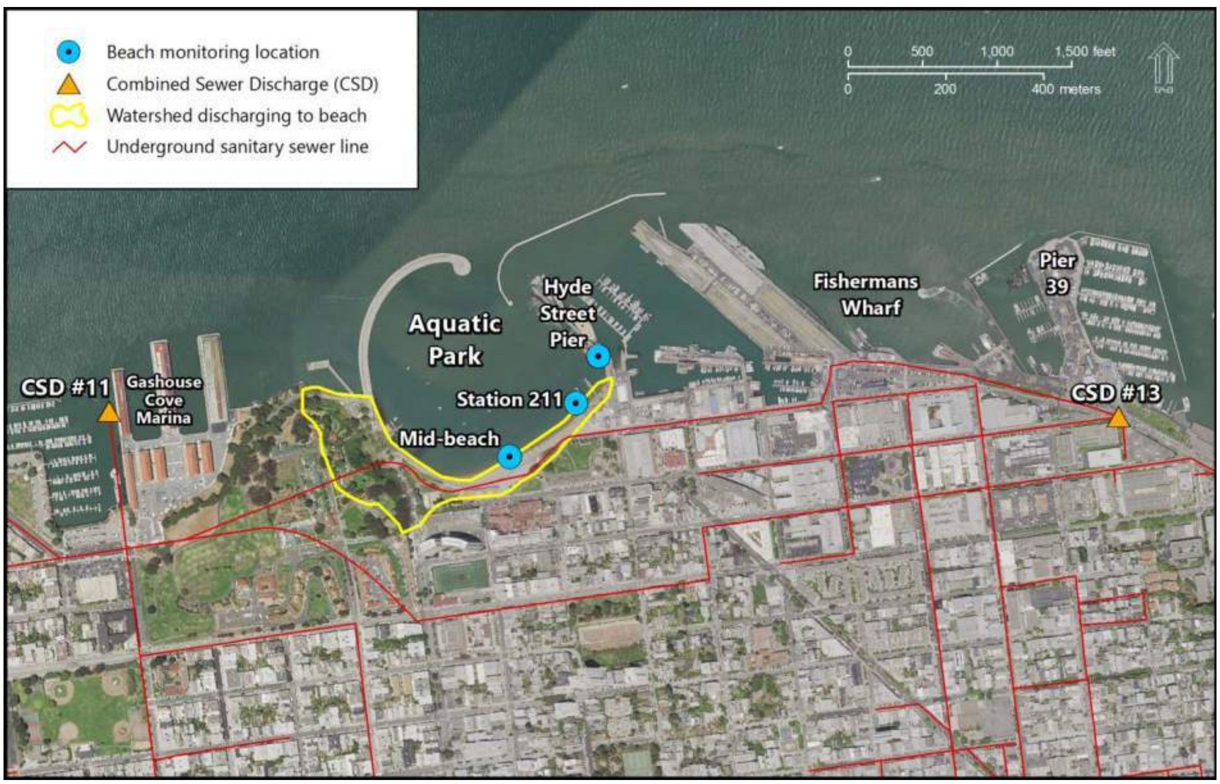
Geometric means are calculated for each indicator bacteria based on a minimum of five samples per rolling 30-day period. Total coliform, fecal coliform, and Enterococcus geometric means are compared to the applicable geometric mean water quality standards. All values exceeding the geometric mean standards are counted as exceedances and are divided by the total number of geometric means to determine the percent exceedance.

The State's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List, specifies that a water segment shall be listed as impaired for bacteria in accordance with CWA § 303(d) if bacteria water quality standards in the California Code of Regulations, Basin Plans, or statewide plans are exceeded: (1) more than ten percent of the time where water quality is monitored year-round; or (2) more than four percent of the time for beaches monitored during the summer (State Water Board 2004). FIB data from each Bay Beach exceeded bacteria water quality standards more than the requisite percent of the time, as discussed further below.

5.2 Aquatic Park Beach

Beach Monitoring Data: The SFPUC and the San Francisco Department of Public Health (SFDPH) collects water samples at Aquatic Park Beach weekly and analyzes the samples for three FIB: total coliform, *E.coli*, and Enterococcus. Samples are collected year-round at two locations along the beach, off Hyde Street Pier and at Station 211 (Figure 5.1).

Figure 5.1 Aquatic Park Beach, San Francisco



In the mid-1990s the Station 211 sample location was moved from the approximate center of the beach to a more easterly location, because that is where most of the swimming occurs, and because members of swim clubs expressed concern to the SFPUC about the impacts of homeless or transient visitors on water quality at the new location. In addition to weekly sampling, after a combined sewer discharge SFPUC monitors the beach daily until monitoring confirms that FIB levels are below water contact recreation standards. SFPUC also monitors daily after an exceedance occurs, even if the exceedance is not related to a combined sewer discharge. Beach monitoring data are summarized in Table 5.1; entries in bold type exceed CWA §303(d) impairment listing criteria.

Table 5.1 Aquatic Park Beach Data Summary: 1/2/2008 – 11/24/2014

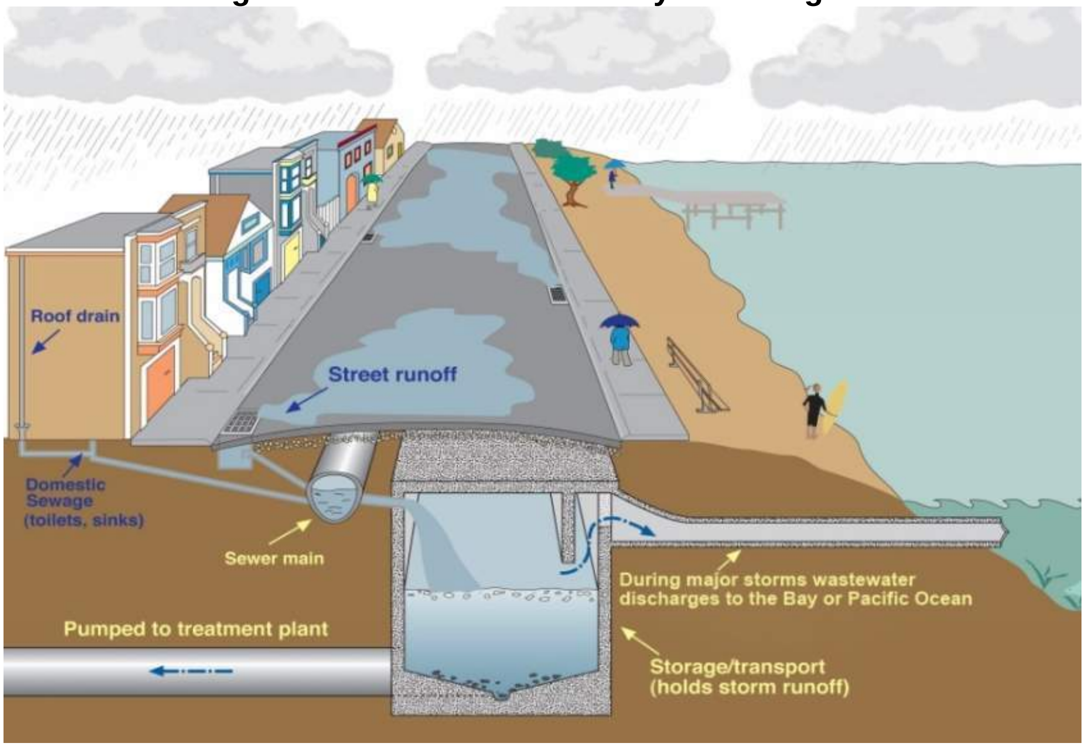
	Location	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	Hyde St. Pier	386	11 (2.8%)	15 (3.9%)
	Station 211	434	42 (9.7%)	**78 (18.1%)**
Total Coliform	Hyde St. Pier	385	0	21 (5.5%)
	Station 211	434	2 (0.5%)	**104 (24.2%)**
E.coli [b]	Hyde St. Pier	385	8 (2.1%)	0
	Station 211	434	38 (8.8%)	20 (9.7%)

[a]Geometric means calculated using all data collected in rolling 30-day periods
[b]Compare to fecal coliform objective, because no marine *E.coli* objective exists for estuarine waters

These data indicate that Enterococcus and total coliform exceed the water quality standards more than ten percent of the time at the Station 211 sample location. Exceedances of FIB water quality objectives rarely exceed water quality standards at the Hyde Street Pier location, indicating there is a source of FIB in the vicinity of Station 211 that is not impacting the Hyde Street Pier location. With very few exceptions, the elevated FIB concentrations occurred during the wet season (October 1 – April 15), although a thorough comparison of rainfall and sampling data was not made.

NPDES Monitoring Data: The SFPUC operates a combined wastewater and stormwater collection and treatment system throughout most of the city of San Francisco. During periods of heavy rain, the collection system's storage capacity (Figure 5.2) can be exceeded due to very high volumes of stormwater runoff, resulting in combined sewer overflow discharges (CSDs) to the Bay.

Figure 5.2 Combined Sewer System Diagram



Source: SFPUC

The combined flows receive some level of treatment prior to discharge insofar as some solids settle and some floatable wastes are retained by baffles, as illustrated in Figure 5.2. SFPUC monitors and records CSDs, as required by its NPDES permit. These CSD event data from outfalls within approximately one mile of Aquatic Park were evaluated for possible connection to bacteria objective exceedances at the beach.

CSDs occurred on four days during the seven year period of analysis, and Enterococcus single-sample maximum objective exceedances occurred 42 times. Table 5.2 shows when the next weekly sample was collected following each CSD and whether that sample exceeded the Enterococcus objective. Samples collected within 72 hours of a CSD may be most relevant, because any bacteria associated with the CSD would likely be dispersed or die out after that length of time. Of the four CSDs, two were sampled within three days and none were followed by exceedances of the Enterococcus objective. Thus, CSDs are not suspected as a significant source of FIB to Aquatic Park Beach.

Table 5.2 CSDs in Vicinity of Aquatic Park Beach: 2008 – 2014[a]

CSD Outfall #	11	13	Date of next sample at Station 211 - and - does it exceed Enterococcus single sample maximum water quality objective?
Location	Approximately 0.6 mile west of Aquatic Park, at eastern end of Gas House Cove (Fig. 5.1)	Approximately one-half mile east of Aquatic Park Beach, near Pier 39 (Fig. 5.1)	
Date	Duration of reported combined sewer discharge in hours[a]		
3/14/2012	0	5.7	3/21/2012 - no
11/30/2012	0	1.7	**12/3/2012 - no**
2/9/2014	0	1	**2/10/2014 - no**
11/20/2014	0	0.4	11/24/14 - no

[a]Compiled from Self-Monitoring Reports available in CIWQS. Bold values indicate beach samples within 3 days of a combined sewer discharge

Special Monitoring Study: In 2012, the Boehm Research Group at Stanford University conducted a study in which it collected two water samples near Station 211 and analyzed the samples using traditional techniques for FIB as well as quantitative polymerase chain reaction (qPCR) technique for human fecal markers. The samples contained Enterococcus concentrations of 10 and 41 MPN/100 mL, well below the single sample maximum objective of 104. Total coliform and *E.coli* were not detected. The HF183Taqman human fecal material marker was present at 114 and 158 copies per milliliter of Bay water, indicating that at least some of the fecal coliform at Station 211 is of human origin (Boehm 2012).

5.3 Candlestick Point Beaches

Beach Monitoring Data: The SFPUC and San Francisco Department of Public Health sample the three Candlestick beaches (Figure 5.3) weekly for three FIB: total coliform, *E.coli*, and Enterococcus. Samples are collected year-round and are not analyzed specifically for fecal coliform. In addition to weekly sampling, following a combined sewer discharge the beaches are monitored daily until monitoring confirms that FIB levels are below water contact recreation standards. Beach monitoring data for Jackrabbit Beach, Sunnydale Cove, and Windsurfer Circle are summarized in the tables below; entries in bold type exceed CWA §303(d) impairment listing criteria.

Figure 5.3 Candlestick Point Beaches

Table 5.3 Jackrabbit Beach Data Summary, 1/2/2008 – 11/24/2014

	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	431	**60 (13.9%)**	**82 (20.4%)**
Total Coliform	431	4 (0.9%)	**56 (13.1%)**
E.coli	431	26 (6.0%)[b]	14 (3.3%)[b]

[a]Geometric means calculated using all data collected in rolling 30-day periods
[b]Compare to fecal coliform objectives, because no marine *E.coli* objective exists for estuarine waters

The Jackrabbit Beach data indicate that both Enterococcus and total coliform exceed water quality objectives in more than 10% of the samples. These exceedances occurred predominately during the wet season (October 1 – April 15), although a thorough comparison of rainfall and sampling data was not made. Numerous Enterococcus exceedances from May through August 2011 correspond to a period of unusual summer rain events.

Table 5.4 Sunnydale Cove Data Summary, 1/2/2008 – 11/24/2014

	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	485	**120 (24.7%)**	**244 (50.7%)**
Total Coliform	485	14 (2.9%)	**229 (47.6%)**
E.coli	485	45 (9.3%)[b]	31 (6.4%)[b]

[a]Geometric means calculated using all data collected in rolling 30-day periods
[b]Compare to fecal coliform objectives, because no marine *E.coli* objective exists for estuarine water

The Sunnydale Cove data indicate that half the samples over a seven year period exceed the geomean standard for Enterococcus, and these exceedances occurred largely during the wet season, including May and June of 2011. A complete comparison of rainfall dates and sampling data was not made. Total coliform geomean exceedances were sporadic and largely occurred during the wet season, including May and June of 2011. Total coliform geomean exceedances also occurred for the entire period of August 4, 2014 through November 24, 2014, a period in which there was no rainfall. *E.coli* results indicate infrequent single sample maximum exceedances occurring during summer months.

Table 5.5 Windsurfer Circle Data Summary, 1/2/2008 – 11/24/2014

	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	593	**218 (36.8%)**	**371 (63.0%)**
Total Coliform	593	**81 (13.7%)**	**450 (76.4%)**
E.coli	593	**92 (15.5%)[b]**	**126 (21.4%)[b]**

[a]Geometric means calculated using all data collected in rolling 30-day periods
[b]Compare to fecal coliform objectives, because no marine *E.coli* objective exists in estuarine waters

At Windsurfer Circle exceedances of the Enterococcus geomean objective occurred predominantly during the wet months of October through March, including the entire wet season of September 2010 through April 2011, and nearly every week of the following three wet seasons (2011-12, 2012-13, and 2013-14). A complete comparison of rainfall dates and sampling data was not made. Sporadic exceedances of the Enterococcus objective occurred during typically dry months. Similarly to Sunnydale Cove and Jackrabbit Beach, Enterococcus exceedances occurred during May 2011, coinciding with rain events; however, unlike at the other two beaches, these exceedances did not extend through the remainder of the summer months of 2011.

Total coliform exceedances occurred largely during the wet season, and also during June and July 2011. Except for one four-week period, the geomean objective for total coliform was exceeded for the entire period of September 2012 through November 2014 (end of data set). *E.coli* exceedances most often coincided with wet weather months.

NPDES Monitoring Data: The SFPUC operates a combined wastewater and stormwater collection and treatment system (Figure 5.2). During periods of heavy rain, the collection system's storage capacity can be exceeded due to very high volumes of stormwater runoff, resulting in CSDs to the Bay. The combined flows receive some level of treatment prior to discharge in that some solids will settle and some floatable wastes are retained by baffles, as illustrated in Figure 5.2. SFPUC monitors and records CSDs, as required by its NPDES permit. These CSD event data were evaluated for possible connection to bacteria objective exceedances at Candlestick beaches.

The four CSD outfalls located closest to Candlestick Park (Figure 5.3) discharged on seven days during the seven year period of 2008-2014 (Table 5.6). The potential effects of these discharges to Jackrabbit Beach and Sunnydale Cove are evaluated here; Windsurfer Circle Beach is not included because it lies between the other two beaches and any impacts from CSDs should be similar to the other beaches. Table 5.6 shows when the next weekly sample was collected following each CSD and whether that sample exceeded the Enterococcus objective. Samples collected within 72 hours of a CSD may be most relevant, because any bacteria associated with the CSD would likely be dispersed or die out after that length of time, and most of the CSDs were sampled with this timeframe. Of the seven CSDs, three were followed by Enterococcus objective exceedances at Jackrabbit Beach and four were followed by exceedances at Sunnydale Cove. However, during the same timeframe, the Enterococcus water quality objective was exceeded 60 times at Jackrabbit and 120 times at Sunnydale Cove. Thus, CSDs are not suspected to be a substantial source of FIB to Candlestick Park beaches.

Table 5.6 Combined Sewer Discharges in Vicinity of Candlestick Park Beaches: 2008 – 2014[a]

CSD Outfall #	**40**	**41**	**42**	**43**	**Date of next sample at Jackrabbit - and - does it exceed Enterococcus single sample maximum water quality objective?**	**Date of next sample at Sunnydale - and - does it exceed Enterococcus single sample maximum water quality objective?**
Location	In Yosemite Slough, approx. one mile northwest of Jackrabbit Beach (Fig. 5.2)			Approximately one-quarter mile southwest of Sunnydale Cove (Fig. 5.2)		
Date	**Duration of reported combined sewer discharge in hours[a]**					
1/4/2008	0.25	0.25	0.25	0	**1/5/2009 - yes**	**1/5/2008 - yes**
1/25/2008	3.1	3.1	3.1	8.25	**1/26/2008 - yes**	**1/26/2008 - yes**
3/5/2009	0	0	0	0.9	**3/6/2009 - no**	**3/6/2009 - no**
10/13/2009	1.1	1.1	1.1	0	**10/14/2009 - yes**	**10/14/2009 - yes**
10/19/2009	1.5	1.5	1.5	0	**10/20/2009 - no**	**10/21/2009 - no**
1/19/2010	1.1	1.1	1.1	0	1/27/2010 - no	**1/20/2010 - yes**
12/2/2012	0.22	0.22	0.22	0.63	**12/3/2012 - no**	**12/3/2012 - no**

[a]Compiled from Self-Monitoring Reports available in CIWQS. Bold values indicate beach samples within 3 days of a combined sewer discharge

Special Monitoring Studies: While most of the area abutting Candlestick Point is served by the SFPUC's combined sewer system, some portions of Candlestick Stadium, Jamestown Avenue and Hunters Point Expressway drain to one of two separate networks of stormwater pipes, and then to one of four stormwater outfalls (Figure 5.3). In addition, the southeastern-most outfall discharges stormwater from the Stadium parking lot to Windsurfer Circle (Figure 5.3).

In 2012, the Boehm Research Group at Stanford University conducted a study in which it collected two water samples from the storm drain outfall at Windsurfer Circle and analyzed them using both traditional techniques for FIB and a quantitative polymerase chain reaction (qPCR) technique for human fecal markers. The samples contained Enterococcus concentrations of 2,000 - 3,000 MPN/100 mL, well above the single sample maximum objective of 104. *E. coli* were detected at 1,500 - 1,700 MPN/100 mL. However, the HF183Taqman human fecal material marker was not detected in either sample, meaning that evidence of human fecal coliform was not found in the samples (Boehm 2012).

5.4 Crissy Field Beach

Beach Monitoring Data: The SFPUC and San Francisco Department of Public Health sample Crissy Field Beach weekly for three FIB: total coliform, *E. coli*, and Enterococcus. Samples are not analyzed specifically for fecal coliform. Samples are collected year-round at two locations along Crissy Beach. In addition to weekly sampling, following a combined sewer discharge the beaches are monitored daily until monitoring confirms that FIB levels are below water contact recreation standards.

Data for the CWA 303(d) listing were collected at the "West Trees" and "Crissy East" locations (Figure 5.4). In 2008 the National Park Service requested that SFPUC sample the far west end of Crissy Beach ("Crissy West") instead of the "West Trees" location, because the west end has higher recreational usage. Since that time, samples have been collected at the "Crissy West" and "Crissy East" locations (Figure 5.4). Water contact recreation objective exceedances are infrequent at "Crissy West," as evidenced in Table 5.7; entries in bold type exceed CWA 303(d) impairment listing criteria. Enterococci continue to exceed the water quality standard more than 10% of the time at the east sample location. Exceedances occurred primarily during the wet season, although a complete comparison of rainfall dates and sampling data was not made.

Table 5.7 Crissy Field Beach Data Summary: 1/2/2008 – 11/24/2014

	Location	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	Crissy East	428	**58 (13.6%)**	**82 (19.3%)**
	Crissy West	370	13 (3.5%)	13 (3.6%)
Total Coliform	Crissy East	428	3 (0.7%)	18 (4.2%)
	Crissy West	370	6 (1.6%)	29 (7.9%)
E.coli [b]	Crissy East	428	15 (3.5%)	2 (0.5%)
	Crissy West	370	7 (1.9%)	1 (0.3%)

[a] Geometric means calculated using all data collected in rolling 30-day periods
[b] Compare to fecal coliform objective, because no marine *E.coli* objective exists for estuarine waters

Figure 5.4 Crissy Field Beach

NPDES Monitoring Data: The SFPUC operates a combined wastewater and stormwater collection and treatment system (Figure 5.2). During periods of heavy rain, the collection system's storage capacity can be exceeded due to very high volumes of stormwater runoff, resulting in CSDs to the Bay. The combined flows receive some level of treatment prior to discharge in that some solids will settle and floatable wastes are retained by baffles, as illustrated in Figure 5.2. CSDs within approximately one mile of Crissy Field Beach were evaluated for possible connection to bacteria objective exceedances at the beach (Table 5.8).

CSDs occurred on 11 days during the seven year period of analysis, and Enterococcus single-sample maximum objective exceedances occurred 58 times. Table 5.8 shows when the next weekly sample was collected following each CSD and whether that sample exceeded the Enterococcus objective. Samples collected within 72 hours of a CSD may be most relevant, because any bacteria associated with the CSD would be dispersed or die out after that length of time. Of the 11 CSDs, six were sampled within three days and two were followed by exceedances of the Enterococcus objective. Thus, CSDs are not suspected as a substantial source of FIB to Crissy Field Beach.

Table 5.8 Combined Sewer Discharges in Vicinity of Crissy Beach: 2008 – 2014[a]

CSD Outfall #	**9**	**10**	**11**	**Date of next sample at Crissy Field East - and - does it exceed Enterococcus single sample maximum water quality objective?**
Location	Baker Street, at the east end of Crissy Field Beach, discharges 290 feet off-shore (Fig. 5.3)	Approximately 0.5 mile east of Crissy Field East station (Fig. 5.3)	Approximately 1 mile east of Crissy Field East station (Fig. 5.1)	
Date	**Duration of reported combined sewer discharge in hours[a]**			
12/28/2010	4	4	0	**12/29/10 - yes**
12/29/2010	0.3	0.3	0	12/30/10 - no
2/17/2011	0.9	0.9	0	2/22/11 - no
3/18/2011	0.5	0.5	0	3/22/11 - no
6/28/2011	2.3	2.3	0	6/14/11 - no
1/20/2012	0	1.3	0	**1/23/12 - yes**
3/14/2012	5.7	5.7	0	3/19/12 - no
11/30/2012	1.7	1.7	0	**12/3/12 - no**
12/2/2012	0.3	0.3	0	**12/3/12 - no**
2/9/2014	1	1	0	**2/10/14 - no**
11/20/2014	0.2	1	0	11/24/14 - no

[a]Compiled from Self-Monitoring Reports available in CIWQS. Bold values indicate beach samples within 3 days of a combined sewer discharge.

Special Monitoring Study: The National Park Service collected water quality data, including bacteria data, from Crissy Marsh (Figure 5.5) from February 2007 to March 2008. Grab samples were collected from several locations around the Marsh at approximately 30-day intervals following a dry period of at least 72 hours. Two additional sampling events targeted “first-flush” events, defined as the first precipitation event of each winter season with rainfall equal to 0.1 inch or greater.

Stormwater runoff from the upland catchment area discharges into Crissy Marsh at four locations, labeled as SE, WQ-7, Tennessee Hollow and Commercial Outfalls in Figure 5.5. Three outfalls and the tidal inlet were included in Marsh sampling conducted by the National Park Service during two rain events and during dry weather. Samples were analyzed for FIB and other parameters (Ward 2013); results are shown in Table 5.9. For comparison purposes, results above WQOs are shown in bold font.

Figure 5.5 Crissy Field Marsh Sample Locations

Table 5.9 Crissy Marsh Bacteria Data, 2007[a]

	WQ-9 Tidal Inlet	WQ-1 SE Outfall	WQ-3 Tennessee Hollow Outfall	WQ-5 Commercial Outfall	WQ-11 Mid-North Shore
Enterococcus (MPN/100 mL)					
Wet Weather:					
2/9/2007	**280**	**5800**	**5800**	**1300**	not sampled
10/11/2007	present>QL[b]	**410**	**260**	**680**	present > QL
Dry Weather summary for 11 samples:					
Mean	23.3	**98**	**143**	**99**	Not enough results above detection limit to do summary statistics
Median	15.0	41	46	40	
Maximum	70.0	**440**	**820**	**540**	
***E.coli* (MPN/100 mL)**					
Wet Weather summary for 11 samples:					
2/9/2007	5	170	present > QL	present > QL	not sampled
10/11/2007	52	**260**	**380**	**390**	120
Dry Weather:					
Mean	133	137	146	137	309
Median	72	74	120	80	285
Maximum	350	**990**	**550**	**550**	**620**
Total Coliform (MPN/100 mL)					
Wet Weather:					
2/9/2007	870	present > QL	present > QL	present > QL	not sampled
10/11/2007	330	present > QL	present > QL	present > QL	1900
Dry Weather summary for 11 samples:					
Mean	2191	9520	9937	5200	1430
Median	1700	**11,000**	9450	4100	1350
Maximum	**>24,000**	**>24,000**	**>24,000**	**>24,000**	2200

[a]Ward 2013
[b]Parameter detected above the method quantitation limit (QL)
Bold type indicates values exceeding the Water Quality Objective

This limited data set shows Enterococci present at higher concentrations at the stormwater outfalls in the Marsh (SE, Tennessee Hollow and Commercial Outfalls) during wet weather and at lower concentrations during dry weather, indicating stormwater runoff transport of enterococci from the surrounding catchment area. Total coliform concentrations indicate the opposite relationship, being below detection levels during wet weather and at very high concentrations during dry months. FIB concentrations in general appear to be lower where the marsh interfaces with Crissy Beach (at tidal inlet location) than at the stormwater outfalls. This study provides a useful snapshot of the distribution of FIB in the marsh; however, the study is not comprehensive enough to indicate with reasonable certainty whether the marsh is a source of FIB to Crissy Beach and, if so, its relative contribution.

FIB data collected from creeks and stormwater conveyances upstream from the marsh provide further information about potential upland bacteria sources. The Presidio Water Quality Monitoring Program has collected watershed data since 2008, sampling locations where creek restoration projects have occurred and where basic water quality information is needed. A summary of the data is shown in Table 5.10.

Table 5.10 Presidio Watershed Monitoring Data Summary

Location	Parameter	Years Sampled	# Data Points	# Samples exceeding Single Sample Max (%)
El Polin Spring 1	Enterococcus	2008	7	4 (58%)
	E.coli	2008 - 2015	82	22 (27%)
	Total Coliform	2008 - 2015	82	18 (22%)
El Polin Spring 2	*E.coli*	2011 - 2015	40	6 (15%)
	Total Coliform	2011 - 2015	40	16 (40%)
Tennessee Hollow (TH) 1	*E.coli*	2009 - 2015	48	6 (12%)
	Total Coliform	2009 - 2015	48	16 (33%)
TH 2	Enterococcus	2008	5	3 (60%)
	E.coli	2008 - 2015	66	13 (20%)
	Total Coliform	2008 - 2015	66	13 (20%)
TH 3	Enterococcus	2008 - 2009	18	13 (72%)
	E.coli	2008 - 2015	81	22 (27%)
	Total Coliform	2008 - 2015	81	50 (62%)
TH 4	Enterococcus	2008 - 2009	17	5 (29%)
	E.coli	2008 - 2015	81	15 (19%)
	Total Coliform	2008 - 2015	81	48 (59%)

The few Enterococcus data collected indicate that high densities of this bacterium can be present in upland surface waters; however, the small numbers of samples prevent drawing conclusions on its relative significance at the beach.

5.5 Marina Lagoon Beaches

Beach Monitoring Data: Since 1998, the San Mateo County Health System has collected samples at two sites on Marina Lagoon: Parkside Aquatic Park and Lakeshore Park (Figure 5.6). Prior to 2007, County Health collected additional samples at Lakeshore Park along the rocks south of the Recreation Center, but sampling at this location was discontinued because swimmers do not use this rocky area (Smith 2012). As funding levels have fluctuated, the City of San Mateo has taken responsibility for some of this sampling. The two beach areas are sampled year-round on a weekly basis for three FIB: total coliform, fecal coliform, and Enterococcus. Beach monitoring data are summarized in Table 5.11 and Table 5.12; entries in bold type exceed CWA 303(d) impairment listing criteria.

Table 5.11 Parkside Aquatic Park Beach Data Summary, 1/2/2008 – 12/22/2014

	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	327	**102 (31.2%)**	**145 (54.1%)**
Total Coliform	329	**65 (19.8%)**	**266 (96.0%)**
Fecal Coliform	329	**115 (35.0%)**	**134 (48.0%)**

[a]Geometric means calculated using all data collected in rolling 30-day periods.

Table 5.12 Lakeshore Park Beach Data Summary, 1/2/2008 – 12/22/2014

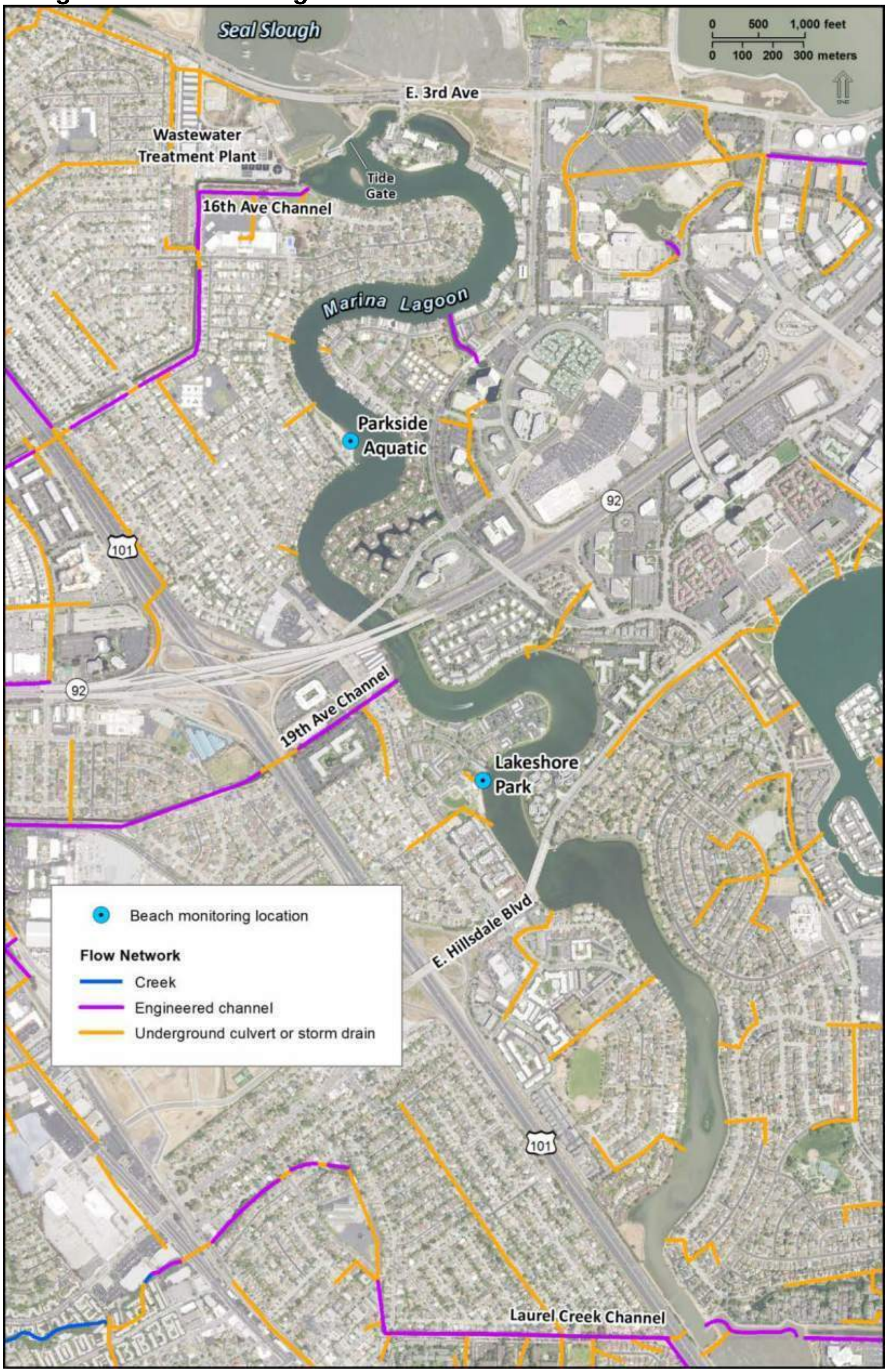
	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	325	**84 (25.8%)**	**148 (54.6%)**
Total Coliform	326	**65 (19.9%)**	**274 (98.9%)**
Fecal Coliform	326	**84 (25.8%)**	**99 (35.7%)**

[a]Geometric means calculated using all data collected in rolling 30-day periods.

The data are similar between the two beaches on Marina Lagoon. The Enterococcus geomean objective is exceeded in approximately half the samples and nearly all the samples exceed the total coliform geomean objective. At Aquatic Park Beach, Enterococcus exceedances occurred during both wet and dry months, including the entire relatively storm-free period from September 2013 through mid-July of 2014. At Lakeshore Park Beach, Enterococcus exceedances occurred during typically wet months, and also during the primarily dry months of June-September of 2012.

NPDES Monitoring Data: The City of San Mateo Wastewater Treatment Plant (Plant), located at the mouth of Marina Lagoon (Figure 5.6), discharges secondary and advanced secondary treated municipal wastewater through a deep water discharge pipe approximately 3,700 feet offshore in San Francisco Bay. This discharge is located too far from the San Mateo beaches to affect them, and the Plant's NPDES permit (No. CA0037541) does not require pathogen monitoring in Marina Lagoon. The Plant is not considered a source of FIB to Marina Lagoon beaches.

Figure 5.6 Marina Lagoon with Lakeshore and Parkside Beaches



Special Monitoring Study – Goose Excrement Removal at Beaches: The City of

San Mateo has proactively conducted a pilot study to determine if removal of goose excrement is beneficial to the water quality in Lakeshore Park and Parkside Aquatic Park Beaches. During the period July 15 to November 18, 2014, goose and gull feces were picked up daily; goose fences were installed at the waterline of both beaches; path and rip-rap cleaning and beach raking techniques were modified to reduce water contamination; aquatic weeds and algae were removed to discourage goose feeding; goose eggs were addled (a population control method in which goose eggs are coated with corn oil to stop the flow of oxygen), and educational information was disseminated to beach patrons and nearby home owner associations. After the first week of the project, City of San Mateo staff reported that Lakeshore Park bacteria densities dropped enough to open the beach for the first time in 2014, and bacteria levels continued to be somewhat lower than historic levels for the remainder of the project (Rudnicki 2014). City staff report, however, that when the water level of the lagoon is dropped to prevent flooding of the lagoon during rain events, water quality at the beaches goes down regardless of goose control efforts (Scheidt 2014).

The goose feces removal project recommenced in February 2015 and is scheduled to run through January 2016. When compared to historic bacteria data, it appears Enterococcus exceedances may have decreased during the period of the goose excrement pilot study. However, more data are needed to draw conclusions due to the significant annual variability of exceedance rates (Table 5.13). Over the 2008 – 2014 timeframe, bacteria densities generally followed a pattern of lower concentrations in summer months.

Table 5.13 Bacteria Densities: Goose Pilot Period vs. Historic

Beach	For July 15 – Nov. 18 of Year:	Enterococcus		Fecal Coliform		Total Coliform	
		% Single Sample Max Exceed-ance	% Geomean Exceed-ance	% Single Sample Max Exceed-ance	% Geomean Exceed-ance	% Single Sample Max Exceed-ance	% Geomean Exceed-ance
Parkside Aquatic	2008	0	0	0	0	0	75
	2009	11	50	22	22	11	72
	2010	5	5	5	5	5	95
	2011	27	22	39	67	22	94
	2012	21	53	11	5	11	84
	2013	56	67	33	39	6	78
	Pilot[a]	**10**	**26**	**26**	**42**	**11**	**100**
Lake-shore Park	2008	9	0	0	0	0	82
	2009	0	0	18	24	18	100
	2010	12	6	18	6	18	94
	2011	33	50	33	33	11	78
	2012	26	37	21	11	0	84
	2013	26	84	37	84	5	100
	Pilot[a]	**15**	**40**	**5**	**20**	**15**	**100**

[a] July 15 – Nov. 18, 2014

5.6 China Camp Beach

Beach Monitoring Data: The Marin County Health Department collects a single sample, from China Camp Beach weekly during the months of April through October (location shown on Figure 5.7). U.S. EPA placed China Camp Beach on the 303(d) list based on 26% of samples exceeding the geomean of total coliform objective (U.S. EPA 2011), using data collected in the 2003-2005 sampling timeframe. Analysis of beach monitoring data collected since then (Table 5.14) indicates that the geomean for total coliform remains elevated above the objective.

Table 5.14 China Camp Beach Data Summary: 4/5/2006 – 10/29/2014

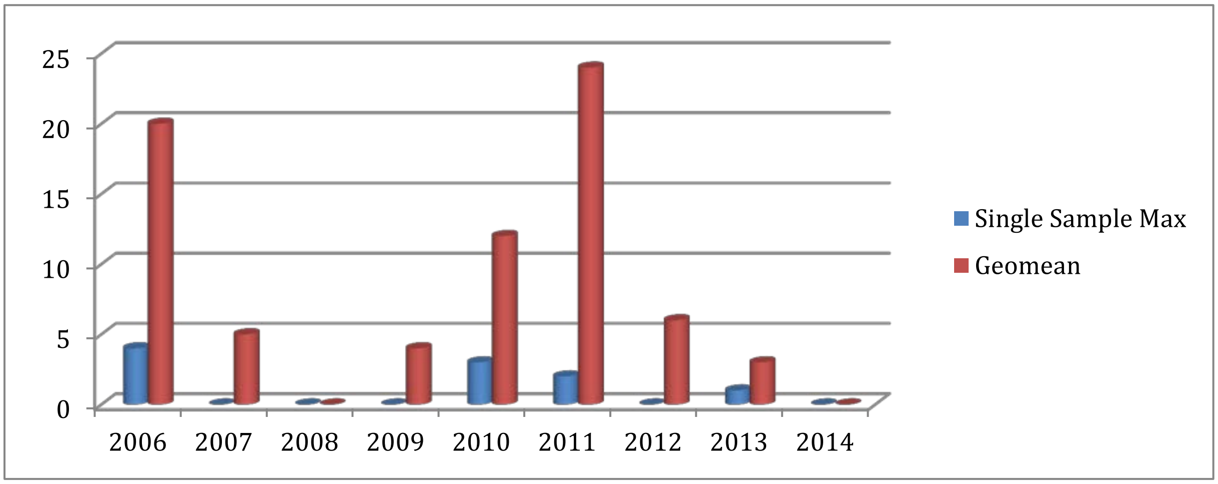
	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	271	3 (1.1%)	0
Total Coliform	267	10 (3.7%)	**75 (32.1%)**
E.coli [b]	271	2 (0.7%)	0

[a]Geometric means calculated using all data collected in rolling 30-day periods
[b]Compare to fecal coliform objectives, because no marine *E.coli* objective exists for estuarine waters

Figure 5.7 China Camp Beach

The total coliform exceedances tended to occur between May and September, which are typically dry months. However, there is a wide annual variation in total coliform results, as illustrated in Figure 5.8. Note that approximately 30 samples are collected annually between April 1 and October 31.

Figure 5.8 Number of Annual Total Coliform Exceedances - China Camp Beach



5.7 McNears Beach

The U.S. EPA placed McNears Beach on the CWA §303(d) list in 2006, because 15% of samples exceeded the geomean for total coliform during summers 2003 through 2005 (U.S. EPA 2011). The Marin County Health Department continued collecting one sample at McNears Beach weekly during the months of April through October until 2009, at which time sampling stopped. Weekly sampling resumed in July, 2013. Available data for the timeframe following the CWA §303(d) listing are summarized in Table 5.15; entries in bold type exceed CWA §303(d) impairment listing criteria. McNears Beach and the location of the beach sampling station are shown in Figure 5.9.

Table 5.15 McNears Beach Data Summary, 2006 – 2008, 2013-2014

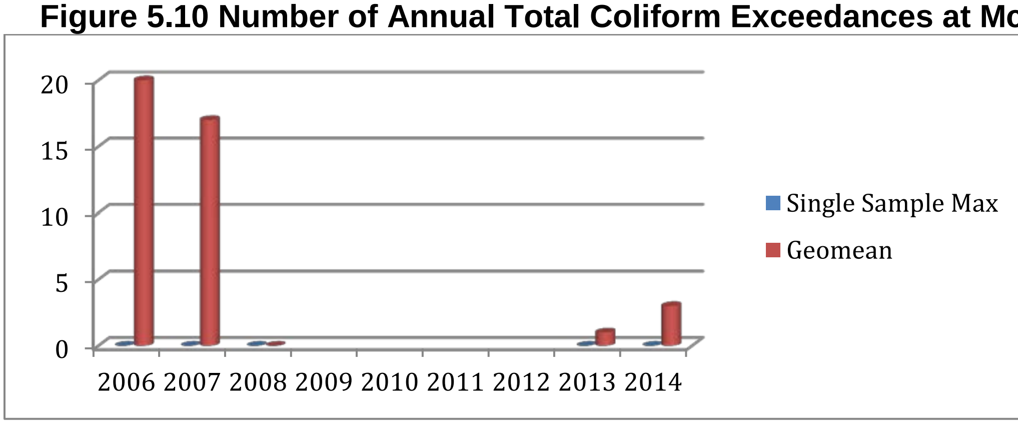
	# Data points	# Samples exceeding Single Sample Max (%)	# Samples exceeding Geometric Mean[a] (%)
Enterococcus	144	7 (4.9%)	4 (3.3%)
Total Coliform	144	0	**41 (32.5%)**
Fecal Coliform	144	1 (0.7%)	0

[a]Geometric means calculated using all data collected in rolling 30-day periods

Figure 5.9 McNears Beach

The data present similarities to the FIB data collected at China Camp Beach, in that *only* total coliform exceed the water quality objective in more than 10% of the samples. Another similarity is that 2006 saw the greatest number of exceedances at both beaches (20 each), while exceedances were few in 2013 and 2014, as evident in comparing the annual exceedances in Figure 5.8 and Figure 5.10. Note that these beaches are separated by less than 5 miles along the bayside Marin County coast.

Figure 5.10 Number of Annual Total Coliform Exceedances at McNears Beach



5.8 Heal the Bay Report Card "Grades"

The nonprofit environmental organization Heal the Bay evaluates beach monitoring data and presents it annually in the form of report card grades, A through F, which provides a different way to look at the same data as used in the analyses above. Heal the Bay's data analyses involved deriving total points available by adding together the geometric mean and the single sample standard (although there is no geometric mean component to wet weather grades), subtracting points lost for exceedances of water quality objectives, then dividing by total number of samples and multiplying by 100 (Heal the Bay 2015). Grades are assigned for each beach sampling location, resulting in some beaches receiving more than one grade, and separate grades are given for summer dry weather, winter dry weather and wet weather year round. The different data evaluation methods make it difficult to compare beach grades to the data summaries provided for each beach in the previous sections of this report. Table 5.16 shows Heal the Bay grades for 2014 along with the long-term exceedance rates of the Enterococcus geometric mean WQO.

Table 5.16 Heal the Bay Beach Grades for 2014

Beach - Sample Location	Summer Dry (April-Oct)	Winter Dry (Nov-Mar)	Wet Weather Year round	Enterococcus geomean exceedance rate: 2008-2014
Aquatic Park – Hyde ST	A	A	B	4%
Aquatic Park – 211 Station	B	B	A	18%
Candlestick – Jackrabbit	A	B	F	20%
Candlestick – Windsurfer Circle	C	C	F	50%
Candlestick – Sunnydale Cove	F	B	F	63%
Crissy Field – East	A	A	B	19%
Crissy Field – West	A	A+	B	4%
Marina Lagoon – Aquatic Park	F	F	F	54
Marina Lagoon – Lakeshore	F	C	F	55
China Camp – only station	A+	ND[a]	ND	0
McNears – only station	A+	ND	ND	3

[a] ND indicates no data were collected during that timeframe
Source: Heal the Bay 2015

6 NUMERIC TARGETS

In order to establish a TMDL, a desired or target condition is established to provide measurable environmental management goals and a clear linkage to attaining the applicable water quality objectives. This section describes the proposed numeric targets.

6.1 Numeric Targets

The numeric targets for San Francisco Bay beaches are based on the Basin Plan water quality objectives for Enterococcus for water contact recreation uses in marine and estuarine waters and are consistent with U.S. EPA's 2012 recommended Recreational Water Quality Criteria for Enterococcus in marine and fresh water. The U.S. EPA recommendations provide two slightly different possible values (geometric means of 30 vs. 35 cfu/100 mL), and the State Board is considering an action to adopt one of those values statewide for Enterococcus in marine waters. The value adopted statewide will be used for future beach delistings and will not replace the numeric targets, listed in Table 6.1.

Table 6.1 Numeric Targets for San Francisco Bay Beaches

Enterococcus	
Geometric mean	< 35 MPN / 100 mL[a,b]
Single sample maximum	No sample > 104 MPN / 100 mL

a. Most Probable Number (MPN) is a method for counting viable cells and provides a statistical representation of the more time-consuming "colony forming unit" method for estimating the number of viable bacteria cells in a sample
b. Based on a minimum of five samples during a 30-day period

San Francisco Bay Water Board staff has adopted numeric targets only for Enterococcus, not fecal and total coliform, for San Francisco Bay beaches because U.S. EPA's 2012 Recreational Water Quality Criteria guidance document recommends relying on Enterococcus alone as a FIB in marine waters. U.S. EPA's current recommendation is based on updated research indicating that levels of Enterococcus in marine waters correlate highly to incidences of human illness (Cabelli et al., 1982; Wade et al., 2008), while levels of total coliform and fecal coliform do not. In addition, EPA has advised states to use Enterococcus as the sole FIB in marine waters in three other guidance documents: "Ambient Water Quality Criteria for Bacteria" issued in 1986; "Protocol for Developing Pathogen TMDLs," issued in 2001; and "Implementation Guidance for Ambient Water Quality Criteria for Bacteria," issued in 2002 and reaffirming the 1986 guidance. The Basin Plan currently contains bacterial indicator water quality objectives for fecal coliform, total coliform and Enterococcus; however, use of only Enterococcus numeric targets for the San Francisco Bay Beaches is appropriate in light of U.S. EPA's updated recommendations.

6.2 Implementation of the Numeric Targets

The numeric targets are the desired condition for all San Francisco Bay beaches. Success in achieving these conditions will be evaluated in accordance with the State of California CWA §303(d) listing policy (State Board 2004).

7 SOURCE ASSESSMENT

The objective of the source assessment is to identify potential sources of bacteria to the impaired water bodies. In this section, background information about bacteria as a contaminant is presented, and bacteria source categories common to all San Francisco Bay beaches are described, followed by descriptions of the site-specific known or likely sources of bacteria to each beach currently listed on the CWA 303(d) list of impaired water bodies.

7.1 Background – Bacteria Fate and Transport

For urban beaches, bacteria sources are well understood, as shown in Sections 7.2 and 7.3. However, the factors that drive bacteria build up and transport, such as temperature, moisture conditions, pH, exposure to sunlight, and nutrient availability, are highly variable temporally and spatially (Hathaway 2010). Bacteria differ from chemical pollutants in ways that are fundamental to assessing bacteria sources and designing actions to reduce their loads:

- Bacteria are living organisms; their primary effect on human health results from their life status rather than their simple presence. Bacteria can die off over short time frames (e.g., 3-5 days), but concentrations also can increase without further bacterial loading when conditions are conducive to growth (Gerba 1976).
- Conditions conducive to growth include little exposure to sunlight (e.g., high turbidity), moist/wet environment, moderate water temperature, and nutrients. Sediment and organic litter can provide both nutrients and protection from sunlight, thus providing favorable conditions for bacteria growth. Bacteria can grow and replicate in beach environments (Yamahara 2009), such as at the rack line and in warm, shallow water. Tide height has been found to affect some beaches, although some had statistically greater concentrations of bacteria at high tides, and others at low tide (Rippy 2014).
- Chemical pollutants often sorb to sediment and organic litter, and thus treatment measures that capture sediments and particulates in the water column are generally effective for reducing chemical pollutant loads. Conversely, removal of water column particulate-bound or free bacteria is not always a reliable permanent removal mechanism for bacteria. Because bacteria survive in the removed sediments, these bacteria can become mobilized, or flushed out of the treatment unit, during subsequent rain events.

All these factors are variable and difficult to model. Models used to date for other bacteria TMDLs generally do not provide the type of information that tells which sources contribute the most bacteria to a beach, or where the best opportunities for controlling bacteria in the watershed may be (e.g., U.S. EPA Region 9 2012). Thus, we look at each potential source's magnitude and proximity to the beach when prioritizing sources to achieve bacteria load reductions.

The likely bacteria sources to San Francisco Bay urban beaches are discussed below and must be addressed. While addressing controllable sources of bacteria, beach stakeholders may choose to conduct studies to better understand the contribution of environmental (or uncontrollable) sources as part of adaptive implementation.

7.2 Sources of Bacteria to Urban Beaches

The beaches on San Francisco Bay are situated in urban locations, and much is known about sources of bacteria within urban ecosystems (ASCE 2014, UWRRC 2014). An inventory of potential FIB sources in urban environments is provided below, along with a discussion of whether and how the bacteria from each source category might be controllable.

7.2.1 Municipal Wastewater Treatment Plant Discharges

Twenty-eight municipal wastewater plants discharge treated wastewater to San Francisco Bay or its tributaries (Figure 7.1). The Water Board issues NPDES permits with effluent limitations protective of REC-1 uses to each of these facilities. The efficiencies of the wastewater treatment systems result in low concentrations of bacteria in treated effluent; FIB concentrations in effluent are generally much lower than water quality objectives. A review of available discharge monitoring data for Bay area wastewater treatment plants revealed only four instances in which a facility exceeded the Enterococcus effluent limitation of a geometric mean of 35 MPN/100 ml between 2002 and April 2009 (CIWQS 2015). Furthermore, with limited exceptions, none of which affect San Francisco Bay beaches, wastewater treatment plants discharge treated effluent to deep water locations distant from the shore. This TMDL does not contemplate further control of municipal wastewater plant discharges.

7.2.2 Sanitary Sewer Collection Systems

Sanitary sewer collection systems include the elements listed in Table 7.1, which are made of a variety of materials, including terra cotta, glazed pipe, vitrified clay pipe, polyvinyl chloride, high density polyethylene, transite, iron and asbestos concrete. Sewer collection system components deteriorate through normal use, age and physical causes, such as root penetration and ground fault movement. State Board Order No. 2006-0003-DWQ, Statewide General Waste Discharge Requirements for Sanitary Sewer Systems, requires sewer collection system agencies in California to maintain their collection systems and to devote adequate resources to an inspection and maintenance program.

Despite such programs, sewer line backups, overflows and leaks occur, frequently during periods of wet weather, creating a potential source of bacteria on land surface that may be transported via urban runoff to an urban beach.

Figure 7.1 Wastewater Treatment Plant Outfalls in San Francisco Bay Region

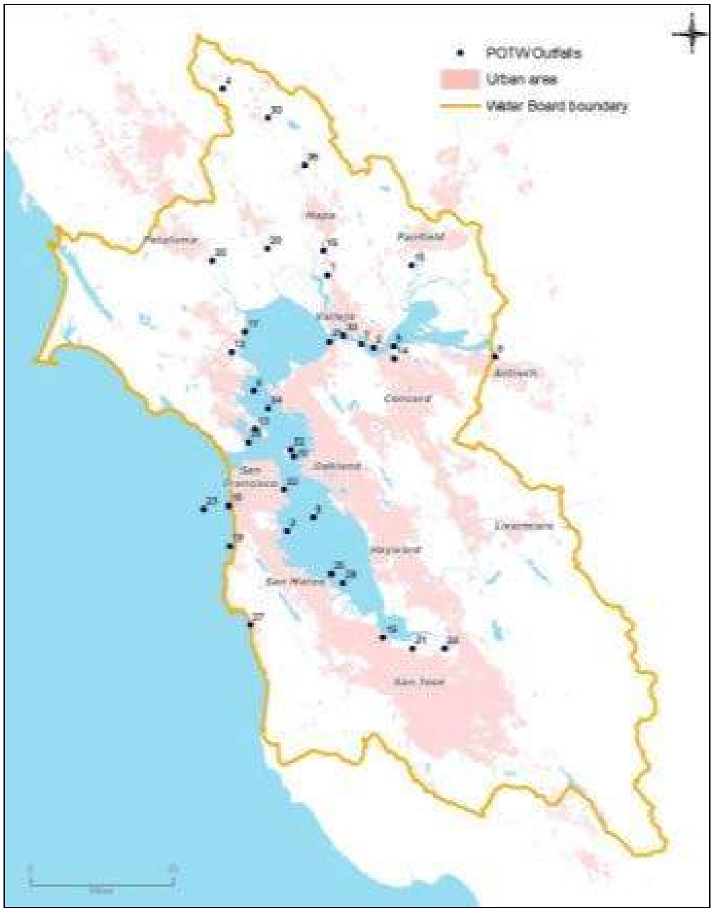


Table 7.1 Sanitary Sewer System Components

Component	Common Pipe Size	Purpose	General Information
Lateral	6 inch	Connect a building's plumbing system to the main sewer line in the street	Also called "service connection." Commonly privately owned and maintained
Branch line	8 inch or more	Receive flow from laterals	Connect laterals to the larger system
Main line	8 inch or more	Collect from numerous lateral and/or branch lines	Can be associated with an area or neighborhood, or can be the system that connects to laterals
Trunk line	24-36 inch	Convey from numerous main lines to interceptor or treatment plant	Considered the main arteries of wastewater collection system
Interceptor	36-48 inch	Largest pipes, fed by multiple trunk lines	Larger systems only
Manhole	n/a	Provide access to underground sewer lines	Used to inspect and clean sewer lines
Lift or pump station	n/a	Pump sewage to a higher elevation	Generally needed at lower elevations

Sanitary sewer overflows (SSO) are commonly caused by either plugged pipes or infiltration and inflow (I/I) (Figure 7.2). Infiltration is groundwater seepage into sewer pipes through holes, cracks, joint failures, and faulty connections. This can be common in areas with high groundwater elevation, such as areas near the Bay. Inflow is rainwater that enters the sewer system from sources such as yard and patio drains, roof gutter downspouts, uncapped cleanouts, pond or pool overflow drains, footing drains, cross-connections with storm drains, and holes in manhole covers. Inflow is greatest during heavy rainfall and can cause excessive flows and sewage spills. Most I/I is caused by aging infrastructure that needs maintenance or replacement.

In addition to plugging and I/I, any major sewer line break could result in a high short-term loading of untreated human waste to the Bay. In the Bay area, fault movements contribute to loss of integrity of sewer pipes.

As required by the Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (Order No. 2006-0003-DWQ as revised by Order No. 2008-0002-EXEC), SSOs must be reported to the California Integrated Water Quality System (CIWQS) Online SSO Database. Data for the San Francisco Bay Region indicate there are approximately five SSOs per hundred miles of sewer collection system piping (CIWQS 2015).

Figure 7.2 Example Causes of Inflow and Infiltration

Town of Needham, MA, http://www.needhamma.gov/index.aspx?NID=320

7.2.3 Urban Stormwater Runoff

The positive relationship between fecal bacteria density in urban waterways and the density of housing, population, development, percent impervious area, and domestic animals has been well established (e.g., Young and Thackston 1999). Potential sources of bacteria in urban areas, excluding wastewater sources discussed above in Sections 7.1.1 and 7.1.2, are listed in Table 7.2.

Table 7.2 Potential Sources of Bacteria in Urbanized Areas, Excluding Wastewater[a]

General Category	Source or Activity
Non-wastewater human sanitary sources	Leaky or failing septic systems
	Homeless encampments
	Porta-Potties
	Dumpsters and trash cans (e.g., diapers, pet waste)
	Garbage trucks
Domestic pets	Dogs, cats, other
Urban wildlife	Rodents (e.g., rats, raccoons, squirrels)
	Birds
	Other (e.g., deer, coyotes, feral cats)
Others (including areas that attract vectors)	Landfills
	Food processing facilities
	Outdoor dining
	Restaurant grease bins
	Bars and stairwells (washdown areas)
	Piers and docks
Urban non-stormwater discharges (potentially mobilize FIB)	Power washing
	Excessive irrigation and overspray
	Car washing
	Pools and hot tubs
	Reclaimed water and graywater (if not properly managed)
Municipal stormwater infrastructure	Illegal dumping
	Illicit sanitary connections to storm drains
	Biofilms and regrowth of bacteria
	Decaying plant matter, litter and sediment in storm drain

[a]From ASCE 2014

A number of studies conducted in southern California present recent information about bacteria in stormwater. This research confirms that bacteria loading in stormwater is substantially higher from urban areas than from undeveloped open space (Stein et al., 2007) and that bacteria are present in urban stormwater runoff during both dry and wet seasons. Rippy et al. (2014) concluded that water quality might be improved by extending drainpipe outlets further into the water to minimize human contact with runoff plumes and/or by building green infrastructure aimed at collecting, retaining, evapotranspiring, treating, and/or reusing dry weather runoff.

Field studies conducted to assess the coastal water quality impact of stormwater runoff from the Santa Ana River during the wet season showed that stormwater runoff leads to fecal indicator bacteria concentrations exceeding water quality standards by up to 500% in the immediate vicinity of the discharge (Ahn 2005). Stein and Tiefenthaler found mean dry season storm drain *E.coli* counts in the urbanized Ballona Creek and Los Angeles River watersheds were 47,000 MPN/100 mL and 21,000 MPN/100 mL, respectively, more than 150 times higher than applicable standards. Bacterial counts from in-river and storm drain samples consistently and uniformly exceed water quality standards in almost all locations surveyed in the study (Stein and Tiefenthaler 2005).

Bacteria in stormwater runoff were also identified by San Francisco Baykeeper in sampling conducted in marinas in the Bay. Over an eighteen-month period from September 2004 through July 2005, Baykeeper collected more than 400 samples from four marinas located on San Francisco Bay: Clipper Yacht Harbor in Sausalito, Corinthian Yacht Club in Tiburon; Berkeley Marina in Berkeley, and Jack London Marina in Oakland. Of the 422 water samples collected and analyzed, only 19 (5%) had bacteria levels that exceeded one or more of the water quality standards listed in Table 4.2. A correlation between elevated bacteria levels and the presence of a storm drain was apparent; seventeen of the 19 (89%) samples that exceeded a water quality standard were collected from stations located adjacent to a municipal storm drain (SF Baykeeper 2006).

Urban runoff from California Department of Transportation's (Caltrans) highways has not been found to be a significant source of indicator bacteria, largely because Caltrans' highways comprise a very small area within San Francisco Bay beach watersheds and are not known to have typical bacteria-generating sources such as homeless encampments, restroom facilities, and garbage bins.

7.2.4 Pets at Beaches

Pet waste originating in the general urban area constitutes part of the urban runoff bacteria load. However, pets at or in the near vicinity of beaches present a bacteria load that does not enter the municipal stormwater collection system. Most San Francisco Bay beaches allow dogs either on- or off-leash. While signs may encourage owners to remove pet waste, the level of compliance varies. Poor pet management within a beach area is a potential source of bacteria to the beaches.

7.2.5 Vessels (Recreational, Live-aboard, and Anchor-out Boats)

Waste discharge from vessels is a potential source of FIB at beaches with marinas. Based on a marina survey conducted for the California Department of Boating and Waterways (DBW) in August 2004, there are 99 recreational marinas with a total of more than 20,000 slips in San Francisco Bay. Most boats are designed for active self-propelled navigation and also to accommodate living onboard. Boats that are used as long-term private residences as well as for navigation are referred to as "live-aboards." More than 1300 live-aboards are berthed in San Francisco Bay marinas (McDowell and Patton 2004).

There are approximately 35 pumpout facilities on San Francisco Bay (DBW and SFEP 2005). A more recent DBW survey did not contain the level of detail found on Table 7.3, but did find that 59% of boats on San Francisco Bay have installed onboard toilets, and 18% have porta-potties. Asked to identify obstacles to using sewage pumpouts on San Francisco Bay, 12% of respondents said the stations are broken at least half the time, and 14% said they are unable to find one at least half the time. Of boaters statewide (question not broken down by area) 64% of the respondents stated that California boaters frequently discharge untreated sewage into the water (DBW 2011).

Note that the San Francisco Baykeeper marina sampling discussed above (Section 7.1.3) found only 5% of water samples from four marinas on San Francisco Bay exceeded bacteria objectives, while the Richardson Bay Pathogen TMDL adopted in 2008 identifies live-aboard vessels as a significant bacteria source.

Table 7.3 San Francisco Bay Boat Marinas

County[a]	Marinas	Slips	Boats Requiring Pumpout	Vessels with Portable Toilets	Transient Boats Requiring Pumpout (boats/yr)	Live Aboards at Marinas
Alameda	26	6541	4368	454	1341	517
Contra Costa	12	2826	1444	472	369	189
Marin	31	3713	2262	186	2965	251
Napa	2	200	150	10	60	7
San Francisco	7	2031	1225	275	5100	53
San Mateo	10	3045	1730	270	812	226
Santa Clara	3	77	2	0	0	0
Solano	5	1618	1059	27	1750	88
Sonoma	3	492	69	52	300	3
Totals	**99**	**20,543**	**12,309**	**1746**	**12,697**	**1334**

[a]Section 5 of this report contains information about any pumpout facilities located at the beaches included in the San Francisco Bay Beaches Bacteria TMDL
Source: DBW 2004

7.2.6 Wildlife

A variety of terrestrial wildlife, such as birds and rodents, inhabit watersheds discharging to San Francisco Bay. Bacteria from terrestrial wildlife are transported to a beach via creeks and stormwater conveyances.

Waterfowl and marine mammals can also represent sources of bacteria to San Francisco Bay beaches. It is difficult to assess the impact of waterfowl on beaches because of the variety of species, their complex distribution and dispersal patterns, and their fluctuating populations. They can cause localized, intermittent impacts, especially during the winter months, and especially when enhanced habitat, such as wetlands, are in the vicinity of the beach. Similar to avian populations, marine mammals follow the herring runs into San Francisco Bay, and may also cause intermittent impacts on water quality in some areas in winter.

In this TMDL, we differentiate between the types of wildlife described above and what can be termed “nuisance wildlife,” which no longer migrate but instead inhabit a beach area due to available food sources and other favorable conditions. It is not feasible to control the former type of wildlife, but actions can be taken to reduce nuisance wildlife sources of bacteria. Where nuisance wildlife presents a significant source of bacteria to a beach, control actions would be necessary to reduce this source.

7.3 Beach-Specific Pollutant Sources

This section provides our understanding of the potential sources of bacteria in the watersheds of each impaired San Francisco Bay Beach, including the type, magnitude, and location of these sources. Due to data and resource limitations, this report does not quantitatively estimate loads (i.e., the total number of bacteria discharged by each source per unit time) for the different bacteria sources in each of the watersheds. However, bacterial water quality data and observations in the watersheds lead us to conclusions about the likelihood and significance of different sources of bacteria.

7.3.1 Aquatic Park Beach

Monitoring data from the two sample locations at Aquatic Park Beach (Section 5.2) show the bacteria objectives are exceeded at only one, Station 211, where the Enterococcus objective is exceeded in 18% of the samples. The Hyde Street Pier sample location does not experience significant bacteria objective exceedances, indicating the likelihood of a bacteria source affecting the area of Aquatic Beach associated with Station 211. The potential bacteria sources are described below.

Sanitary Wastewater: Potential sanitary wastewater sources to Aquatic Park Beach include CSDs and SSOs. However, data on CSD overflows (Section 5.1) demonstrate that CSDs are not a significant source of pathogens to Aquatic Park Beach. Sanitary sewer leakage remains a potential source.

A sanitary sewer main pipeline runs parallel to the beach and is owned and operated by the SFPUC. At the time of report preparation, no information on the condition of this line was available. Other sanitary sewer infrastructure in the vicinity of Aquatic Park Beach includes:

- Under pier piping connects a public restroom facility on Hyde Street Pier to the SFPUC main pipeline. The Port of San Francisco inspects the condition of all under pier water and sewer infrastructure at least annually. Port of San Francisco staff has observed no leaking pipes beneath the Hyde Street Pier. Restroom facilities for vessel berth holders are located at the Hyde Street Harbor Office, adjacent to Hyde Street Pier. The underground laterals for this facility are under the Port's control until they tie into SFPUC's sewer main (Alford 2015).
- The National Park Service owns two public restroom structures, one at either end of the beach. Both were built in the mid-1930s and closed in about 2006 because the piping and pump stations needed frequent maintenance and operating these facilities was not cost-effective. There are no plans to renovate the rest rooms.
- The Sea Scout structure at the west end of the beach does not contain a restroom. Temporary sanitation stations are rented when the structure is used for overnight events.
- The Maritime Museum structure (also called the Aquatic Park Bathhouse) has been extensively renovated. Two pumps within the building pump wastewater to the SFPUC combined sewer system.

Sanitary sewer lines operated by SFPUC, National Park Service, and Port of San Francisco merit investigation as possible sources of bacteria to Aquatic Park Beach.

Urban Runoff: Because most of the watershed runoff flows to San Francisco's combined sewer system, a relatively small land area discharges to Aquatic Park Beach, primarily at the east and western ends of the beach (Figure 5.1). Urban runoff from the Maritime Museum building and grounds, including the green roof over the building, discharges in the vicinity of the former Mid-beach sampling station. Urban runoff from the remainder of the catchment flows to the SFPUC's combined sewer system, discussed below.

Because the area discharging to the beach is quite limited, it would appear that urban runoff would not be a major source of pathogens. However, urban runoff does discharge to the general location of FIB exceedances, i.e., Station 211, and FIB exceedances occur predominately in wet weather months. Thus, urban runoff is a potential source of FIB to Aquatic Park Beach.

Pets at the beach: Officially, dogs are not allowed on Aquatic Park Beach, but dogs do frequent the beach and pet waste is evident at times, according to National Park Service personnel groundskeepers. To date, there has not been a campaign to enforce the “no dogs” rule; thus, pets are a potential source of bacteria to the beach.

Boat waste: Aquatic Park provides anchorage for non-motorized boats for short-term docking of one to five nights. For the period July 2011-June 2012, an average of nine boats anchored overnight per month. However, during the Fourth of July and Fleet Week holidays, up to 50 boats will anchor in Aquatic Park Cove (Morris 2013b).

Boaters either call the harbormaster when they want to anchor or apply in advance for a permit. At that time, boaters are informed of the rules, including the rule that boat must have “zero discharge” of waste to the water. While National Park Service personnel cannot strictly enforce this rule, it is thought that only a minority of boaters may discharge waste in the harbor. Further, Park Service personnel find that most boaters are aware of fact that dumping is prohibited in the entire San Francisco Bay, and within several miles of the coast (Morris 2013a). Signs stating that dumping is prohibited are posted at Municipal Pier and at the U.S. Army Corps of Engineers breakwater.

Another 60 temporary berths are located on the east side of Hyde Street Pier, where Port of San Francisco staff provides information on proper management of marine sanitary devices. Pathogen exceedances of WQOs are not observed at the Hyde Street sampling station, indicating that boats do not appear to be a significant source of FIB to the beach.

At this time, boats are not considered a significant source of bacteria to Aquatic Park Beach. Should this change, enforcement of current regulations by the National Park Service and Port of San Francisco should be sufficient to address this source.

Wildlife: Seals are commonly seen at Aquatic Park, frequently at the west end, and birds are present year-round. National Park Service personnel report that the presence of a barn owl near the cable car turnaround may keep the number of sea gulls in the vicinity relatively low. Nuisance wildlife, such as flocks of geese or seagulls, is not common at or near the beach. Wildlife is not considered a major contributor of bacteria to Aquatic Park Beach.

CONCLUSION: The incidence of exceedance of bacteria objectives at Station 211 is 18.6%, and exceedances commonly occur during wet weather. Possible sources are sewer system overflows or leaks and stormwater runoff, including runoff of pet waste.

7.3.2 Candlestick Point Beaches

Monitoring data from Candlestick Point beaches (Section 5.3) show wide variation in the number of Enterococcus geomean WQO exceedances at the three beaches:

- Jackrabbit Beach - 20% exceedance rate.
- Windsurfer Circle - 63% exceedance rate.
- Sunnydale Cove - 51% exceedance rate.

Potential bacteria sources are described below.

Sanitary Wastewater: Potential sanitary wastewater sources to Candlestick Point Beaches include CSDs and SSOs. However, data on CSD overflows (Section 5.3) demonstrate that CSDs are not a significant source of pathogens to the beaches. Sanitary sewer leakage remains a potential source.

Sewer infrastructure associated with Candlestick Point is owned/operated by three entities: SFPUC, San Francisco Recreation and Parks Department, and the California Department of Parks and Recreation. A large portion of the urban area abutting Candlestick Point is served by SFPUC's combined sewer system, and Candlestick Stadium itself has been operated by the San Francisco Recreation and Parks Department. Leakage from these facilities could present a potential source of FIB.

The California Department of Parks and Recreation maintains seven restroom facilities within Candlestick State Park (Figure 5.3). All the restrooms were built when the park was created in the mid-1970s and are plumbed to the SFPUC combined sewer system. General information about these facilities, as of the writing of this staff report, follows.

- A non-public restroom is located at the kiosk at main gate (also called the Boat Lounge area), which is used on game/event days. A pump was replaced in 2012.
- Public restrooms at Jackrabbit Beach are in working order.
- Public restrooms at Windsurfer Circle are in working order.
- Public restrooms located at the Big Meadow picnic area are in working order. One of two pumps and the electrical system were replaced in 2013.
- Public restrooms at Sunrise Point are operable. Since approximately early 2013, the electrical system has been out of order, so the tanks are pumped out once a day, and checked each morning.
- Public restrooms at the Last Port location (near condominiums) are gravity fed to the SFPUC sewer system.
- The restrooms at the Candlestick Point State Recreation Area headquarters office at 1150 Carroll Avenue are not directly connected to the SFPUC sewer system. Instead, a holding tank is pumped out monthly.

In addition, SFPUC sewer lines east of Sunnydale Cove could impact that beach and potentially Windsurfer Circle if the lines are leaking or have experienced leakage. Sanitary sewer lines operated by SFPUC and the California Department of Parks and Recreation merit investigation as possible sources of bacteria to Candlestick Point Beaches.

Urban Runoff: While most of the area adjacent to Candlestick Point is served by the SFPUC's combined sewer system, some portions of the Candlestick Stadium property, Jamestown Avenue and Hunters Point Expressway drain to one of two separate networks of stormwater pipes, and to one of four stormwater outfalls (Figure 5.3). Runoff from the Stadium parking lot flows through a pipe under Hunters Point Expressway, and discharges via the southeastern-most outfall to Windsurfers Circle. The SFPUC has collected samples of discharges from the outfall (three samples in 2003 and one in 2013). All of the samples had Enterococcus and E.coli concentrations significantly less than water quality standards, but total coliform concentrations greater than the water quality standard.

The final football season for Candlestick Stadium occurred in 2013-2014. At this time, the stadium has been demolished to make way for other development. Control of runoff during reconstruction will be an important factor in controlling pollutants, including FIB, discharged to the beaches, especially to Windsurfer Circle. In addition, stormwater controls (including control of dry weather discharges) must be incorporated into the new design(s) and construction as the property is redeveloped, with the goal of eliminating or minimizing urban runoff flows to the Candlestick Recreation Area shoreline. The City of San Francisco is responsible for managing the development process.

Dirt lots surrounding Candlestick Stadium are owned and managed by the California Department of Parks and Recreation and have been rented out to private parking operators. These lots have been used during San Francisco 49er football games and other public events at Candlestick Stadium. Stormwater discharges from these lots via overland flow to the Bay. The future use of these parcels is unknown. Any new development of these parcels should be designed to eliminate or minimize runoff to the Candlestick Recreation Area shoreline.

Pets at the Beach: Pets are allowed at Candlestick Point recreation area but must be on a leash. No survey or anecdotal information is available on the numbers of pets that visit the beach. Until such information can demonstrate otherwise, pets are considered a potential source of bacteria to the beaches.

Boats: There is no boat ramp at Candlestick Point State Recreation Area. Due to its location on the Bay, which does not facilitate extended anchoring, it is unlikely that dumping from boats is a significant source of pathogens at the Candlestick Point beaches.

Wildlife: Various park personnel have described squirrels and blackbirds as the primary wildlife in the Park, not seagulls or other nuisance wildfowl often associated with marine beaches. Seagulls were prevalent during football games and other events at Candlestick Stadium before it was demolished.

In addition, a large municipal solid waste recycling facility located across Highway 101 from Candlestick Point attracts birds in large numbers, and, while the birds do not inhabit the Park, they may deposit droppings in flight to and from that recycling facility. To date, the limited (two samples) genetic data obtained from Windsurfer Circle Beach did not detect human fecal material marker (Section 5.3), but further data are needed to draw conclusions about the significance of wildlife as a source of bacteria to the beaches. At this time, avian populations are considered an uncontrollable wildlife source.

CONCLUSION: The Candlestick Point Park beaches are located within a distance of approximately one-half mile and have similar sources of bacteria, yet the beaches have distinct physical properties and differing rates of bacteria water quality objective exceedances. Windsurfer Circle, with the highest rate of bacteria exceedances, has been directly impacted by runoff from Candlestick Stadium, which has a storm drain culvert and outfall at the beach. Redevelopment of the Candlestick Stadium property could present an FIB load in the future. Windsurfer Circle Beach has a sunny and somewhat muddy, shallow aspect that may provide physical conditions for bacteria to thrive.

Sunnydale Cove may be receiving bacteria through leaking sewer infrastructure or urban runoff, and this area may receive a lesser degree of mixing with open Bay waters due to its location. Jackrabbit Beach has the lowest rate of bacteria exceedances, faces the open Bay, and is physically separated from the other two beaches by a small peninsula.

Any of the beaches could be affected by leaking piping from aging sewer infrastructure and/or restroom facilities. Wildlife is a potential source. In addition, the beaches are shallow and the possibility that bacteria may persist in the sediments should be examined.

7.3.3 Crissy Field Beach

Monitoring data from the two sample locations at Crissy Field Beach (Section 5.4) show the bacteria objectives are exceeded at only the east end of the beach, where the Enterococcus objective is exceeded in 19% of samples. Enterococcus exceedances occur primarily in November through March, during the rainy season. These data indicate a possible bacteria source at the east end of the beach. Potential bacteria sources are described below.

Sanitary Wastewater: In the 1990s, first the U.S. Army (1992-95) and then the Presidio Trust (1997-present) began systematically upgrading the sanitary infrastructure at the Presidio. This work continues with the repair of interconnections, rehabilitation of manholes, slip-lining of sewer mains, and similar repairs, including repairs along the Doyle Drive realignment project mentioned above (Hurley 2013). Due to the age of the Presidio, leaky sewer infrastructure remains a likely source of FIB.

Infrastructure associated with the Palace of Fine Arts (Figure 5.4) may be a source of bacteria as well. The sewerage system within the Exhibition Hall has overflowed to Palace Drive on more than one occasion; there have been minor back-ups to the landscaping outside the men’s restroom; and the sewer pump station at Lyon Street has overflowed (Taylor 2015). Water in the lagoon, which provides habitat to a variety to birds and aquatic fauna, is a single-use flow-through which discharges to the SFPUC combined sewer system via the sewer pump at Lyon Street. The stand-alone restroom structure in the Palace’s parking lot north of Marina Boulevard is in working order, but has not been inspected for at least 19 years (Chow 2015). The San

Francisco Recreation and Parks Department is responsible for maintenance of the Palace of Fine Arts, including its infrastructure. The SFPUC is responsible for the Lyon Street pump station.

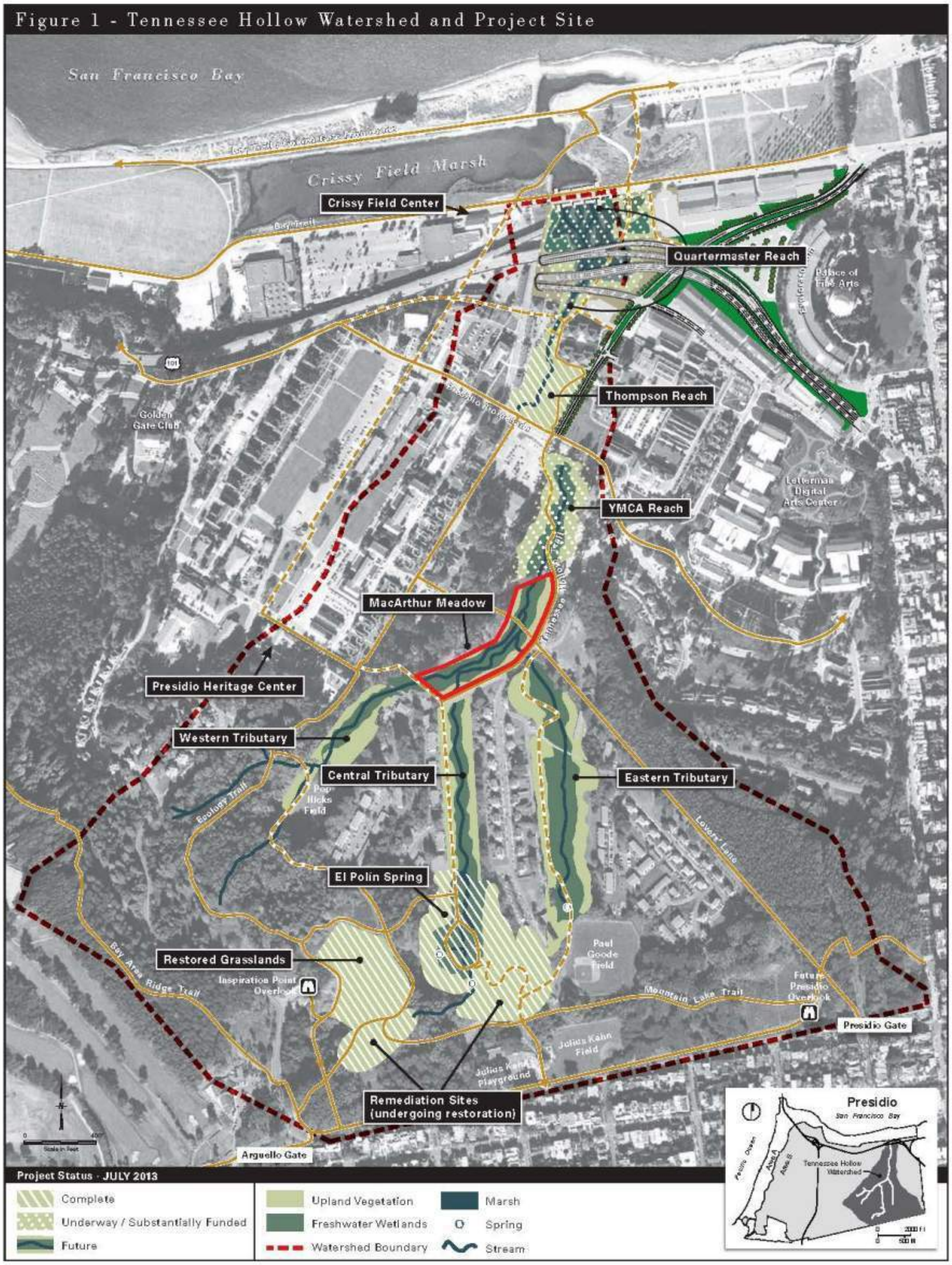
Wastewater infrastructure at St. Francis and Golden Gate Yacht Clubs, if in disrepair, could potentially contribute FIB to Crissy Beach as well. The Yacht clubs are responsible for laterals, and a combined sewer main owned by SFPUC runs under Yacht Road.

Urban Runoff: The watershed discharging to Crissy Field Beach includes the eastern portion of the Presidio (Figure 5.4), which has a mix of commercial uses, and the Palace of Fine Arts area. Monitoring of upland creeks within the Presidio (Table 5.10) revealed elevated densities of Enterococcus, although data are limited (4 of 7 samples in El Polin Spring and up to 13 of 18 samples in Tennessee Hollow exceeded the Enterococcus single sample maximum). Several wetland and riparian corridor habitat restorations, referred to collectively as the San Francisco Airport Wetland Habitat Mitigation project, are underway in the upper Presidio watershed (Figure 7.3). El Polin Spring, Tennessee Hollow and other affected water bodies will be monitored after project completion to determine whether and how the restorations affect FIB densities in these waters.

Lower in the watershed, Caltrans is completing Phase I of a major construction project to realign Doyle Drive, and is currently scheduled to complete all work by the end of 2016. The Doyle Drive realignment has altered upland stormwater runoff patterns and includes biofiltration swales to treat runoff from approximately 33 acres of impervious surface. As this project has progressed, Presidio personnel have replaced affected stormwater and waste water piping (Hurley 2013). In addition, a homeless encampment under the old Doyle Drive was removed.

A significant portion of the Presidio drains into Crissy Marsh, which itself drains to Crissy Field Beach and San Francisco Bay. National Park Service personnel have sampled Crissy Marsh and found elevated FIB at stormwater discharge locations (Table 5.9); however, to date, data indicate the Marsh does not exceed pathogen objectives where it discharges to Crissy Beach.

Figure 7.3 Upper Presidio Watershed Mitigation Project Locations



Source: Presidio Trust 2012

Pets at the Beach: The east end of Crissy Beach is very popular with dog walkers year-round. Current rules restrict dogs on the western end of the beach when plovers are present. Otherwise, dogs are allowed on Crissy Beach on leash or under voice control. The National Park Service is developing new rules regarding pets at Crissy Beach and throughout Golden Gate National Resource Area. Proposed rules will limit the number of dogs per person, but they will continue to allow off-leash dogs on Crissy Beach. Regardless of the final ruling, enforcement of pet waste scoop rules is needed.

Boats: The Yacht Harbor located east of Crissy Beach does not allow live-aboard boats. Restroom facilities are located in the St. Francis and Golden Gate Yacht Clubs as well as the stand-alone restroom on north Lyon St/Yacht Road. Due to the physical configuration of Yacht Harbor, FIB from the Harbor would be subject to mixing prior to potentially reaching Crissy Beach through tidal action. Boat wastes are not considered a significant source of bacteria to Crissy Beach.

Wildlife: Nuisance wildlife, such as flocks of geese or seagulls, is not common at or near the beach. Wildlife is not considered a major contributor of bacteria to Crissy Beach.

CONCLUSION: The rate of exceedance of the Enterococcus water quality objective is 19%, and exceedances occur primarily during typically wet-weather months. Potential sources of bacteria could be stormwater discharges, pets on the beach, leaky sewer lines, or a combination of these sources.

7.3.4 Marina Lagoon Beaches

The physical setting of Marina Lagoon and its two beaches is very different from the other beaches, which are situated on the open Bay. Both Parkside Aquatic and Lakeshore Park Beach had Enterococcus exceedances in over half their samples over the last seven years. A description of potential controllable pathogen sources follows.

Sanitary Wastewater: As mentioned in Section 5.5, the San Mateo Wastewater Treatment Plant (WWTP) discharge to the Bay is not considered to be a source of bacteria to the beaches. Conversely, I/I from sewer lines are known sources, as illustrated by the City of San Mateo in a Clean Beach Initiative grant application (City of San Mateo, 2012b):

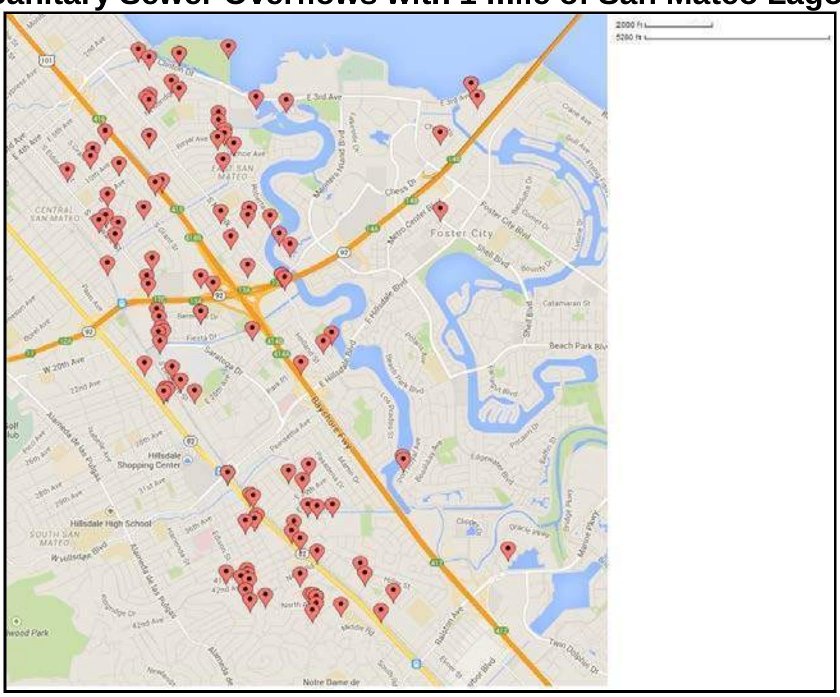
> *“Sewer mainlines in neighborhoods surrounding the Marina Lagoon have been identified as old, defected and in need of replacement. These pipes are located in bay mud. Summer raising and winter lowering of lagoon levels above and below the water table together with shallow and cracked sewer pipes may be responsible for leaching of sewage through the bay mud into lagoon waters. The high salinity content of sewage flow from this area into the WWTP seems to confirm this infiltration/exfiltration.”*

Similarly, SSOs from the WWTP’s collection system appear to be a significant source of FIB to the Lagoon via washoff during precipitation events. The WWTP’s sewage collection system includes approximately 257 miles of sanitary sewer and 25 pump stations in the City of San Mateo, much of which is located in watersheds that discharge to San Mateo Lagoon. Figure 7.4 shows SSOs within approximately one-mile of San Mateo Lagoon reported in the 2008-2014 timeframe. 4.4 million gallons of sewage overflowed the system and approximately 3.3 million gallons were recovered, or cleaned up, resulting in a total release of approximately 1.1 million gallons over the seven-year period (CIWQS 2015).

In 2009 the Water Board issued a Cease and Desist Order (No. R2-2009-0020) to the City of San Mateo, Town of Hillsborough, and Crystal Springs County Sanitation District to cease discharging waste from their respective sanitary sewer systems in violation of applicable permits and the Basin Plan. The order stated that 87 SSOs with a total volume of 3.5 million gallons of raw sewage occurred from the City of San Mateo's sanitary sewer collection system over the previous four years. The City of San Mateo has responded by undertaking sewer system improvement programs which are described in Section 10, Implementation Plan.

Collection systems in Foster City, Town of Hillsborough, and Crystal Springs County Sanitation District, while included in the Cease and Desist Order, are not suspected sources of bacteria to San Mateo Lagoon beaches. As shown in Figure 7.4, few SSOs have been reported in the Foster City area. The Hillsborough and Crystal Springs satellite systems are not suspected bacteria sources due to their distance from San Mateo Lagoon beaches.

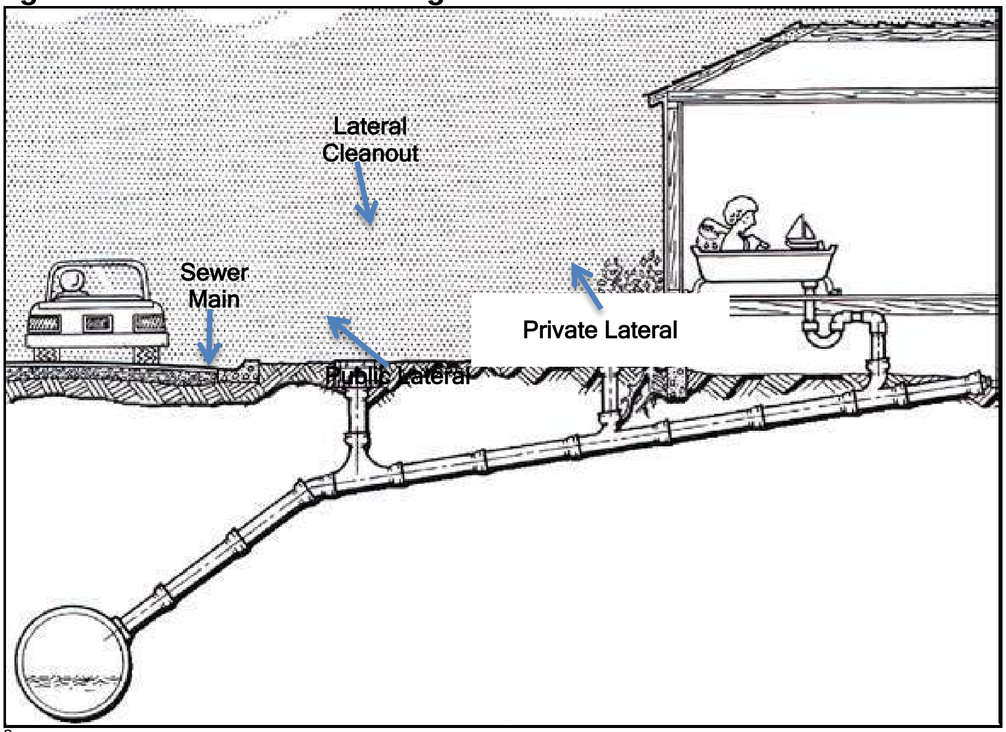
Figure 7.4 Sanitary Sewer Overflows with 1 mile of San Mateo Lagoon 2008–14



Source: CIWQS Online SSO Database http://ciwqs.waterboards.ca.gov/

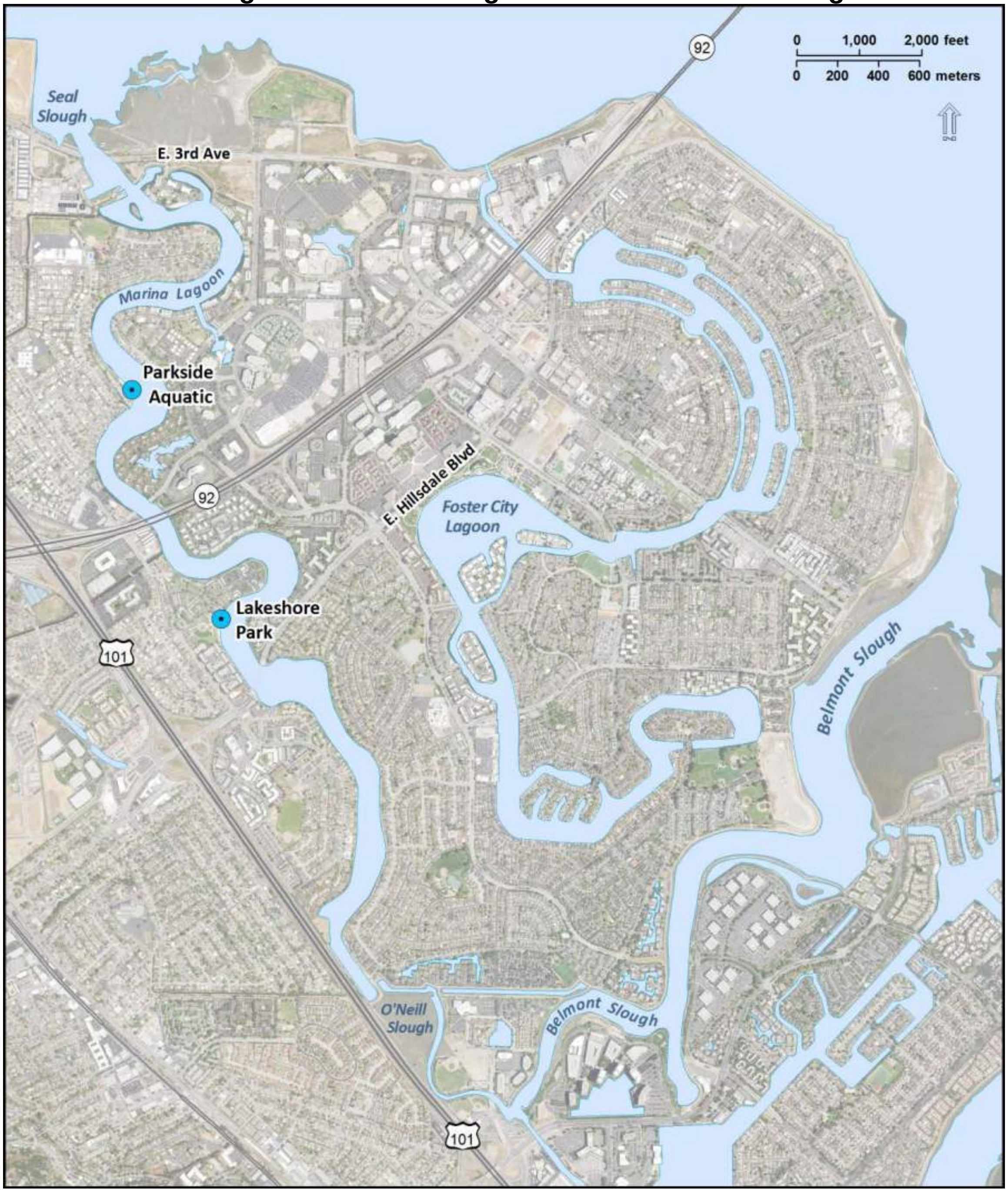
In addition to the collection system described above, hundreds of private sewer laterals (Figure 7.5) lie within a half mile of the two beaches. The maintenance, functioning, and, if needed, replacement of private sewer laterals are the responsibility of private home or business owners.

Figure 7.5 Schematic Drawing of Public vs. Private Sewer Laterals[a]



[a]A private lateral is the pipe that connects indoor plumbing to the public sewer main.

Figure 7.6 Marina Lagoon and Connected Sloughs



Urban Runoff: Marina Lagoon has a ten-square mile watershed, originating in the western hills of San Mateo and Belmont. This drainage area contains four sub-watersheds, including 16th Avenue, 19th Avenue, Laurel Creek, and direct Marina Lagoon drainage, all located in the southern two-thirds of San Mateo (Figure 5.6). Peak storm flows from the hills to the west are controlled by three dams on Laurel Creek. The watershed is almost entirely urbanized (City of San Mateo 2009).

As described in Section 2.4, tidal flows reach Marina Lagoon via O'Neill Slough, at an annualized rate of approximately 52 million gallons per day. Bay water is augmented by perennial low volume fresh water inflow from Laurel Creek and lesser drainage sub-basins. Fresh water flows comprise only about 0.3 percent of total annual inflow, but runoff can comprise a larger proportion of inflow over the short-term during the wet season (City of San Mateo 2013a). Figure 5.6 shows creek and storm drain discharge locations along San Mateo Lagoon, including a storm drain outfall in the vicinity of Lakeshore Park Beach. Figure 7.6 shows the connection between Seal, Belmont and O'Neill Sloughs and Marina Lagoon.

Boat waste: There are no houseboat moorages on the Lagoon, but pleasure boating is a common activity, including motor boating, water skiing, and kayaking. Given the rate of exceedance of bacteria water quality objectives and the lack of moorages, boat waste is not considered a significant potential source of FIB to the beaches.

Pets and Wildlife at the Beach: Within the large urban watershed discharging to Marina Lagoon, bacteria from urban wildlife and pets at the beach are likely to contribute to FIB densities at the beaches. The City of San Mateo has begun evaluating the feasibility and effectiveness of various ways to decrease the FIB load from wildfowl at both beaches (Section 5.5).

CONCLUSION: Documented SSOs and general leakage from the sewage collection system are known sources of controllable bacteria within the beaches' watersheds and, along with private laterals, are likely the greatest source. The large urban watershed's urban sources of bacteria are likely significant FIB sources as well, with nuisance wildlife and other sources also contributing.

7.3.5 China Camp Beach

Due to its location within a sizeable state park and the topography of the surrounding area, China Camp Beach has few of the bacteria sources common to the more urbanized San Francisco Bay beaches described above. Potential bacteria sources at China Camp Beach are outlined below.

Sanitary Wastewater: Wastewater from the residence, café and public restrooms at the beach and the upper parking area are pumped uphill to a San Rafael Sanitary District sewer main in the upland portion of the Park. California State Parks personnel have performed flow tests by volume from each fixture in these structures to the lift station and found the sewer system to be tight, with no indications of ground water or bay water influence into the sewer system (O'Reilly 2015). The sanitary wastewater collection system is not considered a likely significant source of bacteria to China Camp Beach.

Urban Runoff: China Camp State Park itself has no urbanized land use and the beach's catchment, likewise, is not urbanized. The beach lies at the base of a cliff and has very little runoff catchment area beyond the beach itself. With the exception of one resident, who is the last surviving Chinese fisherman of China Camp Village, the structures on the beach are largely historic and unoccupied. A small café and a public restroom structure are located on the beach, along with a one-room museum and a residence.

According to State Park personnel, China Camp Beach is well maintained by its visitors, and there is not a lot of litter. Once a year, on Earth Day, a litter pick-up event yields less than one dumpster load of litter (Goering 2013).Urban runoff is not expected to be a significant source of pathogens to the beach.

Pets at the Beach: Pets are allowed on the beach, provided they are on a leash. There is no survey data, but anecdotal information indicates that pet visits numbers are relatively low, and pets at the beach are not considered a significant potential source of bacteria to the beach.

Boat waste: During the warmer months, sailboats may anchor offshore of the beach. At a busy time, but not commonly, up to 15 boats may be anchored. Less frequently a houseboat has anchored offshore for a longer period of time. These are county waters, and the Marin County or San Rafael police boat patrol deal with the anchored boats, or the U.S. Coast Guard will do so. There are no records kept of when houseboats or large groups of sailboats have anchored off China Camp Beach, so it is not possible to determine whether such activities have been correlated with increased FIB (Goering 2013).

Wildlife: Approximately a mile north of the beach is a marsh that extends northward for several miles. The marsh is heavily used by wildfowl. China Camp Beach itself is not noted for wildfowl or other wildlife populations.

A variety of terrestrial wildlife, such as the birds and rodents that inhabit the open space lands adjacent to San Pedro Creek and the Pacific Ocean, can contribute indicator bacteria to these water bodies through stormwater runoff or direct deposit of waste. No accurate information as to the magnitude and geographic distribution of this waste source is available.

CONCLUSION: During seven years of April-October sampling, only three samples collected at China Beach exceeded the Enterococcus single sample maximum objective, and there were no exceedances of the Enterococcus geometric mean objective. There are few, if any, significant potential sources of human fecal bacteria to China Camp Beach.

7.3.6 McNears Beach

Due to its location within a sizeable county park and the topography of the surrounding area, McNears Beach has few of the common potential sources of pathogens, as outlined below.

Sanitary Wastewater: The Park contains a public swimming pool, showers, restrooms, a small café, park ranger headquarters, and a residence. A sewer main running the length of the park and two pump stations are owned by the San Rafael Sanitation District, which conducts checks on the pump stations three times per week. In early 2014 the San Rafael Sanitation District cleaned all the sewer mains in McNears Beach Park and inspected the manholes and pump station and found no suggestions of leakage. The District has no record of SSOs at the park, and regularly checks for sewer main sags, evidence of surcharged conditions at the manholes, debris and odors during cleaning activities (Smith 2014). At this time, the sanitary wastewater collection system is not considered a likely significant source of bacteria to McNears Beach.

Urban Runoff: Like nearby China Camp Beach, the stormwater catchment area for McNears Beach is small. McNears Park lies at the base of a cliff and thus the Park comprises almost the entire runoff catchment area for the beach.

McNears Park is heavily used throughout much of the year, and park users leave behind large volumes of litter, especially on weekends and holidays. Stormwater runoff from the park discharges to the beach at four locations. In addition, McNears Beach is positioned geographically so that litter from the Delta and Napa River lands on the beach. Park personnel report that they remove plastic and other debris from the beach on a daily basis. Urban runoff is not expected to be a significant source of pathogens to the beach.

Pets at the Beach: Pets are not allowed in McNears Park. One or more Marin County Park rangers work at the park on a daily basis; enforcing the “no pets” policy is among their duties. Pets at the beach are not considered a significant source of bacteria to the beach.

Boat waste: McNears Beach does not have a boat launch area. However, similarly to nearby China Camp Beach, day boats and yachts will anchor offshore for varying lengths of time. On at least one occasion, a boat was anchored offshore for a period of several weeks or months. Boat waste could be an occasional source of FIB to the beach but is not considered an ongoing source.

Wildlife: Geese are attracted to the green lawn at the park, and goose droppings are a nuisance for park-goers. Deer inhabit the park, and marine birds are present as well. No accurate information as to the magnitude of this waste source is available.

CONCLUSION: Of the nearly 150 samples collected at McNears Beach since 2008, fewer than 5% exceeded either the single sample maximum or geometric mean objective for Enterococcus. There are few, if any, significant potential sources of human fecal bacteria to McNears Beach.

8 TOTAL MAXIMUM DAILY LOAD AND POLLUTANT ALLOCATIONS

This Section discusses the approach used for expressing the TMDLs and pollutant load allocations and presents the proposed bacteria TMDLs and load allocations (for nonpoint sources) and wasteload allocations (for point sources) as applicable to identified sources.

8.1 General Approach

U.S. EPA's protocol for developing pathogen TMDLs (U.S. EPA 2001) defines a total maximum daily load as the allowable loadings of a specific pollutant that a water body can receive without exceeding water quality standards. The sum of individual wasteload allocations for point sources and load allocations for nonpoint sources must not result in the exceedance of water quality standards for that water body. In addition, the TMDL must include a margin of safety, either implicit or explicit, that accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving water body.

For most pollutants, TMDLs are expressed on a mass loading basis (e.g., kilograms per year). Regulations (40 CFR §130.2(1)) provide that TMDLs do not need to be expressed as loads (mass per unit time), but may be expressed as "other appropriate measure." For pathogen indicators, it is the number of organisms in a given volume of water (i.e., their density), and not their mass or total number, that is significant with respect to public health and protection of beneficial uses. The density of fecal indicator organisms in a discharge and in the receiving waters is the relevant criterion for assessing the impact of discharges, the quality of the affected receiving waters, and the public-health risk. Therefore, we propose density-based TMDLs and pollutant load allocations, expressed in terms of indicator bacteria densities.

Establishing a density-based, rather than a mass load-based, TMDL has the advantage of eliminating the need to conduct a complex and potentially error-prone analysis to link loads and projected densities. A load-based TMDL would require calculation of loads based on acceptable bacterial densities and expected flows, and then back-calculation of expected densities under various load reduction scenarios. Because flow conditions at San Francisco Bay beaches are highly variable and difficult to measure, such an analysis would involve a great deal of uncertainty with no increased water quality benefit.

8.2 Proposed Total Maximum Daily Load

The proposed TMDL for San Francisco Bay beaches is the water quality objective for Enterococcus for contact recreation. Enterococcus is protective of the other bacteria WQOs, as discussed in Section 6. This TMDL represents the total density of Enterococcus that can be discharged from all sources while not causing the water quality in the beaches to exceed the bacterial densities specified in the Basin Plan. This TMDL is applicable year-round.

Table 8.1 Total Maximum Daily Load of Fecal Indicator Bacteria for San Francisco Bay Beaches

Enterococcus	
Geometric mean	< 35 MPN/100 mL [a,b]
Single sample maximum	No sample > 104 MPN/100 mL

[a] Most Probable Number (MPN) is a method for counting viable cells and provides a statistical representation of the more time-consuming "colony forming unit" method for estimating the number of viable bacteria cells in a sample.
[b] Calculated based on the five most recent samples from each site during a 30-day period.

8.3 Proposed Load and Wasteload Allocations

A load allocation is defined as the portion of the receiving water's pollutant loading capacity allocated to nonpoint sources of pollutants to that receiving water, and a wasteload allocation is the portion allocated to point sources of pollutants to that receiving water. Together, load and wasteload allocations are referred to as "combined load allocations" or "allocations." Density-based allocations are proposed for this TMDL. Unlike mass-based load and wasteload allocations, where the mass of pollutant from each source adds up to the total allocation, density-based allocations do not add up to equal the TMDL. Rather, in order to achieve the density-based TMDL, each source must meet the density-based allocation.

Table 8.2 presents the density-based pathogen load and wasteload allocations proposed for San Francisco Bay beaches. The attainment of these allocations will ensure protection of the water quality and beneficial uses of San Francisco Bay beaches. These allocations will apply year-round at beaches that have year-round monitoring requirements under the California Health and Safety Code or a NPDES permit, as these beaches receive significant public use year-round. These allocations will apply during the months of April through November for all other beaches.

Table 8.2 Load and Wasteload Allocations for San Francisco Bay Beaches

Pollutant Source Category	Type of Allocation	Enterococcus (MPN/100mL)	Compliance Point
Sanitary Sewer Collection Systems[a]	Wasteload Allocation	0	Beach sample location(s)
Urban Runoff[b]	Wasteload Allocation	Geometric mean[c] < 35 No sample[d] > 104	Beach sample location(s)
Vessels (Anchor-out, recreational, houseboats)	Load Allocation	0	Beach sample location(s)
Wildlife[e]	Load Allocation	Geometric mean[c] < 35 No sample[d] > 104	Beach sample location(s)

a. <u>For the City of San Francisco the wasteload allocation applies only to the collection system portion of the combined sewer system</u>.
b. Wasteload allocation for discharges from municipal separate storm sewer systems; includes pet sources.
c. Based on a minimum of five consecutive samples equally spaced over a 30-day period.
d. No more than 10% of total samples during any 30-day period may exceed this number.
e. With the exception of nuisance wildlife, such as geese, wildlife is not believed to be a controllable source of bacteria. No management measures will be required for uncontrollable wildlife sources.

For allocations specified by source category, it is the responsibility of individual facility or property owners within a given source category to meet these allocations. In other words, individual facilities and property owners shall not discharge or release a load of pollution that will increase the density of fecal coliforms in the downstream portion of the nearest water body above the proposed load or wasteload allocation assigned to that source type. This allocation scheme assumes that the concentration of FIB upstream from the discharge point is not in excess of the assigned allocations. For example, the geometric mean of FIB concentrations in urban runoff samples collected at a residential area's storm drain that discharges to a beach shall not exceed the allocated loads listed for the urban runoff source category.

We assign wasteload allocations of zero to sanitary wastewater collections systems and vessels for the following reasons:

- As sources of human waste (as opposed to animal waste) they pose the greatest threat to the public health.
- The zero wasteload allocation is consistent with the existing Basin Plan prohibition of release of untreated sewage.
- When operated properly and lawfully, sanitary sewer systems and vessels should not cause any human waste discharges.
- Human waste discharges from these sources are fully controllable and preventable.

For these reasons, zero wasteload allocations for these source categories are both feasible and warranted. Wet weather discharges from the City of San Francisco's combined sewer system authorized pursuant to U.S. EPA's Combined Sewer Overflow (CSO) Control Policy are not given a waste load allocation because at this time such discharges are not deemed to contribute significantly to bacteria at the beaches; changes to NPDES permit requirements are unnecessary to achieve this TMDL.

All permittees or entities that discharge indicator bacteria or have jurisdiction over such dischargers are collectively responsible for meeting these allocations. Water quality monitoring data at the beaches will be used to demonstrate achievement of the allocations.

8.4 Margin of Safety

TMDLs are required to achieve numeric targets under critical conditions and to include a margin of safety to account for data uncertainty and lack of knowledge. Because the allocations in this TMDL are identical to existing numeric WQOs, which are established as protective standards and inclusive of all uncertainties, the margin of safety is implicitly incorporated into the proposed TMDLs and load and wasteload allocations. Therefore, no additional or explicit margin of safety is needed for this TMDL.

8.5 Critical Conditions

TMDLs are set to meet the numeric target under "critical conditions," which are extreme (or above average) environmental conditions, such as high or low flows or temperatures. Although analyzed separately from the margin of safety for data uncertainty and lack of knowledge, the consideration of critical conditions may be thought of as an additional margin of safety because it ensures the targets are met despite volatility in temperature and precipitation.

FIB densities appear to be greater during the winter wet season (see Section 5 data) due to such factors as precipitation runoff, but they can be high any time of year. Recreational uses of San Francisco Bay beaches are most prevalent in the summer, but can also occur year-round. Therefore, we are not proposing seasonal variation to the TMDLs and load allocations.

9 LINKAGE BETWEEN WATER QUALITY TARGETS AND POLLUTANT SOURCES

The objective of this section is to define the linkage between the selected water quality targets and identified sources of indicator bacteria loading. For this TMDL, the proposed load and wasteload allocations will protect the water contact beneficial use because:

- Fecal waste from warm-blooded animals can contain pathogens.
- Indicator bacteria are present in fecal waste from warm-blooded animals and are routinely used as a monitoring surrogate for pathogens. Thus, it is appropriate to use indicator bacteria as a surrogate to measure pathogen impairment of beneficial uses.
- The proposed pollutant load and wasteload allocations are based on the proposed numeric targets for indicator bacteria for water contact recreation.
- The proposed numeric targets are based on the Basin Plan and U.S. EPA's bacterial water quality objectives for water contact recreation waters.
- The Basin Plan and U.S. EPA's bacterial water quality objective for Enterococcus for water contact recreation, expressed as a geometric mean of 35 MPN/100ml, reflects the assumption that this density of Enterococcus creates an acceptable health risk of 8-19 illnesses per 1,000 exposed individuals (U.S. EPA 1986). Based on more recent studies, however, the same geometric mean of 35 MPN/100mL for Enterococcus is equated with 36 illnesses per 1,000 exposed individuals, which is still considered acceptable. This geometric mean remains a recommended water quality objective by U.S. EPA (U.S. EPA 2012).

Therefore, achievement of the proposed pollutant load and wasteload allocations will ensure the protection of the water quality and water contact beneficial use of San Francisco Bay beaches.

10 IMPLEMENTATION PLANS AND MONITORING

This section outlines the TMDL implementation plans, or strategies, for restoring and monitoring water quality at San Francisco Bay beaches. As shown in the Source Analysis (Section 7), most of the beaches are located in highly developed urban areas that have common anthropogenic sources of bacteria. The implementation plans focus on these known, controllable bacteria sources common to urban beaches.

In addition to anthropogenic and controllable bacteria sources, bacteria in beach water bodies may be present due to natural sources. A variety of environmental factors affect the fate, transport, and persistence of bacteria in beach waters, as discussed in Section 7.1. Because the beaches have data and conclusive information indicating the presence of controllable bacteria sources, and little to no data regarding natural sources, it is the strategy of this TMDL to address the controllable and anthropogenic sources in the near term. Either concurrently or as part of adaptive management, implementing parties may work to identify natural bacteria sources and obtain data to support revision of the numeric targets to reflect bacteria contributions from non-controllable sources. In all cases, implementing parties must control anthropogenic controllable sources of bacteria to the beach. The steps described in each chapter of this Staff Report and in The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches (Griffith 2013) should be used to guide adaptive implementation of the TMDL.

The overarching strategy to address each of the common controllable sources of bacteria at San Francisco Bay beaches is presented in Section 10.1. The sections that follow tailor the implementation strategy to specific conditions at each beach.

10.1 Implementation and Monitoring Plan Elements

Because bacteria sources are similar across urban watersheds in the San Francisco Bay area, this section outlines the overarching strategy, or typical actions, for reducing common, controllable bacteria sources at urban beaches. All potential sources may not be present at all beaches, and sources may vary in their significance. Implementing entities must consider all potential bacteria sources as they implement this strategy and take actions to reduce the sources present at their beaches.

At a given beach, responsibility for reducing bacteria sources will fall on several different entities, potentially including sewage collection system districts; municipal stormwater programs; port authorities; and city, county, regional, state and/or national park managers. The responsibility for meeting the TMDL shall be shared among all the implementing entities. Cooperation is necessary not only to reach the numeric targets for Enterococcus, but also to avoid duplicate actions, such as monitoring and reporting. It would benefit implementing entities to select a lead agency and staff person to manage this shared responsibility.

The TMDL may be implemented through any of the following actions, or a combination of the actions, as needed to address the sources of bacteria contributing to impairment at a given beach:

- State Water Board Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (Order No. 2006-0003-DWQ as revised by Order No. 2008-0002-EXEC)
- Cease and Desist Orders as needed to address sanitary waste or other bacteria releases
- Water Board Municipal Regional Stormwater Permit (NPDES No. CAS612008)
- State Water Board NPDES Permit for Small Municipal Separate Storm Sewer Systems (MS4) (NPDES No. CAS000004)
- State Water Board Stormwater Permit for State of California Department of Transportation (NPDES No. CAS000003)
- NPDES Wastewater permits as needed to address sanitary waste releases.

Table 10.1 presents the general elements of an implementation plan for achieving bacteria water quality standards at an urban beach. Each implementation action is described more fully in the following sections.

Table 10.1 Implementation Plan Elements

Source	Action	General Description	Implementing party	Completion Timeframe
Sanitary Sewer Collection Systems	1. Comply with Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.	All Waste Discharge Requirements continue to apply.	Sanitary sewer collection system authority	Ongoing
	2. Submit an enhanced Sewer System Management Plan that prioritizes sewer system inspections and repairs in areas within ¼ mile of beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.	Within the Sewer System Management Plan, assign a high priority to system components within ¼ mile of the beach, such that these components are inspected and repaired in the near term.	Sanitary sewer collection system authority	6 months 3 years
	3. Determine effectiveness of sewer system repairs: Assess beach monitoring data to determine if targets are met at the beach.	This step allows time for data collection to determine if further sewer system investigations are needed.	Sanitary sewer collection system authority	5 years
	After five years, begin enhanced implementation if targets not met			
	4. If targets not met (see #3 above), submit an enhanced Sewer System	If targets are not met, expand the	Sanitary sewer	5.5 years

Source	Action	General Description	Implementing party	Completion Timeframe
	Management Plan that prioritizes sewer system inspections and repairs in areas within ½ mile of beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.	area of sewer investigation and repair system another ¼ mile, such that these components are inspected and repaired in the allotted timeframe.	collection system authority	8 years
	5. If private laterals are a likely source of bacteria to the beach, establish and implement a private lateral replacement program.	Develop and implement a program, such as an ordinance to replace laterals at the time of property sale.	Sanitary sewer collection system authority, and Municipalities	5 years
Sewer Collection System & Urban Runoff	Develop and implement a protocol to enhance efforts to identify and correct illicit connections to the storm drain system.	Focus illicit connection investigations, which are required under existing permits, areas near the beach	Sanitary sewer collection system authority, and Municipal stormwater entity(s)	6 months
Urban Runoff	1. Submit a plan that describes BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. Include control of nuisance wildlife if it represents a likely source of bacteria to the beach. The plan shall include a schedule and milestones.	Identify existing BMPs that reduce bacteria in urban runoff to the beach. Consider enhancing: • storm system cleaning • site design to further enhance infiltration • homeless camp cleanup • pet waste campaigns • nuisance wildlife control	Municipal stormwater entity(s)	6 months
	2. Determine effectiveness of urban runoff controls: Assess beach monitoring data to determine if targets are met at the beach.	Collect and analyze data to determine if further BMP enhancements are needed.	Municipal stormwater entity(s)	5 years

Source	Action	General Description	Implementing party	Completion Timeframe
	After five years, begin enhanced implementation if targets not met			
	3. If targets not met, submit: (a) a plan describing BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. The plan shall include an implementation schedule and milestones. and (b) a supplemental monitoring plan (*supplemental to ongoing beach monitoring*) to investigate remaining bacteria sources to the beach. This plan may develop data and a quantitative rational to support (i) locations and types of enhanced bacteria BMPs, and/or (ii) revision of the numeric targets to reflect bacteria contributions from non-controllable sources. Include an implementation schedule.	If targets are not met, increase the number of enhanced BMPs that will help reduce sources of bacteria to the beach.	Municipal stormwater entity(s)	5.5 years
	4. Where pet waste may be a source of bacteria to a beach, establish and implement protocols to control pet waste through such measures as providing bags, trash receptacles and signage.	Conduct public education, provide bags and trash receptacles, enforce pet waste control rules	Park authority or Municipal stormwater entity(s)	6 months
Vessels	Where vessels represent a potential source of bacteria to the beach, begin or boost “no dumping” education efforts; identify other needed BMPs, such as improving pump outs and other infrastructure.	Begin or boost “no dumping” education efforts; identify other needed BMPs, such as improving pump outs and other infrastructure.	Port authority or marina owner	6 months from discovery of source
Wildlife	Where nuisance wildlife represents a potential source of bacteria to the beach, and the beach is managed by a non-municipal park authority, establish and implement protocols to control this source of bacteria.	Reduce food sources, e.g., dumpsters and grease traps, other garbage, out-door pet food.	Park authority, or include in Urban Runoff enhanced BMPs plans	6 months from discovery of source
All Sources – Monitoring	Continue monitoring beach as required by California Health and Safety Code section 115880 et. seq. Conduct supplemental monitoring as described in #9 above. Questions that supplemental monitoring could answer include:	Evaluate the data from ongoing beach monitoring to determine if TMDL targets are met. Conduct supplemental	All parties	Ongoing

Source	Action	General Description	Implementing party	Completion Timeframe
	• Could bacteria sources be reduced by placing enhanced urban runoff BMPs in a certain location? • Could bacteria sources be reduced by focusing sewer system investigations and repairs in a certain location? • Are natural sources of bacteria contributing to a significant degree to the impairment at the beach?	monitoring to answer questions about bacteria sources and effectiveness of implementation actions.		
All Sources - Reporting	Submit a report on the status of all TMDL implementation activities. Include an assessment of beach monitoring data and any newly developed, enhanced, or implemented protocols.		All parties	Report annually

10.1.1 Sanitary Sewer Collection System Actions

Implementation of actions to eliminate sanitary sewer system leaks is supported by the Basin Plan's prohibition of discharges of raw sewage or any waste failing to meet waste discharge requirements to any waters of the Basin (SFBRWQCB undated). In addition, a regulatory program is in place to address sanitary collection system releases, the Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Systems, WQ 2013-0058-EXEC. All public entities that own or operate sanitary sewer systems greater than one mile in length and that collect and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in the State of California are required to apply for coverage under the WDR and comply with its requirements.

The WDR contains provisions for SSO prevention and reduction measures, including the following:

- Development and implementation of sanitary sewer system management plans (SSMPs)
- Prohibition of any SSO that results in a discharge of untreated or partially treated wastewater to waters of the United States, or creates a nuisance as defined in California Water Code Section 13050(m).
- Requirement for dischargers to take all feasible steps to eliminate SSOs and to properly manage, operate, and maintain all parts of the collection system.
- Requirement for a monitoring and reporting plan.

In short, sewer collection system authorities are responsible for finding and repairing leaks and overflows of sanitary waste, regardless of the existence of an applicable TMDL. To achieve the numeric targets at San Francisco Bay beaches, authorities must amend their SSMPs (or other sewer collection system Operations and Maintenance

Plans required by applicable permits or orders) as needed to prioritize the investigation and repair of faulty sewer pipes, pumps, and other infrastructure according to their proximity to the beach, the magnitude of leak or overflow risk, and similar considerations.

The radii of initial and expanded implementation efforts are based on the likelihood of sewer leakage impacting the beach and are intended to focus efforts on those areas, while considering what is reasonably achievable by implementing agencies. One quarter mile of the beach refers to a quarter mile radius centered at the beach sampling location that has experienced the bacteria water quality objectives exceedances.

Where publically-owned portions of the sewer collection system have been shown to be in good repair and sewer-related sources of bacteria persist, it may be necessary to address private sewer laterals (Table 7.1, Figure 7.2). Private lateral replacement programs may be a necessary element in achieving the TMDL's numeric targets and may be required under adaptive implementation if beach water quality continues to exceed targets after SSOs and other major sources of bacteria have been minimized.

Inspectors for both the sewer collection system and the municipal stormwater entity must identify cross-connections between sewer and storm water piping and take action to eliminate them, using effective methods such as tracers to identify and quantify sources of FIB as described in analyses by the Urban Water Resources Council (UWRRC 2014) and the City of Santa Barbara (City of Santa Barbara 2012).

10.1.2 Urban Runoff Load Reduction

The federal Clean Water Act requires municipalities to obtain NPDES permits for discharges of municipal runoff from their Municipal Separate Storm Sewer Systems (MS4s). For San Francisco Bay area municipalities, MS4 requirements have been adopted in two permits:

- Municipal Regional Stormwater NPDES permit (MRP) (R2-2015-0049). This permit covers the municipalities in Alameda, Contra Costa, San Mateo and Santa Clara Counties and the cities of Fairfield, Suisun and Vallejo.
- General Permit for Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4) (Order No. 2013-0001-DWQ). This permit covers the remaining municipalities in Marin, Napa, Sonoma, and Solano Counties as well as parts of the City and County of San Francisco.

Under both permits, each Permittee is individually responsible for adoption and enforcement of ordinances and policies, for implementation of control measures or best management practices (BMPs) needed to prevent or reduce pollutants in stormwater, and for funding its own capital, operation, and maintenance expenditures necessary to implement such control measures or BMPs.

Both MS4 permits have requirements related to bacterial pollution prevention, including "illicit discharge detection and elimination" provisions that require Permittees to (1) address stormwater and non-stormwater pollution associated with, but not limited to sewage, wash water, discharges of pet waste, etc., and (2) prohibit, investigate, and eliminate illicit connections and discharges to storm drains.

Both MS4 permits require Permittees to notify the Water Board promptly when discharges are causing or contributing to an exceedance of an applicable water quality standard. Both require treatment units for reducing pollutants in runoff be installed at the time property is develop or redeveloped (see Section 10.1.3.1 below), and both require water quality monitoring.

The bacteria-related control measures required by MS4 permits can be helpful in identifying and controlling bacteria inputs in stormwater discharges and dry weather flows. However, the numbers and locations of control measures required by MS4 permits may not achieve sufficient bacteria reduction to achieve the numeric target at a given beach. If this is the case, the San Francisco Bay Water Board may include requirements in reopened or reissued permits to implement wasteload allocations based on implementation of BMPs. The Water Board will not include numeric limits, based on the wasteload allocations, in NPDES permits provided the discharger demonstrates that it has fully implemented technically feasible, effective, and cost-efficient BMPs to control all controllable sources of FIB to, and discharges from, their storm drain systems.

A menu of BMPs to address bacteria discharges in urban runoff is provided in the subsections below. First, structural stormwater controls (e.g., constructed treatment units such as bioretention cells) are discussed, followed by non-structural BMPs (e.g., prevention practices such as educational campaigns).

10.1.2.1 Urban Load Reduction via Structural BMPs

Structural BMPs are constructed units designed to divert or treat runoff at either the point of generation or the point of discharge to a storm system or receiving water body. Diversion of urban runoff for reuse or infiltration, or to a treatment plant, is the most effective way to reduce bacteria loads, because the runoff will never reach the beach. Structural treatment BMPs reduce bacteria loads by trapping the particles to which bacteria adhere through the mechanisms of sorption, filtration and/or sedimentation. The effectiveness of structural treatment BMPs in reducing bacteria loads varies by their capacity and their ability to trap such particles without re-releasing particulate-bound or free bacteria, as discussed below.

Vegetated Treatment Systems

Vegetated treatment systems, such as swales (also called bioswales), filter strips, bioretention units, tree wells, and stormwater planters, employ a combination of biologic reaction, adsorption to soil particles, retention, infiltration, and evapotranspiration to reduce the total volume of runoff and the concentration of pollutants the runoff contains. These BMPs, often referred to collectively as biofiltration units, can be installed as on-site features during development and redevelopment and/or in street medians, parking lot islands, or curb extensions.

Vegetated BMPs can be useful tools for reducing SSOs because they can reduce or even eliminate runoff volumes from frequent, smaller storm events.

Our understanding of these systems' performance with respect to reducing bacteria continues to develop, in part due to inconsistencies in sampling and analytical methods used in evaluation studies to date (Clary 2008). The International Stormwater BMP Database (Wright and Geosyntec 2010) analyzed available data and determined that bioretention and retention (wet) ponds appear able to reduce bacteria (as do media filters, see below), but detention (dry) ponds and grass swales do not appear to reduce bacteria. Pitt et al. found that biofiltration systems remove sediment particles and the associated bacteria from urban runoff. However, in areas with frequent rainfall, regrowth and subsequent release of bacteria are likely. This phenomenon may occur to a lesser extent in drier climates where biofilter media drying between storms would be more pronounced (Pitt and Clark 2010).

Local Infiltration and Rainwater Capture Systems

Local infiltration systems contribute to bacteria control by reducing the volume of potentially contaminated runoff from houses, streets, parking lots, and agriculture, and mitigating peak flows (CASQA 2003). Such infiltration systems include porous concrete, pervious asphalt, grass pavers, gravel pavers, pervious crushed stone, retention grading that allows rainwater to collect on-site until it can percolate into the ground, and infiltration pits. Local infiltration systems can also entail disconnecting downspouts from the storm drain and directing downspout flows to infiltrative areas, cisterns or subsoil drains (i.e., French drains) where soil conditions and terrain allow infiltration.

Rainwater capture systems include rain barrels, cisterns, and other containers used to hold rainwater for reuse or recharge. These systems are usually designed to capture runoff from roofs. Shergill and Pitt (2004) found that roofs with birds and squirrels in the overhead tree canopy had higher FIB than those without animal activity, indicating that rooftops can be a source of FIB loading during wet weather events. In such cases, disconnecting roof downspouts to collect runoff or redirect it to pervious areas is expected to reduce both runoff volumes and FIB loads.

Media Filtration

In this process, storm water is captured and either gravity fed or pumped through media such as sand, compost, zeolite, or other substrates. Media filtration removes pollutants primarily by separating out fine particles and their associated pollutants. Sand filters can be “extremely effective” in removing bacteria when they are modified to permit water to flow slowly through them; at normal speeds, however, sand filters are only “marginally effective.” (McCoy 2006).

Diversion to Sanitary Sewer

This control measure routes urban runoff away from the storm drain system or waterway and redirects it into the sanitary sewer system. Diversion can be a particularly effective method of treating dry weather urban flows when wastewater treatment plants have excess capacity. However, sanitary sewers may not have the capacity to treat urban runoff during wet weather flows. An example of an urban runoff diversion project is the Ettie Street pump station in Oakland, which diverts some dry weather flows to the East Bay Municipal Utility District treatment plant, primarily for reduction of PCB loads (United States of America 2014).

10.1.2.2 Urban Runoff Load Reduction via Non-structural BMPs

Non-structural BMPs include prevention practices designed to improve water quality by reducing bacteria sources. Non-structural BMPs provide for the development of bacteria control programs that include, but are not limited to, prevention, education, and regulation. These programs are described below.

Storm Drain System and Structural BMP Maintenance

The dark, humid environment and possible presence of wildlife (e.g., raccoons in storm drain catchbasins) can provide conditions favorable to the persistence of bacteria in storm drain systems and BMPs. Examples of maintenance activities that may help to reduce FIB loading include (Geosyntec Consultants 2012):

- *Storm Sewer Cleaning*: Cleaning by jet spraying and vacuuming of wash water removes accumulated trash, sediment, organic matter and animal waste, thereby reducing both FIB and other pollutants. Features and locations to be cleaned can be prioritized based on proximity to the beach, magnitude of threat, and similar considerations.
- *Catchbasin Cleaning*: Most cities clean catchbasins and drain inlets periodically to reduce trash and other pollutants. The FIB load reduction benefits from frequent cleaning, however, have not been well documented (Weston Solutions 2010a). A San Diego study found that commercial catchbasins had significantly higher bacteria than residential catchbasins (Weston Solutions 2010b); thus, if catchbasin cleaning is employed as a BMP, those in commercial areas might be prioritized.
- *Structural BMP Maintenance*: Structural BMPs, such as those described above for urban runoff FIB load reduction, require maintenance both to operate properly and to help remove secondary reservoirs of FIB which can be re-suspended and released during storm events.

Street Cleaning

Measurements of fecal coliform bacteria on sediment collected during street cleaning have ranged up to 10^8 colonies per pound of sediment (Bannerman 1993, Snyder 2012). Street and parking lot cleaning reduces sediment, trash, and other pollutant loading to urban storm drains. The degree of pollutant reduction is influenced by the frequency and timing of cleaning, sweeper speed, whether cars are parked on the street during cleaning, and the type of street cleaning equipment used. High efficiency street sweepers, such as regenerative air sweepers and vacuum assisted sweepers, remove more sediment from roadways, and they better capture the fine particles with which bacteria are typically associated (UWRRC 2014).

As with storm drain system cleaning, most cities clean streets periodically to reduce trash. Increasing the frequency of cleaning in prioritized areas may help reduce FIB in urban runoff discharging in the vicinity of a beach.

Administrative Controls

Administrative controls require less initial investment of time compared to structural BMPs. However, for continuous implementation, administrative actions may require greater time. These actions include better enforcement of existing pet or domestic animals waste disposal ordinances; better enforcement of existing litter ordinances, posting additional signage and proposing stricter penalties for littering; enforcing ordinances for commercial, industrial and multi-family garbage control, including requirements to cover trash enclosures; developing and enforcing guidelines for portable toilets and recreational vehicle dumping, and other actions of an administrative nature.

Outreach and Education

Education and outreach to residents may reduce the potential for contamination of stormwater runoff by encouraging residents to clean up after their pets; pick up litter; minimize runoff from agricultural, residential, and commercial facilities; prevent excessive irrigation; and collect car washing and power washing wastewaters. The public is often unaware of the fact that excess water discharged on streets and lawns ends up in receiving waters, or that the runoff contains pollutants.

The effectiveness of education and outreach efforts is difficult to measure, and there is little information on whether behavior changes continue after cessation of outreach efforts. Thus, education and outreach are important, but not stand-alone, elements for reducing FIB loads.

10.1.3 Control of Waste from Pets at the Beach

Proper disposal of animal waste is an important element of FIB control at beaches, and the discussion below applies to pets in urban watersheds as well. Pets, particularly dogs, are the primary focus, although some urban beaches and watersheds may need to consider horse boarding facilities and trails as well. Elements of pet control programs may include (UWRRR 2014):

- Posting park and trail signs regarding pet waste disposal requirements and leash laws.
- Providing disposal cans at convenient intervals on trails and in open space areas.
- Providing and maintaining off-leash dog parks with stormwater treatment BMPs to prevent or minimize off-site transport of FIB.
- Allowing natural riparian buffers to grow alongside streams to dissuade pet access.
- Providing educational materials regarding the impact of improperly disposed pet waste. These materials can be made available in locations such as pet stores, animal shelters, veterinary offices, and other sites frequented by pet owners.
- Developing and enforcing pet waste ordinances and leash laws. In areas with significantly elevated FIB, allocation of resources to park and open space rangers to enforce pet waste disposal controls and leash laws may be needed.

The effectiveness of pet waste control programs in reducing FIB sources is not well documented, at least in part due to paucity of relevant data. In association with FIB TMDLs in southern California, the degree of behavior change resulting from pet waste outreach campaigns has been measured. A report on the Dog Waste Management Plan for Dog Beach and Ocean Beach found that public compliance with the "scoop the poop" policy was highly dependent on awareness of the policy and availability of waste disposal bags and trash cans (Weston 2004). The City of Austin, Texas, conducted public surveys and found their educational campaign resulted in a 9% improvement in the number of pet owners who claim to regularly pick up waste (UWRRC 2014). Studies in San Diego have shown that installation of pet waste stations with trash cans and disposal bags has resulted in a 37% reduction in the total amount of pet waste in city parks (UWRRC 2014).

10.1.4 Vessel Load Reduction

Actions to reduce bacteria loads related to vessels involve inspections, repair and upgrade of leaky and malfunctioning sewage collection systems, such as onboard sewage systems, pumps, sewer lines, etc. Cities and port authorities should evaluate the adequacy and performance of sewage collection systems (sewage dump stations, sewage pumpout stations, onboard sewage systems, sewer lines, etc.) for all vessel marinas and vessels with toilet facilities on an on-going basis. Marina owners should install an adequate number of sewage pumpout and dump stations, in addition to the inspections, repair and upgrade of sewage systems under their management authority.

In addition, where vessels are a source of bacteria to a beach, beach or port authorities should enhance their education and enforcement of "no dumping" and cleanout rules.

10.1.5 Reduction of Controllable Loads from Wildlife

Although raccoons and other mammals are present in most urban areas surrounding San Francisco Bay, birds are present in more significant numbers and in close proximity to beaches. Geese are considered a contributor to bacteria objective exceedances at two or more of the beaches included within this TMDL, and other types of birds may also contribute.

Control strategies for geese have been developed by the University of Nebraska at Lincoln (Cleary 1994, Internet Center for Wildlife Damage Management 2015) and the U.S. Department of Agriculture APHIS (Preusser 2008), and some of these strategies are appropriate for waterfowl in general. Techniques for waterfowl include the following (UWRRC 2014):

- Public education
    - Minimize feeding
- Habitat modification
    - Porcupine wire to reduce roosting waterfowl and pigeons
    - Eliminate shorelines, islands and peninsulas in constructed water bodies
    - String wire or Mylar tape in grids above roosting pond areas
    - Fence, rock or vegetative barriers around water
    - Minimize mowing adjacent to water bodies
    - Place walking path near water and fields away from water
- Deterrence Measures
    - Sprinklers and motion-detection activated sprayers
    - Pyrotechnics
    - Sonic devices, such as ultrasonics, distress calls, sirens, horns, whistles

- Active visual deterrents, such as strobe lights, laser, light beams
- Passive visual deterrents, such as low balloons, kites, flags, scarecrows, predator decoys (temporary)

- Dispersion Measures
  - Dogs
  - Radio-controlled aircraft or boats
- Reproductive Controls
  - Remove nesting materials before egg laying
  - Oil/addle/puncture eggs during incubation
  - Replace eggs with dummy eggs

As described in Section 5.5, the City of San Mateo conducted a pilot study at its Lakeshore Park and Parkside Aquatic Beaches in 2014, during which goose and gull feces were picked up daily for four months; goose fences were installed at the waterlines; goose eggs were addled; path and rip-rap cleaning and beach raking techniques were modified to reduce water contamination; aquatic weeds and algae were removed to discourage goose feeding; and educational information was disseminated. After one week, City of San Mateo staff reported that Lakeshore Park bacteria densities dropped enough to open the beach for the first time in 2014, and bacteria levels continued to be somewhat lower than historic levels for the remainder of the project (Rudnicki 2014). However, bacteria data at both beaches followed the historic pattern of lower concentrations in summer months, and further monitoring is needed to gauge the effectiveness of this program.

10.1.6 Monitor for Effectiveness of Load Reduction Actions

County health departments, city public works departments and public park organizations conduct FIB monitoring at San Francisco Bay beaches as described in Section 5 in accordance with California Health and Safety Code section 115880 et. seq. Throughout implementation of this TMDL, data from the beach monitoring programs will be used to assess attainment of the TMDL numeric targets for each beach. The compliance points for these assessments will be at or near the existing beach water quality monitoring stations.

If initial implementation actions do not result in achievement of numeric targets at a beach, supplemental monitoring (in addition to beach monitoring) will be needed to investigate and identify bacteria sources in the watershed that could be contributing to the bacteria impairment. Monitoring of catchments within the watershed should help characterize and identify indicator bacteria loadings from different land uses and locations, as well as the effects of any bacteria control actions. Supplemental monitoring is intended to answer such questions as:

- Could bacteria sources be reduced by placing enhanced urban runoff BMPs in a certain location?
- Could bacteria sources be reduced by focusing sewer system investigations and repairs in a certain location?
- Are natural sources of bacteria contributing to a significant degree to the impairment at the beach?

Implementing entities need not wait four years is they wish to begin supplemental monitoring earlier. At any time, implementing entities may present data indicating the presence of natural sources of bacteria to the beach, such as non-nuisance wildfowl, to the Executive Officer of the Water Board, and the Water Board may consider developing new allocations that could include a natural source exclusion.

Monitoring data shall be reported to the Water Board and entered into the State Water Board's "Beach Watch" data base as appropriate.

10.2 Implementation Plans for Impaired Beaches

Implementation plans for each of the beaches currently listed as impaired by bacteria are presented in the following sections. Each plan establishes a strategy to provide reasonable assurance the load allocations and wasteload allocations can be met.

Each implementation plan includes a summary table of implementation requirements, implementing entities, and a schedule for implementing those requirements. Implementing entities should look to Section 10.1 and the scientific literature as appropriate for more detail on how to carry out the implementation requirements. The implementation schedules are intended to allow time for implementing parties to identify and implement measures that are necessary to control bacteria sources contributing to exceedances of water quality objectives at the beaches.

The implementation plans also are intended to be adaptive and incorporate new and relevant scientific information such that effective and efficient measures can be taken to achieve the numeric targets. Water Board staff will periodically evaluate new and relevant information from implementation actions, water quality monitoring results and the scientific literature, including any local reference system studies, U.S. EPA's revised recommended bacteria criteria, or new or revised State bacteria water quality objectives, and assess progress toward attaining TMDL targets, and present that information to the Water Board. When new and relevant information indicate it is appropriate to do so, the Water Board will consider the merits and need for a Basin Plan amendment that reflects any necessary modifications to the targets or implementation.

10.2.1 Aquatic Park Beach Implementation Plan

For Aquatic Park Beach, the data show that the Enterococcus geomean is exceeded at a rate of 18%, and only at Station 211 (center of beach), not at the Hyde Street Station. Single sample maximum objectives are rarely exceeded. Further, the Enterococcus exceedances occur primarily during the winter months, suggesting a wet weather source. Suspected sources of bacteria to Aquatic Park Beach include leaking sewer infrastructure, pet waste at the beach, and urban runoff. The data suggest that the implementation plan should focus on finding and controlling a wet weather source of bacteria to the center of Aquatic Park Beach.

The TMDL implementation plan for Aquatic Park Beach is delineated in Table 10.2. A relatively short timeframe for achieving the numeric targets is proposed, because the beach has a very small urban runoff catchment, potential problems with the sanitary sewer collection system are not likely to be extensive, and this water body is used by swim clubs and other recreational clubs year-round.

Monitoring Plan

The SFPUC and SFDPH will continue monitoring at two locations on Aquatic Park Beach and use the data to assess attainment of the numeric targets for this beach. Due to the small areal extent of the watershed draining to this beach, upland watershed monitoring is not required initially, but may be necessary if the numeric targets are not met at the beach. Implementing entities may opt to conduct bacteria source identification studies or other types of monitoring to assist them with finding and reducing sources of bacteria to the beach.

Table 10.2 Aquatic Park Beach Implementation Plan

Source	Action	Implementing Party	Completion Timeframe[a]
Sanitary Sewer Collection System	1. Comply with Statewide General Waste Discharge Requirements for Sanitary Sewer Systems and Order No. R2-2013-0029.	Port of San Francisco and SFPUC	Ongoing
	2. Submit an enhanced Sewer System Management Plan and Combined Sewer Operations and Maintenance Plan as applicable, acceptable to the Executive Officer, that prioritizes sewer system inspections and repairs in areas within ¼ mile of the beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.	SFPUC, Port of San Francisco, and San Francisco Maritime National Historic Park	6 months 3 years
	3. Determine effectiveness of sewer system repairs: Assess beach monitoring data to determine if targets are met at the beach.	SFPUC	5 years
	4. If targets not met, submit an enhanced Sewer System Management Plan and Combined Sewer Operations and Maintenance Plan as applicable, acceptable to the	SFPUC, Port of San	5.5 years

Source	Action	Implementing Party	Completion Timeframe[a]
	Executive Officer, that prioritizes sewer system inspections and repairs in areas within ½ mile of the beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.	Francisco, and San Francisco Maritime National Historic Park	8 years
	5. If private laterals are a likely source of bacteria to the beach, establish and implement a private lateral replacement program or refocus existing lateral program efforts to address these sources.	SFPUC, Port of San Francisco, San Francisco Maritime National Historic Park, and City of San Francisco	5 years
Sewer Collection System & Urban Runoff	Establish and implement a protocol to enhance efforts to identify and correct illicit connections to the storm drain system.	SFPUC, Port of San Francisco, and San Francisco Maritime National Historic Park	6 months
Urban Runoff	1. Submit a plan acceptable to the Executive Officer describing BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. Include control of nuisance wildlife if it represents a likely source of bacteria to the beach. The plan shall include a schedule and milestones for implementation.	SFPUC, Port of San Francisco, San Francisco Maritime National Historic Park, and City of San Francisco	6 months
	2. Determine effectiveness of urban runoff controls: Assess beach monitoring data to determine if targets are met at the beach.	SFPUC	5 years
	3. If targets not met, submit, acceptable to the Executive Officer: (a) a plan describing BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. The plan shall include an implementation schedule and milestones. and (b) a supplemental monitoring plan (*supplemental to ongoing beach monitoring*) to investigate remaining bacteria sources to the beach. This plan may develop data and a quantitative rational to support (i) locations and types of enhanced bacteria BMPs, and/or (ii) revision of the numeric targets to reflect bacteria contributions from non-controllable sources. Include an	SFPUC, Port of San Francisco, San Francisco Maritime National Historic Park, and City of San Francisco	5.5 years

Source	Action	Implementing Party	Completion Timeframe[a]
	implementation schedule.		
	4. Where pet waste may be a source of bacteria to a beach, establish and implement protocols to control pet waste through such measures as providing bags, trash receptacles and signage.	San Francisco Maritime National Historic Park	6 months

[a] Timeframe begins on the effective date of this Basin Plan amendment

10.2.2 Candlestick Point Beaches Implementation Plan

The three beaches at Candlestick Point State Park have similar suspected bacteria sources and are under the same management; thus, a single implementation plan addresses all three beaches. Windsurfer Circle has the highest rate of Enterococcus exceedances at 63%. Sunnydale Cove, located closest to a major highway, follows with an exceedance rate of 51%, and Jackrabbit Beach experiences a relatively modest 20% rate of exceedances. In all cases, potential bacteria sources include leaky restroom and other sanitary sewer piping, pets at the beach, and wildfowl. At this time, urban runoff is an additional source to both Windsurfer Circle and Sunnydale Cove, the beaches with the higher exceedance rates. The data suggest that the implementation plan should focus on investigating and repairing sanitary sewer collection infrastructure and controlling runoff. Given the very small urban runoff catchment, if leaks are not detected in nearby restrooms, microbial source investigations could help pinpoint bacteria source(s), which may be gulls and other local and migratory birds.

The TMDL implementation plan for Candlestick Point State Park Beaches is presented in Table 10.3. Proposed timeframes are intended to reflect and balance State Park planning/budgeting cycles; the redevelopment occurring at the Candlestick Arena property; and the frequency of use, particularly the year-round use of Windsurfer Circle.

Monitoring Plan

Implementing entities will continue bacteria monitoring at the three beaches in Candlestick Point State Park and use the data to assess attainment of the TMDL numeric targets for each beach. Due to the high WQO exceedance rates at Windsurfer Circle and Sunnydale Cove beaches, supplemental monitoring may be necessary to collect sufficient data to prioritize implementation efforts and assess the effectiveness of source control actions. If investigations and repairs of the sanitary sewer collection system do not result in attainment of the numeric targets at the three beaches, implementing entities should develop and implement a supplemental monitoring program to 1) identify source(s) or source areas with significant bacteria contributions; 2) better characterize the source(s) of bacteria from a source area as needed; and 3) determine if management actions effectively reduce bacteria from source areas.

Table 10.3 Candlestick Point Beaches Implementation Plan

Source	Action	Implementing Party	Completion Timeframe[a]
Sanitary Sewer Collection System	1. Comply with Statewide General Waste Discharge Requirements for Sanitary Sewer Systems and Order No. R2-2013-0029.	SFPUC and California State Parks	Ongoing
	2. Submit an enhanced Sewer System Management Plan and Combined Sewer Operations and Maintenance Plan as applicable, acceptable to the Executive Officer, that prioritizes sewer system inspections and repairs in areas within ¼ mile of the beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as	SFPUC and California State Parks	6 months

Source	Action	Implementing Party	Completion Timeframe[a]
	necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.		3 years
	3. Determine effectiveness of sewer system repairs: Assess beach monitoring data to determine if targets are met at the beach.	SFPUC	5 years
	4. If targets not met, submit an enhanced Sewer System Management Plan and Combined Sewer Operations and Maintenance Plan as applicable, acceptable to the Executive Officer, that prioritizes sewer system inspections and repairs in areas within ½ mile of the beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.	SFPUC and California State Parks	5.5 years 8 years
	5. If private laterals are a likely source of bacteria to the beach, establish and implement a private lateral replacement program or refocus existing lateral program efforts to address these sources.	SFPUC and City of San Francisco	5 years
Sewer Collection System & Urban Runoff	Establish and implement a protocol to enhance efforts to identify and correct illicit connections to the storm drain system.	SFPUC and California State Parks	6 months
Urban Runoff	1. Submit a plan acceptable to the Executive Officer that describes BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. Include control of nuisance wildlife if it represents a likely source of bacteria to the beach. The plan shall include a schedule and milestones for implementation.	SFPUC, California State Parks, and City of San Francisco	6 months
	2. Determine effectiveness of urban runoff controls: Assess beach monitoring data to determine if targets are met at the beach.	SFPUC	5 years
	3. If targets not met, submit, acceptable to the Executive Officer: (a) a plan describing BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. The plan shall include an implementation schedule and milestones. and (b) a supplemental monitoring plan (*supplemental to ongoing beach monitoring*) to investigate remaining bacteria sources to the beach. This plan may develop data and a quantitative rational to support (i) locations	SFPUC, California State Parks, and City of San Francisco	5.5 years

Source	Action	Implementing Party	Completion Timeframe[a]
	and types of enhanced bacteria BMPs, and/or (ii) revision of the numeric targets to reflect bacteria contributions from non-controllable sources. Include an implementation schedule.		
	4. Where pet waste may be a source of bacteria to a beach, establish and implement protocols to control pet waste through such measures as providing bags, trash receptacles and signage.	California State Parks	6 months

[a] Timeframe begins on the effective date of this Basin Plan amendment

10.2.3 Crissy Field Beach Implementation Plan

Despite being located in a national park, Crissy Field Beach is at the base of a fairly significantly sized urban watershed that includes the eastern side of the Presidio as well as parts of urban San Francisco surrounding the Palace of Fine Arts. Thus, potential sources of bacteria include most of the common urban sources, as well as leaking sewer infrastructure and pets on the beach.

Crissy Field Beach Enterococcus WQO exceedance rates are similar to those at Aquatic Park Beach, located less than two miles east of Crissy Field. Enterococcus single sample maximum objectives are exceeded in 14% of samples, the geomean is exceeded at a rate of 19%, and exceedances occur primarily at only one of two sampling stations. Exceedances occur primarily during the winter months, suggesting a wet weather source. The data suggest that the implementation plan should focus on finding and controlling wet weather source(s) of bacteria to the eastern end of Crissy Field Beach.

Doyle Drive realignment and upland restoration efforts described in Section 7.2.3 may have an effect on bacteria at the beach. Thus, the first years of implementation will focus on investigation and repair of sanitary sewer collection system infrastructure, without further urban runoff controls. If numeric targets are not achieved within this timeframe, implementation actions shall be expanded to include urban runoff BMPs.

The TMDL implementation plan for Crissy Field Beach is delineated in Table 10.4. The proposed timeframe for achieving the numeric targets is intended to allow the numerous public agencies responsible for bacteria source reduction time to plan for and conduct source investigations and to develop cost-effective strategies for meeting load allocations.

Monitoring Plan

Implementing entities will continue bacteria monitoring at two locations on Crissy Field Beach and use the data to assess attainment of the TMDL numeric targets for this beach.

If near shore actions, the changes to Doyle Drive, and upland restoration efforts (Section 7.2.3) do not result in attainment of the numeric targets, then implementing entities shall develop and implement a supplemental monitoring program to 1) identify source(s) or source areas with significant bacteria contributions; 2) better characterize the source(s) of bacteria from a source area as needed; and 3) determine if management actions effectively reduce bacteria from source areas.

Table 10.4 Crissy Field Beach Implementation Plan

Source	Action	Implementing Party	Completion Timeframe[a]
Sanitary Sewer Collection System	1. Comply with Statewide General Waste Discharge Requirements for Sanitary Sewer Systems and Order No. R2-2013-0029.	Presidio Trust and SFPUC	Ongoing
	2a. Submit an enhanced Sewer System Management Plan and Combined Sewer Operations and Maintenance	Presidio Trust and SFPUC	6 months

Source	Action	Implementing Party	Completion Timeframe[a]
	Plan as applicable, acceptable to the Executive Officer, that prioritizes sewer system inspections and repairs in areas within ¼ mile of the beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.		3 years
	2b. Inspect laterals and all other components connecting SF Rec & Parks facilities to the sanitary sewer system. Repair all leaks. Submit annual status reports until all system components are inspected and repaired.	San Francisco Rec & Parks	1 year 3 years
	3. Determine effectiveness of sewer system repairs: Assess beach monitoring data to determine if targets are met at the beach.	SFPUC	5 years
	4. If targets not met, submit an enhanced Sewer System Management Plan and Combined Sewer Operations and Maintenance Plan as applicable, acceptable to the Executive Officer, that prioritizes sewer system inspections and repairs in areas within ½ mile of the beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.	Presidio Trust and SFPUC	5.5 years 8 years
	5. If private laterals are a likely source of bacteria to the beach, establish and implement a private lateral replacement program or refocus existing lateral program efforts to address these sources.	Presidio Trust and SFPUC	5 years
Sewer Collection System & Urban Runoff	Establish and implement a protocol to enhance efforts to identify and correct illicit connections to the storm drain system.	Presidio Trust and SFPUC	6 months
Urban Runoff	1. Submit a plan acceptable to the Executive Officer that describes BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. Include control of nuisance wildlife if it represents a likely source of bacteria to the beach. The plan shall include a schedule and milestones for implementation.	Presidio Trust, Golden Gate National Recreation Area, SFPUC, and San Francisco Rec & Parks	6 months
	2. Determine effectiveness of urban runoff controls: Assess beach monitoring data to determine if targets are	SFPUC	5 years

Source	Action	Implementing Party	Completion Timeframe[a]
	met at the beach.		
	3. If targets not met, submit, acceptable to the Executive Officer: (a) a plan describing BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beach. The plan shall include an implementation schedule and milestones. and (b) a supplemental monitoring plan (*supplemental to ongoing beach monitoring*) to investigate remaining bacteria sources to the beach. This plan may develop data and a quantitative rational to support (i) locations and types of enhanced bacteria BMPs, and/or (ii) revision of the numeric targets to reflect bacteria contributions from non-controllable sources. Include an implementation schedule.	Presidio Trust, Golden Gate National Recreation Area, SFPUC, and San Francisco Rec & Parks	5.5 years
	4. Establish and implement protocols for enhancing efforts to control pet waste through such measures as providing bags, trash receptacles, signage at Crissy Beach, and increased rule enforcement during wet periods.	Golden Gate National Recreation Area	6 months

[a] Timeframe begins on the effective date of this Basin Plan amendment

10.2.4 Marina Lagoon Beaches Implementation Plan

Lakeshore and Parkside Aquatic Beaches on Marina Lagoon have very large and very urban watersheds that include much of the city of San Mateo. Potential bacteria sources include most of the common urban sources and leaking sewer infrastructure, and nuisance wildlife contributes to the bacteria load as well. Both beaches exceed the Enterococcus geometric mean WQO at a rate of approximately 55 percent.

The Enterococcus geomean exceedances tend to occur year-round at Parkside Aquatic Beach and occur primarily, but not exclusively, during non-summer months at Lakeshore Park Beach. Existing information and data suggest that the implementation plan should focus on repairing leaking sewer infrastructure and reducing bacteria loads in urban runoff year-round. Control of resident geese populations also appears effective in reducing bacteria loads, especially at Parkside Aquatic Beach in the summer months.

Cease and Desist Order for Wastewater Discharges

The City of San Mateo has taken actions to reduce bacteria loads to the beaches in response to the Water Board's Cease and Desist Order (No. R2-2009-0020). This Order requires action toward elimination of capacity-related SSOs from a major trunk line; a plan and schedule for sewer system cleaning and root control; certification that pump stations are equipped for peak wet weather flows and continued operation during power or mechanical failure; a system capacity assessment; and a plan for short term and long term capacity improvements. The Order also includes requirements for sanitary sewer management plan certification, various communications and reports, and audits. Recent actions taken by the City in response to the Order include the following (Underwood 2015):

Sewer Cleaning and Root Control

- Targeted sewer cleaning at "hot spots": 417,564 linear feet (80 miles)
- Citywide sewer cleaning: 1,425,296 linear feet (270 miles)

Pump Station and Force Main Reliability and Upgrade

- Completed upgrades of two pump stations
- Initiated efforts for further upgrades

Capacity Assurance: Short and Long Term Improvements

- Short Term and Long Term Improvement Plans have been developed
- Upgrades of sewer lines or pump stations have been initiated every year since 2009; approximately six projects have been completed.

The Cease and Desist Order also specifies that the plan for short term and long term sewer repair include measures to address private sewer lateral (Figure 7.5) repair, rehabilitation and replacement. In 2011, the City of San Mateo initiated a private lateral replacement project as a Supplemental Environmental Project funded in part by fine monies from the Cease and Desist Order. This project consisted of two parts: a grant program for lower income property owners and a low interest loan program, both for video inspection and replacement of laterals. In a two year period this project incentivized repair of 392 laterals at single family homes, including 149 laterals at low income households, as well as 346 video inspections of sewer piping, at a cost of about $1.5 million (SFBRWQCB 2015).

Following completion of this project, the City determined that administrative costs were too high relative to the number of laterals repaired or replaced. In 2013 the program was revived as the Private Sewer Lateral Cost Sharing Program, which provides grants to property owners for 50% of the cost of a full sewer lateral replacement, with a maximum grant of $5,000. Video inspections, spot repairs and partial repairs are not included in the cost sharing program. All types of properties (residential, commercial, multi-family, etc.) within the City of San Mateo are eligible for the full lateral replacement cost sharing. The City does not require inspection or replacement of laterals at the point of sale.

Continued compliance with the Cease and Desist Order requirements may minimize SSOs sufficiently to address their contribution to the bacterial impairment at San Mateo beaches. Board staff from the NPDES Wastewater and the Planning and TMDL Divisions will review beach monitoring data, annual Cease and Desist Order Reports and other applicable information to determine whether the Order should be amended to include additional requirements. At this time, this TMDL does not include additional measures to address SSOs.

In complying with the Cease and Desist Order, the City of San Mateo is replacing sewer lines and other infrastructure. During this process, potential exists for designing sanitary sewer collection system components to accept urban runoff flows from areas that may have high bacteria concentrations due to, for example, the age of private laterals. The City of San Mateo should investigate the feasibility of diverting stormwater and dry weather urban runoff to the City of San Mateo Wastewater Treatment Plant.

Goose feces removal pilot project

Independent of the Cease and Desist Order, the City of San Mateo has conducted a pilot test to determine whether removing goose feces from the beaches improves water quality at the beaches. This project, which featured the removal of goose feces on the order of about ten pounds/day from each beach, is more fully described in Section 5.5. Beach data collected during the pilot study suggested a decline in bacteria, although insufficient data were collected to perform a statistical evaluation of project results. The City of San Mateo should continue to develop and conduct a wildfowl feces removal study to determine the relative contribution of this source to ongoing bacteria impairment and the feasibility and cost-effectiveness of various feces removal methods. The purpose of the study would be twofold:

- Statistically evaluate whether removal of wildfowl feces from San Mateo beaches reduces bacterial impairment of the beaches on either a seasonal or continuous basis, and, if so,
- Develop wildfowl feces control measures for long-term implementation as needed to obtain and maintain the numeric target.

Because the City of San Mateo is both the stormwater management and beach authority, a nuisance wildlife control effectiveness study should be included as an element of the urban runoff BMP plan.

Monitoring Plan

Implementing parties shall continue bacteria monitoring at the two beaches on San Mateo Lagoon, Parkside Aquatic and Lakeshore Beaches, and use the data to assess attainment of the TMDL numeric targets for these beaches.

Due to the high WQO exceedance rates at Marina Lagoon beaches, the City of San Mateo should develop and implement a supplemental monitoring plan to 1) identify source(s) or source areas with significant bacteria contributions; 2) better characterize the source(s) of bacteria from a source area as needed; and 3) determine if management actions effectively reduce bacteria from source areas. Given that SSOs are likely a significant source of bacteria to the beaches, and that SSOs are being addressed and reduced through compliance with the Cease and Desist Order, the supplemental monitoring should also measure the effectiveness of sewer infrastructure upgrades in reducing bacteria loads, or otherwise support or complement Cease and Desist Order compliance actions.

The TMDL implementation plan for Marina Lagoon beaches is delineated in Table 10.5. The proposed timeframe for achieving the numeric targets is intended to be consistent with the SSO reduction schedule contained in Order No. R2-2009-0020, to allow time to plan for and conduct source investigations and to develop cost-effective strategies for meeting the numeric targets at the two beaches.

Table 10.5 Marina Lagoon Beaches Implementation Plan

Source	Action	Implementing Party	Completion Timeframe[a]
Sanitary Sewer Collection System	1. Comply with Statewide General Waste Discharge Requirements for Sanitary Sewer Systems.	City of San Mateo	Ongoing
	2a. Comply with Cease and Desist Order No. R2-2009-0020 (CDO) and any future amendments. In next annual CDO report, submit enhancements to the Infrastructure Renewal and Capacity Assurance Plans, acceptable to the Executive Officer, that prioritize sewer system inspections and repairs in areas within ¼ mile of the beach to the extent possible within the framework of the CDO. Include a diagram of prioritized infrastructure and time schedule. Complete inspections and repairs in prioritized area(s).	City of San Mateo	According to due dates in Cease and Desist Order
	2b. In conjunction with ongoing planning for treatment plant and sewer line upgrades, investigate the feasibility of diverting stormwater and dry weather urban runoff to the City of San Mateo Wastewater Treatment Plant.	City of San Mateo	Summarize efforts in annual reports
	3. Determine effectiveness of sewer system repairs: Assess beach monitoring data to determine if targets are met at the beach.	City of San Mateo	5 years
	4. If targets not met, submit enhanced Infrastructure Renewal and Capacity Assurance Plans, acceptable to the Executive Officer, that prioritize sewer system inspections and repairs in areas within ½ mile of the	City of San Mateo	5.5 years

Source	Action	Implementing Party	Completion Timeframe[a]
	beach or otherwise connected to the beach. Include a diagram of prioritized infrastructure, a time schedule for implementing short- and long-term plans, and, as necessary, a schedule for developing the funds needed for the capital improvement plan. Complete inspections and repairs.		 8 years
	5. If private laterals are a likely source of bacteria to the beach, establish and implement a private lateral replacement program or refocus existing lateral program efforts to address these sources.	City of San Mateo	2 years
Sewer Collection System & Urban Runoff	Establish and implement a protocol to enhance efforts to identify and correct illicit connections to the storm drain system.	City of San Mateo	6 months
Urban Runoff	1. Submit a plan acceptable to the Executive Officer that describes BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beaches. Include control of nuisance wildlife. The plan shall include a schedule and milestones for implementation.	City of San Mateo	6 months
	2. Determine effectiveness of urban runoff controls: Assess beach monitoring data to determine if targets are met at the beaches.	City of San Mateo	5 years
	3. If targets not met, submit, acceptable to the Executive Officer: (a) a plan describing BMPs being implemented and additional BMPs that will be implemented to reduce discharges of bacteria to the beaches. The plan shall include an implementation schedule and milestones. and (b) a supplemental monitoring plan (*supplemental to ongoing beach monitoring*) to investigate remaining bacteria sources to the beaches. This plan may develop data and a quantitative rational to support (i) locations and types of enhanced bacteria BMPs, and/or (ii) revision of the numeric targets to reflect bacteria contributions from non-controllable sources. Include an implementation schedule.	City of San Mateo	5.5 years

[a] Timeframe begins on the effective date of this Basin Plan amendment

10.2.5 China Camp and McNears Beaches Implementation Plan

The data for China Camp and McNears beaches, which are co-located along a five-mile stretch of the Marin County shoreline, contrast vividly from FIB data from the remaining beaches on San Francisco Bay. Both China Camp and McNears Beaches exceed *only* the total coliform water quality objective, while the other beaches experience significant Enterococcus exceedances.

The numeric targets for this TMDL are for Enterococcus only, as discussed in Section 4. Therefore, both China Camp and McNears Beaches already meet the numeric targets, and no further implementation actions are necessary.

10.3 Adaptive Implementation

The Water Board will adapt the TMDL and implementation plans to incorporate new and relevant scientific information so that effective and efficient measures can be taken to achieve the numeric targets. At approximately six-year increments, Water Board staff will evaluate new and relevant information from implementation actions, water quality monitoring results and the scientific literature, including any local reference system studies, U.S. EPA's revised recommended bacteria criteria, or new or revised State bacteria water quality objectives, and assess progress toward attaining the TMDL, and present that information to the Water Board. The Water Board will consider a Basin Plan amendment that reflects any necessary modifications to the targets or implementation plans.

11 REGULATORY ANALYSES

11.1 Overview

This section provides the regulatory analyses required to adopt the Basin Plan amendment establishing both a TMDL for bacteria at SanFrancisco Bay beaches and an implementation plan. Regional basin planning is a certified regulatory program for which a substitute environmental document (SED) may be prepared in lieu of an Environmental Impact Report (EIR) or negative declaration under the California Environmental Quality Act (CEQA) (Cal. Pub. Res. Code § 21080.5; Cal. Code Regs., tit. 14, §§ 15251 (g), 15252(a)). This Staff Report, including the CEQA checklist and the analyses that follow, constitutes an SED under California Code of Regulations, title 14, section 15252, subdivision (a). The Staff Report also analyzes the environmental effects and economic feasibility of reasonably foreseeable implementation actions, as required under California Public Resources Code section 21159, which applies to rules or regulations requiring installation of pollution control equipment.

These environmental and economic analyses assess impacts for many of the potential individual projects that may be developed to implement the TMDL, to the extent such impacts can be identified at this time. The results of these analyses indicate that the TMDL will not result in significant, long-term detrimental impacts to the environment and will not cause immediate, large scale expenditures by the entities required to implement it. The implementation plan of the TMDL incorporates management measures required by existing regulations to reduce or eliminate waste discharges from sanitary sewer systems, stormwater runoff, vessels, pets, and controllable wildlife, and the reduction or elimination of these discharges is expected to benefit the environment.

This section of the Staff Report is organized into three main parts: 11.2 Environmental Analysis, including the Environmental Checklist, 11.3 Alternatives Analysis; and 11.4 Economic Considerations.

11.2 Environmental Analysis

The Water Board is the Lead Agency responsible for evaluating the potential environmental impacts of the TMDL and its implementation plan. This section of the Staff Report describes the project, presents the environmental checklist evaluating the environmental impacts of the projects, and explains the results of the analysis. Sections 11.2 and 11.3 also provide details about the project definition, objectives and a description of the environmental setting that provide the basis for the CEQA evaluation. The environmental checklist frames the analysis and discusses potential environmental impacts as well as the mitigation measures that will likely be used to eliminate or reduce those impacts.

Pursuant to section 13360 of the Water Code, the Water Board cannot dictate which compliance or mitigation measures parties employ to implement the TMDL. However, the Water Board recommends that the measures chosen be applied in order to reduce, and if possible avoid, significant environmental impacts. The measures discussed in this section are readily available, low-impact, and generally considered to be consistent with industry standards. Therefore, these measures can and should be adopted by the parties.

11.2.1 Project Description

This Basin Plan amendment will establish a Total Maximum Daily Load (TMDL) and an implementation plan for bacteria at SanFrancisco Bay beaches. The primary purpose of the project is to restore and protect the recreational beneficial uses in the following San Francisco Bay beaches:

- Aquatic Park Beach, San Francisco
- Jackrabbit, Sunnydale Cove, and Windsurfer Beaches in Candlestick Point State Recreation Area, San Francisco
- Crissy Field Beach, San Francisco
- Parkside Aquatic and Lakeshore Beaches on Marina Lagoon, City of San Mateo
- China Camp Beach, Marin County
- McNears Beach, Marin County

The project includes numeric targets for Enterococcus to protect these recreational uses. The TMDL assigns load and wasteload allocations for Enterococcus that are expected to result in attainment of the targets. Two of the beaches, China Camp and McNears, have attained the targets already and the TMDL does not include implementation actions for them. Thus, these beaches are not included in the Regulatory Analysis.

Bacteria sources identified in the TMDL include sanitary sewer collection systems, urban stormwater runoff, pets at the beaches, vessels and wildlife. The TMDL Implementation Plan includes existing regulatory programs and required management measures to reduce bacteria discharges from all of these sources. These implementation actions are summarized in Table 11.1 below.

11.2.2 Project Objectives

The objectives of the proposed TMDL and implementation plan are consistent with the mission of the Water Board and the requirements of the federal Clean Water Act (CWA) and California's Water Code. These objectives are:

- Comply with the CWA requirement to adopt a TMDL for Section 303(d)-listed water bodies;
- Protect existing recreational uses in San Francisco Bay beaches;
- Attain the bacteria objectives for water contact recreation in San Francisco Bay beaches as quickly as feasible;
- Set numeric targets to attain relevant water quality standards in San Francisco Bay beaches;
- Avoid imposing regulatory requirements that are more stringent than necessary to meet numeric targets and attain water quality standards.

11.2.3 Baseline Conditions

To satisfy CEQA's recommendation to engage the public and interested parties in early consultation about the scope of the environmental analysis, Board staff held a CEQA scoping meeting on September 29, 2014, in San Francisco to receive input into the environmental analysis. The environmental analysis commenced at this time and the baseline for impact assessments was determined to be the water quality regulatory framework that was in effect in September 2014. This framework, including existing State and Regional Water Board orders, will result in many actions that will reduce bacteria loading but would have occurred with or without the TMDL. The following existing regulations and Orders comprise the regulatory baseline:

State and Regional Water Board Orders and Discharge Prohibitions

- Water Board Municipal Regional Stormwater Permit (NPDES No. CAS612008)
- State Water Board NPDES Permit for Small Municipal Separate Storm Sewer Systems (MS4) (NPDES No. CAS000004)
- State Water Board Statewide General Waste Discharge Requirements for Sanitary Sewer Systems (Order No. 2006-0003-DWQ as revised by Order No. 2008-0002-EXEC)
- State Water Board Stormwater Permit for State of California Department of Transportation (NPDES No. CAS000003)
- Basin Plan Discharge Prohibition No. 15 (Table 4.1), which states: "It shall be prohibited to discharge raw sewage or any waste failing to meet waste discharge requirements to any waters of the Basin."

Water Board Enforcement Orders

- Regional Water Board Cease and Desist Order for the City of San Mateo, Town of Hillsborough, and Crystal Springs County Sanitation District Sanitary Sewer Waste Discharges (Order No. R2-2009-0020)

11.2.4 Reasonably Foreseeable Methods of Compliance

Implementation measures that are proposed in the TMDL are consistent with existing local, regional, and statewide regulations and are identified in Table 11.1, below. The potential environmental impacts of these measures are evaluated in the environmental analysis (checklist and explanations below). The cumulative effects of potential implementation actions are also evaluated below.

Table 11.1 Implementation Plan Actions Evaluated in the CEQA Analysis

Source	Implementation Actions	Compliance Measures
Sanitary Sewer Collection Systems	• Continue to comply with Statewide General Waste Discharge Requirements Order for sanitary sewer systems (which aims to prevent sanitary sewer overflows[a]) • For City of San Mateo, continue to comply with Cease and Desist Order	Examples of activities that would bring parties into compliance include: • Actions to inspect and clean existing sewer lines • Actions to repair and replace existing leaky sewer lines • Actions to control tree roots to prevent

Source	Implementation Actions	Compliance Measures
	No. R2-2009-0020	them from damaging the sewer lines
Urban Runoff and Pet Waste at Beach[b]	• For City of San Mateo, continue to comply with Municipal Regional Stormwater Permit requirements to identify and implement additional specific measures, as needed, to reduce bacteria in stormwater runoff and dry-weather flows to achieve wasteload allocations • For City and County of San Francisco, continue to comply with State Water Board NPDES Permit for Small Municipal Separate Storm Sewer Systems where applicable. Where not applicable and urban runoff is a source of bacteria to the beach, apply for coverage under this Permit	Examples of activities that would bring parties into compliance include: • Additional storm drain cleaning • Detection and elimination of illicit discharges • Construction of facilities to detain, divert, infiltrate, or treat urban runoff • Increased maintenance of structural BMPs • Installation of additional pet waste receptacles and signage in watershed and at beach
Vessels	Continue to enforce rules pertaining to dumping if vessels become a source of bacteria to a beach[c]	Example activity: • Increased education of “no dumping” rules for boats harboring near the beach • Increased enforcement of “no dumping” rules for boats harboring near the beach • Repair of leaking sewage pumpout station equipment (pumps, tanks, piping)
Wildlife	Discourage nuisance wildlife from nesting and feeding in the vicinity of the beach	Example activities that would bring parties into compliance include: • Public education, additional pet waste receptacles and signage, and increased enforcement of pet rules at the beach • Habitat modification, such as wire, fencing, mowing • Deterrence and dispersion measures, such as water sprayers, sonic devices, and dogs • Reproductive controls, such as addling eggs

a. The ongoing activities relied on for achievement of the TMDL are those specified in the General WDRs for sanitary sewer systems that pertain to sanitary sewer overflow prevention, not to other aspects of sanitary district operations.
b. Bacteria from pets in the watershed are included in the urban runoff source. Control of pet sources of bacteria at beaches will be distinct actions at some beaches.
c. Vessels and associated facilities have not been identified as a source of bacteria to the beaches in this TMDL, but are included in this analysis in the event that additional source investigations find vessels to be a source in the future.

Implementing parties will choose management practices necessary and most effective to reduce bacteria loads in their discharges. For example, the City of San Mateo is required under the MRP to develop and submit a plan that includes specific measures to reduce bacteria in stormwater runoff and dry weather flows sufficient to achieve the wasteload allocations. Since some implementation projects have yet to be designed, it is not possible to know the location, proposed activities, or construction specifications at this time and therefore, the environmental analysis considers these impacts on a general level. Some projects to implement the TMDL would require additional permitting, and environmental analysis will occur at that time. Projects that would involve construction affecting an area of one acre or more would be required to obtain coverage under the statewide General Construction Stormwater Permit. Projects that could result in dredge or fill of streams, wetlands, or coastal waters would be required to comply with Sections 401 and 404 of the CWA and obtain applicable permits from the U.S. Army Corp of Engineers and the Water Board.

11.2.5 Environmental Analysis

The Water Board has based its Environmental Analysis on the checklist and sample questions found in Appendix G of the CEQA Guidelines (14 Cal. Code Regs. App'x G).The checklist and the discussion that follows evaluate the environmental impacts of TMDL implementation activities listed in Table 11.1 in 18 areas, such as air quality, cultural resources, or land use. Some TMDL implementation activities solely involve planning or assessment; public outreach and education; and water quality monitoring. These activities are not evaluated in the Environmental Analysis because they do not result in direct or reasonably foreseeable indirect physical changes in the environment.

The possible responses to the questions in the Checklist and the types of discussion required are summarized below:

Potentially Significant Impact. Checked if a discussion of the existing setting (including relevant regulations or policies pertaining to the subject) and project characteristics with regard to the environmental topic demonstrate, based on substantial evidence, supporting information, previously prepared and adopted environmental analysis documents, and specific criteria or thresholds used to assess significance, that the Project will have a potentially significant impact of the type described in the question.

Less Than Significant With Mitigation. Checked if the discussion of existing setting and specific project characteristics, adequately supported with relevant research or documents, indicate that the project clearly will or is likely to have particular physical impacts that will exceed the given threshold or criteria of significance, and that with the incorporation of clearly defined mitigation measures into the Project, such impacts will be avoided or reduced to less-than-significant levels.

Less Than Significant Impact. Checked if a more detailed discussion of existing conditions and specific project features, based on relevant information, reports or studies, demonstrates that, while some effects may be discernible with regard to the individual environmental topic of the question, the effect would not exceed a threshold of significance which has been established by the appropriate agencies. The discussion may note that due to the evidence that a given impact would not occur or would be less than significant, no mitigation measures are required.

No Impact. Checked if brief statements (one or two sentences) or cited reference materials (maps, reports or studies) clearly show that the type of impact could not be reasonably expected to occur due to the specific characteristics of the project or its location.

ENVIRONMENTAL CHECKLIST

1. **Project Title:** Proposed Basin Plan Amendment to Establish a Total Maximum Daily Load (TMDL) for Bacteria at San Francisco Bay Beaches

2. **Lead Agency Name and Address:** California Regional Water Quality Control Board San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

3. **Contact Person and Phone:** Janet O'Hara, (510) 622-5681

4. **Project Locations:** San Francisco Bay at the City and County of San Francisco and at the City of San Mateo, San Mateo County, California

5. **Project Sponsor's Name & Address:** California Regional Water Quality Control Board San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

6. **General Plan Designation:** Not Applicable

7. **Zoning:** Not Applicable

8. **Description of Project:**

The project is a proposed Basin Plan amendment for a TMDL and implementation plan for San Francisco Bay Beaches listed in Table 11.2. A detailed project description and a project definition are provided in Sections 2 and 3, respectively, of this report.

Table 11.2 Project Locations and Surrounding Land Uses

Beach	Location[a]
Aquatic Park	San Francisco, north shore
Jackrabbit, Sunnydale Cove, and Windsurfer	Candlestick Point State Recreation Area, San Francisco
Crissy Field	San Francisco, north shore
Parkside Aquatic and Lakeshore	Marina Lagoon, City of San Mateo
China Camp[b]	Marin County, east shore
McNears[b]	Marin County, east shore

[a]See Figure 1.1 for beach locations.
[b]The TMDL does not call for implementation actions at these beaches. See Staff Report sections 10.2.4 and 10.2.5.

The TMDL calls for implementation actions at each of the beaches listed in Table 11.2 except China Camp and McNears, which already meet the TMDL's numeric targets for Enterococcus. Therefore, this Environmental Analysis focuses only on the beaches (and watersheds) where implementation actions will occur, as shown in Table 11.3 below.

9. Surrounding Land Uses and Setting:

The proposed Basin Plan amendment would affect San Francisco Bay beaches, as described in Section 2 of this report and listed below. Implementation is likely to involve the beaches themselves and upland urban watershed areas that drain to the beaches.

Table 11.3 Project Locations and Surrounding Land Uses

Beach	Surrounding Land Use[a]
Aquatic Park	Highly urban, very small catchment area (Figure 5.1)
Candlestick Point Park Beaches: Jackrabbit, Sunnydale Cove, and Windsurfer	Urban, with new high-density development occurring in the very small catchment area; narrow strip of park land buffers the beaches (Figure 5.3)
Crissy Field	Upland urban uses; lower watershed is largely park land (Figure 5.4)
Marina Lagoon Beaches: Parkside Aquatic and Lakeshore	Highly urban ten square mile watershed (Figure 5.6)

[a]See Section 2 of this report for more detailed description of surrounding land uses.

10. Other Public Agencies Whose Approval is Required:

The State Water Board, the California Office of Administrative Law, and the U.S. EPA must approve the Basin Plan amendment following adoption by the Water Board.

I. AESTHETICS

Background:

The beaches are located in a National Recreation Area (Aquatic Park), National and State Recreation Areas (Crissy Field and Candlestick Point, respectively), and local city parks (Marina Lagoon). Their park settings and locations along San Francisco Bay and San Mateo County's Marina Lagoon provide the beaches with scenic views and attractive landscaping.

Discussion of Impacts:

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	X
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	X

a) Any physical changes to the aesthetic environment as a result of the Bacteria TMDL would be small in scale. No actions or projects associated with implementation of the TMDL would result in tall or massive structures that could obstruct views from, or of scenic vistas. Construction of detention basins or other facilities could result in minor changes to the scenic views; however, these are likely to be situated in disturbed urban areas. These aesthetic affects are considered less than significant.

b) Actions or projects implemented for the TMDL would occur in localized areas throughout the watershed and would not occur within a designated state scenic highway, and therefore do not result in adverse aesthetic impacts to state scenic highways.

c) Actions to implement the TMDL would not substantially affect or degrade the existing visual character or quality of any site or its surroundings and are expected to be less than significant because physical changes to the aesthetic environment would be small in scale.

d) Actions and projects that could result from the TMDL would not include new lighting or installation of large structures that could generate reflected sunlight or glare, and therefore do not result in adverse light and glare impacts.

II. AGRICULTURE RESOURCES

Background:

Land uses in the beach watersheds are largely urban. There is no important farmland in the City and County of San Francisco or in the portion of San Mateo County included in this TMDL.

Discussion of Impacts:

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland.

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	X

a-c) The TMDL would affect urban land in the watersheds that drain to the beaches, and would not affect land designated as Prime, Unique, or Farmland of Statewide Importance by the California Resources Agency. The TMDL would not affect existing agricultural zoning or any aspects of Williamson Act contract nor would it result in the conversion of farmland to non-agricultural uses. Therefore, no impacts would result.

III. AIR QUALITY

Background

San Mateo County is bounded on the west by the Pacific Ocean, on the east by San Francisco Bay, on the south by the Santa Cruz Mountains and on the north by the City and County of San Francisco and the Golden Gate. The city of San Mateo lies in the southeastern peninsula and experiences warmer temperatures and fewer foggy days because the marine layer is blocked by the ridgeline to the west. Mean maximum summer temperatures are in the low-80’s, and mean minimum temperatures during winter months are in the high-30’s to low-40’s. A gap occurs in the Santa Cruz Mountains between Half Moon Bay and San Carlos. As the sea breeze strengthens on summer afternoons, the gap permits maritime air to pass across the mountains, and its cooling effect is commonly seen in San Mateo. On the east side of the mountains winds are generally from the west, although wind patterns in this area are often influenced greatly by local topographic features. Localized pollutants, such as carbon monoxide, can build up in "urban canyons." Winds are generally fast enough to carry the pollutants away before they can accumulate (BAAQMD 1999).

San Francisco lies at the northern end of the peninsula. Because most of San Francisco's topography is below 200 feet, marine air is able to flow easily across most of the city, making its climate cool and windy. Mean maximum summer temperatures are in the mid-60's, and mean minimum temperatures during winter months are in the low-40’s. A second gap in the Santa Cruz Mountains extends from Fort Funston on the ocean to the San Francisco Airport. Because the gap is oriented in the same northwest to southeast direction as the prevailing winds, and because the elevations along the gap are less than 200 feet, marine air is easily able to penetrate into the bay (BAAQMD 1999).

Discussion of Impacts

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	X	☐

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	X
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	X
e) Create objectionable odors affecting a substantial number of people?	☐	☐	X	☐

a) Because the TMDL would not cause any significant changes in population or employment, it is not expected to generate ongoing traffic-related emissions. It does not require construction of any permanent emissions sources. For these reasons, no permanent change in air emissions would occur, and the TMDL would not conflict with applicable air quality plans. Therefore, no air quality impacts would result.

b) Construction of stormwater detention/treatment facilities and repair and replacement of sewer pipelines could result in temporary construction-related emissions. However, these emissions would not "violate any air quality standard or contribute substantially to an existing or project air quality standard." Nor would it involve the construction of any permanent emissions sources or generate ongoing traffic-related emissions. Construction and minor earthmoving that would occur as a result of Bacteria TMDL implementation actions would be of short-term duration and would likely involve discrete, small-scale projects as opposed to extensive earthmoving activities.

If specific construction projects were proposed to comply with requirements derived from the proposed TMDL, such projects would have to comply with the Bay Area Air Quality Management District's (BAAQMD) requirements with respect to the operation of portable equipment. Moreover, BAAQMD has identified readily available measures, routinely employed at most construction sites, to control construction-related air quality emissions (BAAQMD 2012). These measures include watering active construction areas; covering trucks hauling soil; and applying water or applying soil stabilizers on unpaved areas. Therefore, the TMDL would not violate any air quality standard or contribute substantially to any air quality violation, and its temporary construction-related air quality impacts would be less than significant.

c) Because the TMDL would not generate ongoing traffic-related emissions or involve the construction of any permanent emissions sources, it would not result in a cumulatively considerable net increase of any pollutant for which the project region is in non-attainment of air quality standards. No air quality impact would result.

d) Because the TMDL would not require the construction of any permanent emissions sources but rather involves short-term and discrete construction activities, it would not expose sensitive receptors to substantial pollutant concentrations. No air quality impact would result.

e) The TMDL would include actions to manage controllable wildlife sources of bacteria, including geese feces removal at the two Marina Lagoon beaches. This action began prior to adoption to the TMDL. Feces management activities include the collection and transport of feces, which could result in odor at the time of collection. However, because the feces are not stored or stockpiled prior to transport to an approved disposal facility, possible odors would not affect substantial numbers of people and impacts would be less than significant.

IV. BIOLOGICAL RESOURCES

Background

The San Francisco Bay beaches included in this Environmental Analysis are in highly urban environments and can be subject to high use by the public. However, wild birds are present at the beaches. In addition, according to the California Department of Fish and Wildlife's California Natural Diversity Database, the beaches may provide habitat for rare plants and animals including California red-legged frog, Cooper's hawk, western snowy plover, and double-crested cormorant (https://map.dfg.ca.gov/bios/?tool=cnddbQuick).

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	X	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	X	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	X	☐

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	X	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	X

a) Actions proposed under the Bacteria TMDL are likely to be small in scale and are located in areas that are currently developed. Actions, such as repair and replacement of pipelines and construction of stormwater detention/treatment facilities area likely to be located in existing disturbed areas such as in roadways or other paved urban areas and would not impact habitats of rare species. Therefore, the TMDL would not have significant adverse effect, either directly or through habitat modifications, on any sensitive or special-status species.

b) Implementation measures that involve repair of sewage systems or minor construction in beach watersheds are not expected to have a significant impact on sensitive natural communities because they would be located in already disturbed areas away from creeks and the beach.

In addition, in discharging its regulatory program responsibilities, the Water Board is expected to require mitigation measures for work it approves that may impact coastal ecosystems or other sensitive natural communities. Such requirements include but are not limited to pre-construction surveys; construction buffers and setbacks; restrictions on construction during sensitive periods of time; employment of on-site biologists to oversee work; avoidance of construction in known sensitive habitat areas; and relocation and restoration of sensitive habitats where avoidance is impossible. Therefore, the TMDL would not have a substantial adverse effect, either directly or through habitat modifications to sensitive natural communities.

c) The TMDL does not authorize construction of new fill in riparian or wetland areas in the San Francisco Estuary. Implementation actions are likely to occur in existing roadways and at existing stormwater facilities. Therefore, the TMDL would result in less than significant adverse impacts on wetlands.

d) TMDL implementation actions could include management actions to keep nuisance, non-threatened species of wildlife off beaches. These actions could include egg addling of habituated, formerly migratory Canada geese, a practice which began prior to adoption of the TMDL. These actions could potentially affect wildlife migration; however this effect would be localized and unlikely to result in significant disturbance to wildlife due to the size of the Canada goose population in the San Francisco Bay area. Therefore, impacts would be less than significant.

e) The TMDL does not conflict with any local policies or ordinances protecting biological resources such as trees. Projects to comply with the TMDL would not affect riparian zones, nor would they include tree removal, and would not conflict with local policies or ordinances.

f) Actions to implement the TMDL will promote improved water quality. The TMDL does not conflict with any adopted Habitat Conservation Plan, Natural Community Plan, or other approved local, regional or state habitat conservation plan.

V. CULTURAL RESOURCES

Background

The San Francisco Bay beaches' watersheds are located in an environment that would have been suitable for early inhabitants to live or gather resources, and therefore could be considered sensitive for prehistoric and tribal cultural resources. Potentially attractive natural resources during the prehistoric period would have included the Bay itself, which provided a bounty of resources for early inhabitants of the area, including estuarine fish, mammals, shellfish, and waterfowl.

Historic buildings dating to the late 1800s and mid-1900s exist in the upper watersheds of Aquatic Park and Crissy Field, including the Bathhouse building and several structures within the historic Presidio, respectively. The entire Presidio has been designated a National Historic Landmark District. The historic ship Balclutha is moored at the Hyde Street Pier adjoining Aquatic Park Beach.

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource, as defined in California Code of Regulations, Title 14, section 15064.5, subdivision (a)?	☐	☐	☐	X
b) Cause a substantial adverse change in the significance of a unique archaeological resource, as defined in Public Resources Code, section 21083.2, subdivision (g)?	☐	☐	X	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	X	☐
d) Cause a substantial adverse change in the significance of a tribal cultural resource, as				

defined in Public Resources Code section 21074, subdivision (a)?	☐	☐	X	☐
e) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	X

a) Likely TMDL implementation actions include only minor construction in existing roadways and stormwater facilities and would not require changes to historic buildings or structures. Therefore, the TMDL is not expected to have any impacts on historic resources.

b) Likely TMDL implementation actions would involve minor construction in existing roadways and stormwater facilities in urban areas that are not known or believed to contain significant archeological resources. Large-scale grading and deep excavations are not foreseeable. Therefore, the TMDL is anticipated to have less than significant impacts on archeological resources.

c) Likely TMDL implementation actions would involve minor construction in existing roadways and stormwater facilities, in urban areas not known or believed to contain unique paleontological resources or unique geologic features or resources of cultural value or significance to Native American tribes. Large-scale grading or deep excavations are not foreseeable. Therefore, impacts to paleontological and tribal cultural resources are expected to be less than significant.

d) Actions to implement the TMDL are likely to result in minor construction in existing roadways and stormwater facilities, where underground utilities already exist, and human remains are not known or believed to exist. No large-scale grading or deep excavations are foreseeable. No human remains are expected to be encountered or disturbed.

VI. GEOLOGY AND SOILS

Background

San Francisco Bay is located within the Coast Ranges of California. The Coast Ranges are characterized by northwest trending longitudinal mountain ranges and valleys formed by faulting. The San Francisco Bay – Santa Clara Valley lies between the ranges in stable or slowly down-dropping areas formed between three major faults, the San Andreas, the Hayward and the Calavaras.

Surface soils in the TMDL implementation areas are generally classified as “urban.” According to a 1991 Soil Survey of San Mateo County, Eastern Part, and San Francisco County, urban land consists of areas that are completely covered by asphalt, concrete, buildings, and other structures. These soils often consists of poorly drained soils that have been filled, and are composed of gravel, broken cement and asphalt, bay mud, and solid waste material.

Discussion of Impacts

	Potentially Significant	*Less Than Significant With Mitigation*	*Less Than Significant*	*No*

Issues:	*Impact*	*Incorporation*	*Impact*	*Impact*
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent applicable Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist, or based on other substantial evidence of a known fault? (California Geological Survey, Special Publication 42: Fault-Rupture Hazard Zones in California).	☐	☐	☐	X
ii) Strong seismic ground shaking?	☐	☐	☐	X
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	X
iv) Landslides?	☐	☐	☐	X
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	X	☐
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	X	☐
d) Be located on expansive soil, as defined in Title 24, section 1803.5.3 of the California Code of Regulations, creating substantial risks to life or property?	☐	☐	☐	X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	X

a) Implementation of the TMDL would not require construction of habitable structures or lead to an increase in population; therefore, implementation actions would not create or increase any human safety risks related to fault rupture, seismic ground-shaking, ground failure, or landslides.

b) Action to implement the TMDL may result in minor construction and earthmoving. Although there is some risk of erosion during construction of stormwater facilities in low-lying areas, the risk is not expected to be significant because of the small scale of the likely projects. During large scale earthmoving and construction, landowners must implement erosion control practices per the Construction General Permit.

c) Actions to comply with the TMDL would generally be located in existing disturbed areas, such as streets, and on the beaches. While these areas may contain localized areas that are prone to instability, the type of construction anticipated under the TMDL, such as replacement of pipes, would be small in scale and very unlikely to trigger land instability. Construction of stormwater facilities in low-lying urban areas would not create a risk of landslides. No adverse impacts to local geologic conditions, including on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse are expected to occur as a result of adoption of this Basin Plan amendment.

d) Construction of buildings (as defined in Cal. Code Regs. tit. 24, § 202) or any habitable structures is neither required by nor a reasonably foreseeable consequence of the TMDL. Minor grading could occur in areas with expansive soils but this activity would not create a substantial risk to life or property. Therefore, the TMDL would not result in impacts related to expansive soils or risks to life or property.

e) The TMDL would not require construction of new septic systems; therefore, affected soils need not be capable of supporting the use of septic tanks or alternative wastewater disposal systems. No impacts from septic tanks or alternative wastewater disposal systems would result from the project.

VII. GREENHOUSE GAS EMISSIONS

Background:

In 2006, California passed the California Global Warming Solutions Act of 2006, which requires the California Air Resources Board (CARB) to design and implement emission limits and regulations to reduce statewide greenhouse gas (GHG) emissions by approximately 25 percent by 2020 in a feasible and cost-effective manner. California recognizes seven GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) and nitrogen trifluoride (NF_3) (Cal. Health & Safety Code, § 38505(g)(1)-(7)). Carbon dioxide is the reference gas for climate change, and to account for the warming potential of different GHGs, GHG emissions are quantified and reported as CO_2 equivalents (CO_2E). The effects of GHG emission sources (i.e., individual projects) are reported in metric tons/year of CO_2E.

State law requires local agencies to analyze the environmental impact of GHGs under CEQA. The Natural Resources Agency adopted the CEQA Guidelines Amendments in December 2009. San Mateo County adopted the San Mateo Energy Efficiency Climate Action Plan in 2013. The City and County of San Francisco updated its 2004 Climate Action Strategy in 2013.

Discussion of Impacts:

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	X	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	X

a) Although actions to implement the TMDL are expected to generate intermittent, short-term greenhouse gas emissions related to construction, repair, and maintenance activities, the actions listed in Table 11.1 will not be large-scale, nor will they be associated with a permanent new emissions source, such as from a new transportation or energy project.

b) In addition, many of these implementation activities are required under existing State and Regional Water Board Orders. Therefore, implementation of the TMDL is expected to result in negligible GHG emissions beyond those that would have resulted from the baseline regulatory framework.

VIII. HAZARDS AND HAZARDOUS MATERIALS

Background

Hazardous materials can threaten human health and/or the environment through routine emissions and/or accidental releases. Hazardous materials include materials that are toxic, corrosive, flammable, reactive, irritating, and strongly sensitizing. According to the State of California, a hazardous material is defined as a substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either: 1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating irreversible illness; or 2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, or disposed of or otherwise managed. Hazardous waste (a subset of hazardous material) refers to a hazardous material that is to be abandoned, discarded or recycled.

Discussion of Impacts:

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	X

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	X	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code, section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	X

a) The TMDL is not expected to involve the routine transport, use, or disposal of hazardous materials. Therefore, no impacts from the use, transport or disposal of hazardous materials would result.

b) Actions to implement the TMDL, such as repair of pipelines and construction of stormwater facilities are not expected to result in upset or accident conditions involving the release of hazardous materials. Domestic sewage is not considered a hazardous material (Cal. Code Regs., tit. 22 § 66261.4(b)(2)). Laws and regulations restrict the manner of handling and disposal of sewage during repair and replacement of holding tanks and sewer pipes. Although small amounts of potentially hazardous solvents could potentially be used for repairs or minor construction, these materials must be handled in accordance with applicable laws and regulations, which would minimize hazards to the public or the environment and the potential for accidents or upsets. Therefore, implementation of the TMDL is not expected to create, increase, or otherwise impact a health risk from exposure to hazardous materials.

c) As indicated in response to item VIII b) above, actions to implement the TMDL would not be associated with emission or handling of hazardous materials or substances. Therefore, no impact from hazardous materials would occur within one-quarter mile of an existing or proposed school.

d) There are no sites located within the San Francisco Bay beaches' watersheds identified on the hazardous waste and substance material sites compiled pursuant to Government Code Section 65962.5 (Cortese List). Therefore, minor construction that may be undertaken to implement the TMDL would have no impact to hazardous waste sites.

e) There are no airports in the vicinity of the beaches requiring TMDL implementation actions. Therefore, the TMDL does not include actions that would result in a safety hazard for people residing or working within two miles of a public airport or vicinity.

f) There are no private airstrips are located near the beaches requiring TMDL implementation. Therefore, the TMDL would not result in the construction of buildings or other structures that could result in safety hazards for people residing or working near a private air strip.

g) Because implementation of the TMDL is not expected to generate hazardous wastes, the TMDL will not result in hazardous waste management activities that could interfere with any emergency response plans or emergency evacuation plans, and no impacts would result.

h) Implementation of the TMDL would not create or increase a risk of wildland fires. Therefore no impacts from wildfires would result.

XI. HYDROLOGY AND WATER QUALITY

Background

The watershed area of each of the San Francisco Bay beaches is predominantly urbanized and highly impervious, with the remainder comprised mainly of land used for recreation. As a result of the changes to hydrology from urban development, stormwater outfalls provide most of the flow to the beaches, with some localized overland flow.

The beaches are monitored weekly for bacteria indicators. Water quality at the beaches is presented in detail in Section 5.0 of this Staff Report.

Discussion of Impacts

	Potentially Significant	*Less Than Significant With Mitigation*	*Less Than Significant*	*No*

Issues:	*Impact*	*Incorporation*	*Impact*	*Impact*
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion of siltation on- or off-site?	☐	☐	X	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	X	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	X
f) Otherwise substantially degrade water quality?	☐	☐	☐	X
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	X

j) Inundation of seiche, tsunami, or mudflow?	☐	☐	☐	X

a) TMDL implementation actions listed in Table 11.1 would not result in violations of water quality standards or waste discharge requirements. The purpose of the TMDL is to attain applicable water quality standards, and implementation actions are expected to reduce bacteria densities at the beaches; therefore, the TMDL will not violate standards or waste discharge requirements.

b) The TMDL would not deplete groundwater supplies or interfere with groundwater recharge. No adverse impacts to groundwater would result.

c) Actions to comply with the TMDL could alter runoff patterns within urban areas if they increase the amount of urban runoff that is infiltrated or diverted to a treatment plant. Such actions would not alter the course of rivers or streams and would not include large scale grading, deep excavation, construction on unpaved areas, or vegetation removal. Implementation would not result in substantial erosion or siltation, either on- or off-site.

d) Compliance with the TMDL could involve minor construction and earthmoving, which would likely have minor effects on existing drainage patterns and the conveyance of urban storm water. Implementation actions could also include construction of drainage swales or other structures designed specifically to alter the flow of storm water. Such projects would be described in municipal storm water permit reports or enforcement order submittals that would be subject to Water Board review and/or approval; the board's staff will ensure that these projects are designed not to adversely affect upstream areas or contribute to flooding. Therefore, the TMDL would not result in significant impacts related to flooding.

e) TMDL implementation actions would be designed and intended to decrease peak runoff rates from upland land uses. Therefore, the bacteria TMDL would not increase the rate or amount of runoff or exceed the capacity of storm water drainage systems. No adverse impacts to channels would occur.

f) TMDL implementation actions are intended to reduce bacteria in the San Francisco Bay beaches' watersheds and improve water quality. No adverse water quality impacts would occur.

g-j) No new housing would be constructed as a result of the TMDL and no flood hazard would be created. Actions to implement the TMDL would not affect existing flood hazard areas or otherwise impede or redirect stream flows. As indicated in item IX d), actions taken to implement the bacteria TMDL are limited to minor construction to repair and replace pipelines and install other stormwater bacteria management features and would not create flooding hazards.

X. LAND USE AND PLANNING

Background

The San Francisco Bay beaches' watersheds are situated in densely populated, urbanized settings. The population of San Francisco is about 850,000. The city's principal planning document, the San Francisco General Plan, is updated periodically; for example, the Housing Element of the General Plan was updated in 2014, and the Environment Element was updated in 2004. The population of the City of San Mateo is about 100,000; its planning document, the City of San Mateo General Plan, “Vision 2030,” was updated in 2010.

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Physically divide an established community?	☐	☐	☐	X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	X

a) Implementation actions of the TMDL would include small-scale repairs and construction and would not physically divide any established community.

b) The TMDL is consistent with existing conservation policies and goals in both San Francisco and San Mateo’s general plans, and would not conflict with land use plans, policies, or regulations. Some actions to comply with TMDL requirements, such as detention basins or other stormwater facilities would be subject to regional or local agency review. Therefore, implementation actions would not conflict with local land use plans or policies.

c) Projects proposed to comply with the TMDL requirements would be implemented to improve water quality and would not conflict with habitat conservation plans or natural community conservation plans.

XI. MINERAL RESOURCES

Background

San Francisco and the City of San Mateo do not contain areas of mineral resources of local importance.

Discussion of Impacts

Less Than Significant

Issues:	*Potentially Significant Impact*	*With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	X

a-b) TMDL-related excavation and construction would be small in scale and would not result in loss of availability of any known mineral resources that would be of value to the region or the residents of the State.

XII. NOISE

Background

The City of San Mateo General Plan indicates that noise levels in the city exceed 60 decibels throughout most of the city. San Mateo's Municipal Code restricts the hours when construction activities can occur and the maximum noise levels that construction equipment can generate. (http://www.cityofsanmateo.org/DocumentCenter/Home/View/1888)

San Francisco's Noise Control Ordinance regulates prohibits noise that is loud, disturbing, unnecessary, and unusual and limits construction activities to the hours between 7:00 am and 8:00 pm.
(http://www.sfdpw.org/ftp/uploadedfiles/sfdpw/boe/manager/Noise_Control_Ordinance.pdf)

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	X	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	X	☐

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	X	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	X

a) To comply with the TMDL, specific projects could involve minor construction and earthmoving, as well as the use of some heavy equipment, including pump trucks, which could result in temporary ground-borne vibration or noise. These activities would typically last no more than a few days, and would be carried out in compliance with local noise and nuisance standards. Therefore, the TMDL would not result in substantial noise, and noise impacts would be less-than-significant.

b) The bacteria TMDL would not cause any permanent increase in ambient noise levels. Any noise would be short-term in nature.

c) As indicated in response to XI b) above, specific projects would have to comply with local noise standards and would not result in substantial noise impacts.

d) The TMDL would not result in increased population in the watershed and would not affect residents' or workers' exposure to airport noise.

e) The San Francisco Bay beaches' watersheds do not contain any private airstrips.

XIII. POPULATION AND HOUSING

Background

San Francisco has a population of about 850,000, living in 390,000 housing units, predominately multifamily units (http://quickfacts.census.gov/qfd/states/06/06075.html). San Francisco has experienced growth of approximately 45,000 inhabitants since 2010 (http://quickfacts.census.gov/qfd/states/06/0667000.html). The City of San Mateo has a population of about 100,000 living in about 40,000 housing units, split between single-family and multifamily houses. The City has experienced about 8% growth since 2000. (http://www.cityofsanmateo.org/DocumentCenter/View/3937)

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	X
b) Displace substantial existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X
c) Displace substantial numbers of people necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X

a) The TMDL would not result in population growth. It would not induce growth through construction of new housing or businesses, or by extending roads or infrastructure.

b) The TMDL would not affect the population of the beaches' watersheds. It would not displace any existing housing or any people who would need replacement housing, and no adverse housing impacts would occur.

c) The TMDL would not displace people or create a need for construction of replacement housing.

XIV. PUBLIC SERVICES

Background

The City of San Mateo and the City and County of San Francisco provide police and fire protection, recreation services, public works, and city management as, well as K-12 and higher education.

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant				

environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	X
Police protection?	☐	☐	☐	X
Schools?	☐	☐	☐	X
Parks?	☐	☐	☐	X
Other public facilities?	☐	☐	☐	X

a) The TMDL would not affect any governmental facilities or service ratios, response times, or other performance objectives for any public services, including fire protection, police protection, schools, or parks.

XV. RECREATION

Background

The San Francisco Bay beaches provide valuable recreation opportunities in a densely populated region. The beaches are used by waders, swimmers, sun bathers, wind surfers, walkers, runners, and kayakers.

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	X

a) Projects to implement the TMDL could include minor excavation and grading to repair or replace sewer pipes and installation of additional pet waste receptacles at the beaches and in parks and open space. However, these activities would not result in physical deterioration of park or recreational facilities. No recreational facilities would need to be constructed or expanded. Therefore, no recreational impacts would occur.

b) The TMDL would not result in the need for construction or expansion of recreational facilities that could have an adverse effect on the environment. Any short-term changes would be less than significant.

XVI. TRANSPORTATION / TRAFFIC

Background

Each of the San Francisco Bay beaches is located off Highway 101, which experiences high traffic volumes on a regular basis. Traffic is a lesser concern on the arterial routes to the Marina Lagoon beaches, but can be significant for the other beaches, although the impact that redevelopment of the Candlestick Arena property will have is not yet known.

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	X
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	X
e) Result in inadequate emergency access?	☐	☐	☐	X
f) Result in inadequate parking capacity?	☐	☐	☐	X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	X

a) Actions to implement the TMDL could result in minor construction requiring the use of heavy equipment to repair sewer pipelines and construct stormwater facilities. Any increase in traffic would be temporary and would be limited to local areas and would not create substantial traffic in relation to the existing load and capacity of existing street systems.

b) Because the TMDL would not increase population or provide employment, it would not generate any ongoing motor vehicle trips and would not affect level of service standards established by the county congestion management agency. Therefore, the TMDL would not result in permanent, substantial increases in traffic above existing conditions. Impacts would be less than significant.

c) The TMDL would not affect air traffic and no impacts are anticipated.

d) The TMDL does not include provisions for construction of new roads. No new hazards due to the design or engineering of the road network in the San Pedro watershed would occur.

e) The TMDL would not result in changes to roads used for emergency access. Therefore, the project would not result in inadequate emergency access.

f) Because the TMDL would not increase population or provide employment, it would not affect parking demand or supply.

g) Because the TMDL would not generate ongoing motor vehicle trips, it would not conflict with adopted policies, plans, or programs supporting alternative transportation.

XVII. UTILITIES AND SERVICE SYSTEMS

Background

The San Francisco Bay beaches are within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board, lead agency for this TMDL. The Water Board regulates waste water and storm water quality. Solid waste collection, recycling, and waste disposal are provided by Recology of San Mateo and Recology San Francisco.

Discussion of Impacts

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	X	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	X	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	X
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in				

addition to the provider's existing commitments?	☐	☐	X	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	X
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	X

a) The project would amend the Basin Plan, which is the basis for wastewater treatment requirements to improve water quality and the environment in the Bay Area; therefore, the TMDL would be consistent with such requirements.

b) The TMDL includes changes to local wastewater collection and conveyance systems but does not require construction of any new wastewater treatment facilities.

c) TMDL implementation actions could result in improvements to urban storm water runoff systems designed to reduce bacteria discharges to San Francisco Bay beaches. These improvements could include small stormwater detention ponds, holding tanks, or treatment wetlands. It is likely that stormwater facilities would be constructed at the bottom of the collection system, in the low-lying areas. The need, location and design of such facilities have not been determined, so it is not possible to evaluate specific impact at this time. Future projects to improve stormwater quality would be subject to environmental analysis pursuant to City of San Mateo or San Francisco regulations, and would be reviewed by state, local, and federal resources agencies, including the Water Board.

d) Because the TMDL will not increase population or provide employment, it will not require ongoing additional water supply or entitlements.

e) Because the TMDL addresses a pollution problem linked to the wastewater conveyance system, not the treatment plants themselves, compliance would not require any increased wastewater treatment capacity or construction. Implementing parties may choose to divert stormwater to a wastewater treatment plant but are not required to do so by the TMDL. Before making this determination, the implementing party would determine whether resultant additional flow is within the capacity of the treatment plant.

f) TMDL implementation would not substantially affect municipal solid waste generation or landfill capacities. No impacts would occur.

g) TMDL implementation would not substantially affect municipal solid waste generation or landfill capacities and no impacts would occur.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

Issues:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	X
b) Does the project have impacts that are individually limited, but cumulatively considerable when viewed in connection with the effects of past, current, and probable future projects)?	☐	☐	☐	X
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	X

a) Taken as a whole, the TMDL would not degrade the quality of the environment. The proposed TMDL is intended to benefit water quality and the future of recreational uses in San Francisco Bay beaches.

b) As discussed above, the TMDL could pose some less-than-significant adverse environmental impacts related to minor sewage system repair, replacement, and re-construction, and other small construction projects, such as stormwater retention facilities. These impacts from repair and construction activities would be individually limited and of short-term duration. Therefore, these future projects would not lead to cumulatively considerable significant impacts.

c) The TMDL would not cause any substantial adverse effects to human beings, either directly or indirectly. The TMDL is intended to benefit human beings through implementation of actions to improve water quality in San Francisco Bay beaches.

11.2.6 Cumulative Impact Analysis

This section provides an analysis of the significant cumulative impacts of the proposed basin plan amendment (Cal. Code Regs., tit. 14 §15130). Cumulative impacts refers to “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.”

The cumulative impact here is the overall positive change in the environment that results from the incremental impact of closely related past, present and reasonably foreseeable probable future projects to reduce bacteria in the watersheds of the San Francisco Bay beaches during the period of implementation.

Individual TMDL implementation actions would not result in significant adverse impacts to the environment and no cumulative adverse impacts are anticipated. This analysis considers past, present, and reasonably foreseeable future projects, including projects that would involve substantial changes to urban stormwater infrastructure in the San Francisco Bay beach watersheds covered by the proposed Basin Plan amendment.

For instance, projects implemented to comply with Regional Water Board Cease and Desist Order for the City of San Mateo's Wastewater Discharges would also contribute to compliance with the TMDL, and would not adversely affect water quality or the environment. Other future Water Board regulations or enforcement actions would improve overall water quality in the beaches' watersheds and could include implementation actions that would further reduce bacteria in the beaches.

The cumulative impact of the TMDL with these other projects would be beneficial to the environment and would not result in significant adverse environmental impacts. Our review of other planned, proposed, and ongoing projects reveals none that would lead to significant environmental impacts.

11.3 Alternatives Analysis

This section presents three Program Alternatives that encompass actions within the jurisdiction of the Water Board and implementing parties. An evaluation of the alternatives is required under California Code of Regulations, title 14, section 15252, subdivision (a)(2)(A) in order to avoid or reduce any significant or potentially significant effects on the environment.

The program alternatives that we have considered are:

1. The bacteria TMDL as it is proposed for Water Board adoption;
2. A bacteria TMDL with longer implementation time frames; and,
3. A "No TMDL" alternative in which a bacteria TMDL is not implemented.

Because a TMDL is required by Section 303(d) of the Clean Water Act, the "No TMDL" alternative is only analyzed to allow decision makers to compare the impacts of approving a proposed alternative and its components compared with the impacts of not approving a proposed alternative. The specifics of the many projects which would make up a program alternative are discussed in detail in Section 10 (summarized in Table 11.1) and include structural and nonstructural bacteria control measures that are reasonably foreseeable to be implemented under the bacteria TMDL program alternatives.

The components assessed at a program level generally are program elements that would be implemented as part of the bacteria TMDL, but these elements do not have specific locations or design details identified. The components assessed at a project level have specific locations which will be determined by implementing parties. The project-level components will be subject to additional future environmental analysis, including review by cities and municipalities implementing bacteria control projects.

11.3.1 Alternative 1 – Water Board TMDL as Proposed

This program alternative is based on the TMDL that is presently proposed for Water Board consideration. The TMDL assigns both wasteload allocations and load allocations The wasteload allocations will achieve reductions in bacteria discharges from stormwater runoff and dry-weather flows and will be implemented through Municipal Regional Stormwater NPDES Permit; the NPDES Permit for Small Municipal Separate Storm Sewer Systems; and enforcement actions. The TMDL load allocations will achieve reductions of bacteria from sanitary sewer systems. The load allocations will be implemented through ongoing enforcement actions and new enforcement actions as needed.

The Water Board TMDL provides a plan for addressing the adverse impacts of bacteria in the San Francisco Bay beaches. The plan uses a phased approach in which anthropogenic sources and controllable wildlife sources of bacteria are fully addressed before bacteria contributions from background sources such as wildlife, soil, sediment, and vegetation are investigated. This approach ensures that beach water quality is improved as quickly as possible and to the extent possible through reduction of common urban sources of bacteria, while allowing impementing parties to assess natural bacteria sources over the longer term.

The TMDL proposes a five to ten year schedule for compliance with allowable exceedances at the beaches based on the complexity of sources and cost of controlling them at each beach. Once adopted into the Basin Plan, load and wasteload allocations will be considered in in other permitting and regulatory actions by the Water Board.

Although the Water Board cannot mandate the manner of compliance, foreseeable environmental impacts from methods of compliance are well known. During the development of the TMDL, a CEQA scoping meeting was held during which the manner of compliance was discussed and reasonably foreseeable means of compliance were examined.

This TMDL program alternative anticipates compliance through implementation of control measures as discussed in Section 10 and summarized in Table 11.1. Potential adverse impacts to the environment stem principally from the installation, operation, and maintenance of these control measures. This document analyzes these impacts and concludes that they will be relatively short-term and typical of baseline construction and maintenance projects that occur presently in the TMDL area. The document also concludes that the TMDL implementation projects will not cause significant adverse impacts to the environment either individually or cumulatively.

11.3.2 Alternative 2 – TMDL with Longer Implementation Time Frames

Under this alternative, compliance with the proposed pollutant load allocations would be phased in over a longer period of time (i.e., ten to twenty years) than what is currently proposed by the Basin Plan amendment. Therefore, attainment of water quality standards would take a longer period of time.

This alternative would not meet the project objectives because it would not attain standards in the shortest time frame possible. Further, many of the proposed implementation actions are and have been required under various existing regulatory programs. Therefore, their implementation should be already underway, making a longer implementation time frame unnecessary. Further, implementing parties have begun to take actions independently in order to improve beach water quality.

11.3.3 Alternative 3 – No TMDL

This program alternative assumes that the Water Board would not implement a bacteria TMDL. While responsible parties could implement bacteria control measures on a discretionary basis, this CEQA analysis is based on the assumption that no additional bacterial control measures would be implemented in addition to those that are presently in place. However, the “No TMDL” alternative is contrary to state and federal laws, which require TMDL implementation. Therefore, the failure to implement a bacteria TMDL is unlawful.

In addition, while impact to the environment from construction or maintenance of structural BMPs would be avoided in this “No TMDL” alternative, this alternative would not restore beneficial uses in these San Francisco Bay beaches: Aquatic Park, Candlestick Point Park, Crissy Field, and Marina Lagoon beaches. TMDL program alternative 1 or 2 will restore water quality to meet beneficial uses in these beaches. As such, both program alternatives 1 and 2 represent a benefit to the environment and the No TMDL program alternative represents a continued bacteria impairment of the environment.

11.3.4 Recommended Program Alternative

This environmental analysis finds that Program Alternative 1 is the most environmentally advantageous alternative.

Alternative 3 is not a feasible alternative. While it avoids potential impacts due to discrete implementation projects, bacterial impairment of San Francisco Bay beaches will continue. Both program alternatives 1 and 2 will comply with the law and remove the bacterial impairment in the beaches.

11.4 Economic Considerations

The objective of this analysis is to estimate the costs of various implementation measures for bacteria reduction in the watersheds draining to San Francisco Bay beaches. The implementation plan calls for reductions in the discharge of bacteria from sanitary sewer systems and urban runoff. This report’s implementation section (Section 10) describes possible implementation measures that may be used to control each potential bacteria source.

The discussion of economic considerations or costs associated with various measures described in the implementation Section is limited to those actions that are currently technically feasible and reasonably likely to be implemented by dischargers. The TMDL is not prescriptive; no specific actions to achieve the numeric targets are required. Rather, dischargers are allowed to independently select implementation actions that will allow them to meet their allocations, based on their own considerations of need, budget, feasibility, or other criteria.

This section provides cost estimates for each reasonably foreseeable TMDL implementation measure. In most cases, specific elements of the implementation action will be determined at some point in the future, and therefore the specifics are unknown. In other cases, where it is possible to make educated guesses about the likely elements of an implementation action, cost estimates are included. In instances where estimating the elements of a program would be decidedly speculative, no cost estimates are developed. Costs of implementing existing requirements are also not included in this report.

In reviewing the cost estimates, it should be noted that there are multiple additional benefits associated with the implementation of these strategies. For example, many of the structural and non-structural BMPs to address bacteria loading would also reduce the loading of other contaminants, which could assist in protecting other beneficial uses of the beaches. Furthermore, nothing in this TMDL suggests that structural BMPs should be installed at every possible location across each beach's watershed. Structural BMPs should be installed at strategic locations to treat urban runoff at locations where the benefit of treat is expected to be maximized and most costs-effective. Thus, costs are generally presented as per acre of treated drainage area.

A summary of the estimated cost ranges for each reasonably foreseeable TMDL implementation measure is given in Table 11.4.

Table 11.4 Summary of Potential Cost Ranges of Implementation

Implementation Action	Cost – low	Cost - high	Units
Sanitary sewer collection system repair	Previously required No additional cost	Previously required No additional cost	Not applicable
Nonstructural controls (enhanced O&M, pet waste and litter programs)	$161,000		Combined watersheds of Aquatic, Candlestick, Crissy & Marina Lagoon Beaches
Vegetated treatment system – residential area	$7,000	$9,000	Per acre of impervious area treated
Vegetated treatment system – commercial/industrial area	$17,000	$72,000	Per acre of impervious area treated
Local infiltration systems	$75,000	$250,000	Per 25,000 sq.ft. installed
Rainwater capture	$0.40	$4.00	Per gallon of rain water captured; labor not included
Media filtration, sand filter	$10,000	$16,000	Per 5 acres of drainage area
Diversion / treatment	$78,000 annualized capital cost $69,000 annualized operating costs		One low-flow storm drain diversion.
Control nuisance wildfowl at beach	$20,000	$40,000	Per beach per year
Inspection and repair of marina sewage collection equipment/piping	$400	$33,500	Per pumpout station
Water Quality Monitoring	$3,000	$10,000	Per beach, to add upland bacteria monitoring to existing monitoring programs

11.4.1 Sanitary Sewer Collection Systems

Sanitary sewer collection system repairs or replacements may be necessary at all of the beaches in order to meet the TMDL's numeric targets, as described in the implementation section (Section 10). For the Marina Lagoon beaches, collection system repair/replacement has been required since 2009 by the San Francisco Bay Water Board's Cease and Desist Order for the City of San Mateo (Order No. R2-2009-0020); thus the TMDL does not require additional actions and no additional costs will be incurred.

For Aquatic Park and Crissy Field beaches, the San Francisco Public Utility Commission (SFPUC), Presidio and Port of Oakland are covered under the Statewide General Waste Discharge Requirements for sanitary sewer systems (Order No. 2006-0003-DWQ). As a result, these entities are required to prepare and implement Sewer System Management Plans (SSMPs). A SSMP requires measures to contain sanitary sewer overflows, identify structures needing repair, and develop a preventive maintenance program. Requirements also include monitoring the effectiveness of each SSMP element, and submitting annual reports), and thus the TMDL does not require additional actions and no additional costs will be incurred.

For the Candlestick Point beaches, repairs may be necessary within Candlestick Point State Recreation Area. The California Department of Parks and Recreation operates this Recreation Area, and is in the process of applying for coverage under the Statewide Waste Discharge Requirements for sanitary sewer systems (Order No. 2006-0003-DWQ). The Basin Plan amendment would not impose any new requirements or actions for sanitary sewer systems; therefore, no additional costs to sanitary sewer collection agencies would be incurred as result of this Basin Plan amendment.

11.4.2 Urban Runoff

Approximate costs associated with typical best management practices (BMPs) that might be implemented in order to attain this TMDL's numeric targets are provided below, including both non-structural and structural BMPs. For the purposes of the cost analysis, costs for structural BMPs are estimated for general BMP types, which could be scaled up or down depending on if sub-regional or regional BMPs were implemented. In all cases, land acquisition costs were excluded from the cost estimate, and costs are given in 2015 dollars.

11.4.2.1 Non-Structural BMPs

The costs for a number of non-structural source control measures have been estimated for the entire Los Angeles Region (Devinny et al. 2004), which has an area of 3,100 square miles. The source control measure costs for the San Francisco Bay beaches' watersheds were scaled down proportionally. The approximate areas of the beaches where implementation actions are necessary are as follows:

- Aquatic Park Beach – 0.02 square mile
- Candlestick Point Beaches – 0.2 square mile
- Crissy Field Beach East – 1 square mile; Note that Crissy Field West meets the TMDL numeric target and thus pollution controls are not needed in its watershed.

- Marina Lagoon Beaches – 10 square miles

The approximate costs for implementing non-structure urban runoff controls across each of the beaches' watersheds are as follows:

- Enforcement of litter and pet waste ordinances - $12,000 per year
- Improved Public education - $6,700 per year
- Increased storm drain cleaning - $36,000 per year
- Enhanced Illicit discharge detection and elimination – $106,000

Summary: Estimated Annual Costs: $161,000 per year

11.4.2.2 Vegetated Treatment Systems

Vegetated treatment systems, often referred to as bioretention cells, include curb planters (curb extensions), bioswales, and infiltration planters. The Alameda Countywide Clean Water Program (ACCWP) estimates that bioretention areas should be sized at about 4% of the contributing impervious area, or 1,740 square feet of bioretention per acre of impervious surface treated (ACCWP 2012). The 2003 CASQA BMP Handbook for New Development and Redevelopment estimates bioretention costs at about $4.00 to $5.20 per square foot for residential and as much as $10-41.50 per square foot of bioretention cell constructed for commercial and industrial land use (adjusted to 2015 dollars). After adjusting for inflation, in 2015 dollars, the bioretention cost is about $7,000 to $9,100 per acre of impervious surface treated in residential areas, or about $17,000 to $72,000 in certain industrial and commercial settings. The cost for retrofitting a site is typically more because of the need to remove existing asphalt, concrete, paving, drainage structures. For new construction, however, some cost savings may accrue due to avoiding or reducing construction of traditional underground storm drain infrastructure.

11.4.2.3 Local Infiltration Systems

The installed costs per square foot of permeable paver materials can range from $0.50-1.50 for asphalt pavement; $2.50-8.50 for porous concrete; $2.00-7.75 for grass or gravel pavers, and $6.50-14.00 for interlocking concrete paving blocks (Low Impact Development Urban Design Tools 2015). Little data are available for life cycle costs, but maintenance by period cleaning is necessary to maintain system effectiveness.

Permeable infiltration systems would be most cost-effective if located strategically, such as at parking areas and walkways surrounding the beach. Assuming a range of $3.00-10.00/sq.ft. to install infiltrating pavement on a total of 25,000 sq.ft. across the affected watersheds, the estimated construction cost would range from $75,000 to 250,000.

11.4.2.4 Rainwater Capture

Rain barrels and cisterns can be installed to capture stormwater runoff from rooftops and store it for later use to irrigate landscapes. Costs vary between manufacturers, but the Low Impact Development Center (2015) provides the general cost estimates for single rain barrel roof top water catchment system, pre-manufactured cisterns and constructed cisterns. Cost estimates for cisterns follow:

Rain Barrel: $220 plus labor for 55 gallon barrel and accessories;

Pre-manufactured Cistern: approximately $100 per 100 gallons of capacity for steel and polyethylene tanks, $50 per 100 gallons of capacity for fiberglass; plus labor and associated piping;

Manually Constructed Cistern: $1200 plus labor and associated piping for a 3000 gallon unit; and

Summary: Rainwater capture systems range in cost from $0.40/gallon (manually constructed cistern) to $4.00/gallon (rain barrel) plus labor for installation and associated piping.

11.4.2.5 Media Filtration Systems

The construction cost of a sand/organic filter system depends on the drainage areas, expected efficiency, and other design parameters, but ranges from $10,000 to $16,000 (2015 dollars) to treat a drainage area of 5 acres or less (LARWQCB 2010). Annual maintenance costs average approximately 5% of construction costs.

11.4.2.6 Diversion to Sanitary Sewer for Treatment

The Santa Clara Estuary River Bacteria TMDL estimated the annualized capital cost to construct 10 low-flow storm drain diversions at $783,000 (2015 dollars), assuming financing for 20 years at 7 percent (LARWQCB 2010). It also estimated the operation and maintenance costs for 27 existing diversions at $1.7 million. From these estimates, we can estimate the annualized capital and operation and maintenance costs for a single low-flow diversion as follows:

- Annualized Capital Costs - $78,000
- Operation and Maintenance Costs - $69,000 per year.

11.4.3 Control Wildlife at Beach

Because control of pets at the beach is included in Section 11.4.2.1 Non-Structural BMPs, only the costs of controlling wildfowl are estimated here. In 2015 the City of San Mateo conducted a comprehensive pilot program to control geese at its two beaches. Pilot program actions included weekly inspections; excrement removal; raking tideline algae; adjusting mowing, fertilization, and watering schedules at adjoining parks; goose population control (addling eggs); and public outreach. To date, based on the pilot program, the annual cost is $20,000 per beach (Rudnicki 2015). To allow for contingencies and beach-specific added costs, such as increased goose activity, public outreach, mileage costs, inter-agency coordination, the annual cost range for controlling wildlife at a beach is $20,000 to $40,000.

11.4.4 Vessels *(Recreational, Anchor-out, Live-aboard Boats)*

Where vessel pumpout stations are a suspected source of bacteria, marina owners would need to inspect the existing sewage pumpout and dump stations at marinas. This type of evaluation could be performed by a qualified contractor at a cost of between $250 and $350 per station.

A comprehensive evaluation of vessels' sewage collection systems would also include a program for inspection of the holding tanks and discharge valves for those vessels with a head facility. However, the specifics of this program have not yet been determined, and therefore, no cost estimates have been developed for this element of vessels' sewage collection systems evaluation.

Estimates for repair and maintenance for sewage dump stations range from $125 - $650. Estimates for repair and maintenance of sewage pump-out stations range from $125–$25,000, depending on the complexity of any needed replacement parts (Department of Boating and Waterways, 2004).

11.4.5 Costs of Monitoring

Weekly monitoring of each beach is ongoing and does not represent a new cost under this TMDL. However, additional upland creek or storm drain monitoring may be needed to detect and monitor sources of bacteria to the beaches, particularly at Crissy Field and San Mateo Lagoon beaches, which have large land areas discharging to the vicinity of the beach. The specifics of this monitoring, such as the exact number of monitoring stations and sampling frequency, have not yet been determined. For the purpose of a cost estimate, it is assumed that in addition to the existing water quality monitoring conducted at the beaches, 5 different upland creek reaches will also be monitored for Crissy Field Beach and 5 for San Mateo Lagoon beaches. Based on the prices for bacteriological analyses provided by a local laboratory, the cost per sample for analyzing Enterococcus is $55. Assuming a monitoring frequency of 5 times a month for each monitoring site, twice a year, the annual cost for additional upland monitoring is estimated at $2,740 to $8,250 as shown in Table 11.5 below.

Table 11.5 Water Quality Monitoring Cost Estimate

Activity	Unit Cost	Cost/Beach
Collecting and transporting samples by lab personnel (1)	$500	$500
Reviewing lab reports by in-house staff	$0	$0
Interacting with lab by City/County staff	$0	$0
Laboratory Analysis	$55/sample	$275
Basic reporting of data by lab (2)	$0	$0
Data analysis by City/County staff	$0	$0
Analysis, interpretation, and certified reporting of results by lab	$150	$150
Millage for sample transportation by City/County staff	$0.6/mile	$30
Total Cost Range One Sampling Event (5 samples, 1 location)		$300(3) to $1000(4)
Total Cost Range For Ten Sampling Events (5 samples each, 5 locations, twice/year)		$3,000(3) to $10,000(4)

1. Sample collection, transport, and all supplies are included as one lump sum cost if they are to be completed by the laboratory.

2. Basic reporting of results is included in the sample analysis cost and is expected to be sufficient for the purposes of the proposed monitoring.
3. Estimated cost if sample collection and transportation, and data analysis is conducted by City/County staff.
4. Estimated cost if samples collection and transportation and data analysis and certified reporting is conducted by the lab personnel.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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San Francisco, CA 94105-3901

FEB 24 2017

Bruce H. Wolfe
Executive Officer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612

Subject: Approval of San Francisco Bay Beaches TMDL

Dear Mr. Wolfe:

On January 9, 2017, the San Francisco Bay Regional Water Quality Control Board (Regional Board) requested EPA approval of the Total Maximum Daily Load (TMDL) for indicator bacteria in the following San Francisco Bay Beaches: Aquatic Park Beach, Candlestick Point Beaches, Crissy Field Beach, China Camp Beach, McNears Beach and Marina Lagoon Beaches. These beaches have been identified under federal Clean Water Act Section 303(d) as impaired water bodies due to bacteria. The TMDL, upon completion, will result in the attainment of the bacteria water quality objectives for the San Francisco Bay Beaches. EPA hereby approves the San Francisco Bay Beaches TMDL pursuant to Clean Water Act Section 303(d).

The State took action on the TMDL on the following dates:

- On January 15, 2016, the Regional Board public noticed the proposed TMDL, Basin Plan amendment and supporting materials for public review and comment. The comment period closed on February 29, 2016.
- On April 13, 2016, the Regional Board approved the TMDL and Basin Plan amendment (R2-2016-0021).
- On May 25, 2016 the State Water Resources Control Board (State Board) public noticed the TMDL and Basin Plan amendment. The comment period ended on June 30, 2016.
- On August 16, 2016, the State Board approved the TMDL and Basin Plan amendment (2016-0046).
- On December 13, 2016, the TMDL and Basin Plan amendment was approved by California's Office of Administrative Law.

The TMDL appropriately considers the use of the bacterial objectives for enterococcus to develop numeric targets and load and waste load allocations to protect recreational uses at the San Francisco Bay Beaches. In addition, the TMDL appropriately considers seasonal variation and critical conditions, and provides an adequate margin of safety. EPA finds the State's TMDL submittal and public engagement process to be comprehensive, reasonable and appropriate.

Implementation of the TMDL is a critical next-step to realize water quality improvements in these San Francisco beaches. EPA is available to support the Regional Board and the regulated community in achieving the objectives in the TMDL. If you have any questions concerning this approval, please call me at (415) 972-3337 or Terry Fleming at (415) 972-3462.

Sincerely,

Tomás Torres February 24, 2017
Director, Water Division

cc: Naomi Feger, RWQCB2
Janet O'Hara, RWQCB2
Rik Rasmussen, SWRCB

Appendix C
Response to Comments

California Regional Water Quality Control Board
San Francisco Bay Region

RESPONSE TO WRITTEN COMMENTS
On the Reissuance of an NPDES Permit for Discharges from the
San Francisco Southeast Water Pollution Control Plant, North Point Wet Weather Facility,
Bayside Wet Weather Facilities, and Wastewater Collection System

The Regional Water Board received written comments from the City and County of San Francisco, U.S. EPA, and the Bay Area Clean Water Agencies on a tentative order distributed for public comment. This response to those comments summarizes each comment in *italics* (paraphrased for brevity) followed by a staff response. Revisions are shown with ~~strikethough~~ for deletions and underline for additions. For the full content and context of each comment, refer to the comment letters.

CITY AND COUNTY OF SAN FRANCISCO

City General Comments
San Francisco's combined system provides tremendous protection to San Francisco Bay. *The City points to water quality improvements due to construction of large transport/storage units that have markedly decreased the volume and frequency of combined sewer discharges.*

San Francisco is committed to improving wet weather performance through the implementation of Green Infrastructure. *The City commits to increasing the area for stormwater capture and recharging the groundwater aquifer before stormwater enters the transport/storage units as part of a long-term program to replace aging infrastructure.*

The Receiving Water Limitation language is inappropriately applied to wet weather discharges. *The City's greatest concern is that Receiving Water Limitation V.C of the tentative order could expose it to potential permit violations. The City points to a 1979 order finding that beneficial uses would be protected if the City constructed a storage system and introduced baffles and other means to collect floatables at its combined sewer discharge points. It says the City built the system as agreed. The City says requirements to operate the system are narrative water quality-based effluent limitations for wet weather. It claims Basin Plan section 4.9.1 codifies this approach, recognizing that numeric limits cannot be readily established due to the unpredictability of storms. The City says the receiving water limit broadly prohibits all discharges that cause violations of water quality standards, regardless of wet or dry conditions. The City claims this requirement is inconsistent with U.S. EPA's* Combined Sewer Overflow (CSO) Control Policy *and the Basin Plan. It claims the receiving water limit is unnecessary because the narrative effluent limitation is sufficient to protect beneficial uses.*

The City asserts that the proposed receiving water limitation could be interpreted to prohibit any exceedance of any numeric water quality criteria, regardless of duration or spatial extent. It *claims compliance with such a requirement is impossible because of the variable characteristics of stormwater flows and the impossibility of constructing sufficient storage or treatment capacity to manage all storms of all sizes. The City also says studies show that its combined sewer discharges have little impact on water quality and recreational uses. The City includes more detailed comments among its specific comments below.*

Response to City General Comments
The City's first and second general comments do not require a response. However, we disagree with the third comment, i.e., that the tentative order inappropriately applies receiving water limitations to wet weather discharges. In accordance with the federal Clean Water Act (CWA) and regulations adopted thereunder, including U.S. EPA's *Combined Sewer Overflow (CSO) Control Policy*, Receiving Water Limitation V.C states our expectation that the City's operations will protect and maintain water quality standards in the waters that receive its discharges. This is the premise upon which we have based all the permit's provisions.

The *Combined Sewer Overflow (CSO) Control Policy* requires control of combined sewer discharges sufficient to maintain water quality standards. As outlined in the policy, the tentative order establishes implementation of the City's Long-Term Control Plan as a narrative water quality-based effluent limitation necessary to maintain water quality standards. Consistent with the policy, we presume that implementation of the Long-Term Control Plan is sufficient to maintain water quality standards. However, the policy explicitly requires our presumption to be reasonable and supported by evidence obtained through post-construction compliance monitoring. The tentative order requires such monitoring.

Like nearly all individual NPDES permits in the San Francisco Bay Region, the tentative order contains a broad receiving water limitation that prohibits discharges that cause violations of water quality standards. This limitation serves as a backstop in the event that our presumption regarding the adequacy of the Long-Term Control Plan proves to be incorrect. The City's proposed changes to that limitation (see City Comment 5) would gut the provision and render it meaningless and superfluous in light of other permit requirements.

The tentative order is wholly consistent with the description of how the Regional Water Board regulates these discharges. Basin Plan section 4.9.1 states, in part, "the CSO Control Policy requires immediate compliance with water quality standards expressed in the form of a narrative limitation." The 1979 order the City cites is an expired permit superseded many times over by other permits, including the current one to be reissued. It is worth noting, however, that the 1979 order contains nearly word-for-word the same provision as the City objects to today.

Finally, the City's comments are contradictory. While the City asserts that its discharges have little impact on beneficial uses, it also expresses concern about its ability to prevent violations of water quality standards. It worries specifically about how the receiving water limit might be interpreted and enforced. The Regional Water Board will interpret and enforce all requirements judiciously. We address the City's specific comments on this matter in our responses to City Comments 5, 5.1, 5.2, 5.3, 5.4, 5.5, and 5.6 below.

City Comment 1

The specific and limited* new *language regarding enforcement with the previous permit should be removed. *The City notes that the tentative order contains new language clarifying that, if there is a stay of any part of the order, the City must comply with the analogous portion of the previous order. The City asserts that this provision does not allow for changed conditions that could render compliance with the previous order infeasible. The City also asserts that this is not required under federal law; therefore, we must provide an economic analysis pursuant to Water Code section 13241. The City proposes deletion.*

Response to City Comment 1

We disagree. This provision is necessary to ensure that appropriate requirements are in place if there is a temporary stay of the order or any of its provisions. (This provision also appears in the most recent statewide template for NPDES permits.) Without it, discharges could be regulated inadequately in the event of a stay. We reviewed the tentative order and the previous order side-by-side and concluded that there is little potential for confusion over what is analogous text. Most headings and subheadings are essentially the same. Nevertheless, for clarity, we revised the provision as follows:

> THEREFORE, IT IS HEREBY ORDERED that Order No. R2-2008-0007 (previous order) is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions of Water Code division 7 (commencing with § 13000) and regulations adopted thereunder, and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the Regional Water Board from taking enforcement action for past violations of the previous order. If any part of this Order is subject to a temporary stay of enforcement, unless otherwise specified, the Discharger shall comply with the analogous portions of the previous order, <u>to the extent analogous portions exist,</u> which shall remain in effect for all purposes during the pendency of the stay.

This provision does not require any special analysis pursuant to Water Code section 13241. The Water Code only requires an economic analysis where numeric limitations are more stringent than those required under federal law. As explained in Fact Sheet section IV.D.3, the tentative order's requirements are no more stringent than those required under federal law. The City has provided no evidence that imposing the limits in the previous order could involve any new economic considerations or that any economic considerations justify allowing an inadequately regulated discharge of a pollutant that could cause or contribute to a violation of water quality standards.

City Comment 2

It appears there was an oversight in that silver is shown as having effluent limits in Table 4. *The City notes that the reasonable potential analysis shown in Fact Sheet Table F-9 indicates there is no reasonable potential for silver. The City proposes deleting the silver effluent limits.*

Response to City Comment 2
We agree. We revised Table 4 as follows:

Table 4. Effluent Limitations—Dry Weather

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
⋮						
Copper, Total Recoverable	µg/L	53	---	76	---	---
~~Silver, Total Recoverable~~	~~µg/L~~	~~7.3~~	~~---~~	~~22~~	~~---~~	~~---~~
Cyanide, Total	µg/L	20	---	43	---	---
⋮						

City Comment 3
The continuous chlorine residual monitoring provision should specify use of reliable data. *Table 4 Footnote 2 and Table 5 Footnote 1 describe continuous monitoring requirements for chlorine. The City notes that wet chemistry analytical methods are more accurate and reliable than continuous monitoring methods. The City requests that the Regional Water Board limit its right to consider all continuous monitoring data for discretionary enforcement to all "reliable" data.*

Response to City Comment 3
We disagree. This text reserves for the Regional Water Board the right to evaluate all monitoring data when considering discretionary enforcement. (It also appears in permits the Regional Water Board has adopted in recent years.) The Regional Water Board may choose not to pursue enforcement if data appear to be unreliable.

City Comment 4
Language in the Receiving Water Limitations should be changed to clarify that the dry weather discharge will not alter certain conditions **outside the zone of dilution.** *The City notes that within the dilution zone, effluent and receiving water typically have different temperature, turbidity, and apparent color. The City proposes to modify Receiving Water Limitation V.A.3.*

Response to City Comment 4
We agree and see no reason to restrict this change to Receiving Water Limitation V.A.3. We incorporated changes into revisions shown in our response to City Comment 5.6.

City Comment 5
The Receiving Water Limitations language should be modified to provide consistency between those provisions and the specific water quality based limitations in the draft permit. *The City proposes to revise Receiving Water Limitation V.C. The City claims the following changes are necessary to remove confusion and contradictory language regarding which water quality standards could provide a basis for permit violation in wet weather:*

> *The discharge shall not cause a violation of any* <u>*applicable*</u> *water quality standard for receiving water adopted by the Regional Water Board or the State Water Board as required by the CWA and regulations adopted thereunder. If*

> *more stringent water quality standards are promulgated or approved pursuant to CWA section 303, or amendments thereto, the Regional Water Board may revise or modify this Order in accordance with the more stringent standards.*
>
> *<u>Applicable standards during dry weather are those for which this order establishes effluent limitations following the procedures in the State Implementation Policy and identified in Section IV.A. A violation is established by the exceedance of a water quality-based effluent limitation established in this order.</u>*
>
> *<u>During wet weather, applicable standards consist of implementation of San Francisco's long-term control plan (LTCP) as described in Sections 4.9.1 of the Basin Plan and identified in Order Section VI.C.5. A violation is established by not fully implementing the LTCP.</u>*

The City claims that the proposed change would be consistent with the language used in the permit for the Washington D.C. combined sewer system:

> *Consistent with the Clean Water Act, Section 301(b)(I)(C), the permittee may not discharge in excess of any limitation necessary to meet applicable water quality standards including those of the District of Columbia set forth in Chapter 21 of the District of Columbia Municipal Regulations, Chapter 11 (2006).*
>
> *The limitations and conditions in this permit for the discharges from Blue Plains and the CSS are limitations that are necessary to meet the applicable water quality standards, including those of the District of Columbia referenced above.*

The City lists six reasons for the change, addressed individually below as Comments 5.1 through 5.6).

Response to City Comment 5

We disagree. The City's proposed revisions would gut the meaning and intent of Receiving Water Limitation V.C. The proposal would redefine the applicability of the water quality standards in the Basin Plan, California Toxics Rule, and other laws and regulations (see Fact Sheet section III.C) such that "applicable" water quality standards would only be those for which the Regional Water Board has established effluent limitations for the discharge. This is wholly inconsistent with the CWA because water quality standards exist for waters of the United States independent of any discharges to such waters. Water quality standards apply to these waters regardless of whether there is reasonable potential for a discharge to cause or contribute to exceedance of a water quality standard. The tentative order correctly describes implementation of the Long-Term Control Plan as the effluent limitation necessary to maintain water quality standards, not as a water quality standard in its own right. We place limitations on discharges for the purpose of maintaining water quality standards in receiving waters. Redefining "water quality standards" as "implementation of the Long-Term Control Plan" would fail to differentiate between "standards" and "limitations."

The purpose of Receiving Water Limitation V.C is to serve as a backstop in the event that the reasonable potential analysis described in Fact Sheet section IV.C.3 fails to account for something in the discharge that could, in fact, cause an exceedance of water quality standards. Likewise, it serves as a backstop in the event that our presumption that implementing the Long-Term Control Plan will maintain water quality standards proves to be unreasonable. Without this receiving water limitation, the Regional Water Board could find it more difficult to enforce against possible harmful discharges it cannot foresee at this time.

Receiving Water Limitation V.C, as currently drafted, is consistent with the Washington D.C. permit that the City cites. Like that permit, the tentative order would require the City to comply with limitations derived to maintain water quality standards. It is also consistent with nearly every individual NPDES permit the Regional Water Board has adopted in recent years and the NPDES permits for combined sewer systems in Chicago, Illinois; Portland, Maine; Portland, Oregon; Boston, Massachusetts; and New York, New York. Moreover, the City's previous orders (e.g., Orders R2-79-67, R2-84-28, R2-95-039, and R2-2002-0073) contained essentially the same receiving water limit. Even the receiving water limitations in the most recent order (R2-2008-0007) state, "Receiving water limitations are based on water quality objectives … and are a required part of this Order." To remove this limitation would result in a permit with conditions not as stringent as those in the previous permits.

We address the City's specific comments regarding Receiving Water Limitation V.C below.

City Comment 5.1
Proposed language purports to regulate wet weather discharges without developing wet weather standards, contrary to CSO Policy. *The City asserts that the tentative order requires wet weather discharges to meet water quality standards designed for dry weather, which it claims is contrary to the CWA, citing the* Combined Sewer Overflow (CSO) Control Policy. *U.S. EPA guidance states, "The CSO Control Policy anticipates the review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans to reflect site-specific wet weather impacts of CSOs." The City claims to have repeatedly requested development of wet weather water quality standards during Basin Plan triennial reviews to no avail. The City finds it unworkable and contrary to the CWA to hold its wet weather discharges to water quality standards not designed for wet weather.*

Response to City Comment 5.1
We disagree because nothing in the Basin Plan, the California Toxics Rule, or any other law or regulation (see Fact Sheet section III.C) states that existing water quality standards are designed only for dry weather. Although the *Combined Sewer Overflow (CSO) Control Policy* states that development of Long-Term Control Plans should be coordinated with review and appropriate revision of water quality standards, it does not mandate that water quality standards be revised. Roughly every three years, the Regional Water Board reviews whether to revise its water quality standards through its triennial review. To date, the Regional Water Board has chosen not to revise its standards to differentiate between wet and dry weather conditions. The City did not raise this issue during the most recent triennial review in 2012.

The City argues that the tentative order should not require its discharges to meet water quality standards that do not specifically account for the nature of its discharges. The City ignores the fact that water quality standards are almost always developed without regard to specific discharges. Water quality standards recognize the beneficial uses of the waters to be protected and set forth water quality objectives necessary to protect those uses (and include antidegradation policies). Although water quality standards could conceivably differ during wet and dry conditions, none of the water quality standards applicable to San Francisco Bay and its tributaries do. For this reason, we revised Receiving Water Limitations V.A and V.B, as shown in our response to City Comment 5.6, to remove wet weather exclusions.

City Comment 5.2

The proposed violation of WQS provision is unacceptably vague without the clarification. *The City claims the proposed receiving water limit is too vague to implement. It says the limit fails to specify the application point (e.g., point of discharge, edge of mixing zone) and does not name the specific water quality objectives that apply (e.g., 1-hour, 4-day, 24-hour average). The City notes that the limit does not state whether a 10:1 dilution factor would be applied, or actual dilution, or whether a 303(d) listing would indicate that a water quality standard is exceeded. The City says the limit fails to specify whether a numeric effluent concentration could be compared directly to a numeric water quality standard. It claims this imprecision could put it at risk of violation, even though the tentative order contains findings that compliance with the permit's water quality based effluent limitations is consistent with the Combined Sewer Overflow (CSO) Control Policy and will protect beneficial uses.*

Response to City Comment 5.2

We disagree. Receiving Water Limitation V.C is appropriately clear. The tentative order does not specify the timeframes for the water quality standards because individual water quality objectives already include relevant timeframes. It also does not restrict the Regional Water Board's discretion in considering effluent concentrations when evaluating compliance. This allows the Regional Water Board to consider whether a violation has occurred on a case-by-case basis based on all relevant facts.

The tentative order does not need to state whether a CWA section 303(d) listing could indicate that a water quality standard is exceeded because that is precisely what a CWA section 303(d) listing means. However, a CWA section 303(d) listing alone would not constitute a violation of the receiving water limit. To find a violation, the Regional Water Board would need to establish both (1) that receiving water conditions violate a water quality standard pursuant to the CWA and regulations adopted thereunder, including the *Combined Sewer Overflow (CSO) Control Policy,* and (2) that the discharge caused the violation.

As shown below in our response to City Comment 5.6, we revised Receiving Water Limitation V.C to refer specifically to the *Combined Sewer Overflow (CSO) Control Policy* as a regulation that addresses implementation of water quality standards. We also revised the limitation to recognize mixing zones in response to City Comment 4.

City Comment 5.3

The proposed provision could be read to require compliance with all narrative and numeric water quality objectives, thereby supplanting the "reasonable potential" procedures in US EPA regulations and the State Implementation Policy. *Federal regulations require effluent limits to ensure that discharges do not cause, have a reasonable potential to cause, or contribute to violations numeric or narrative water quality standards. For the City's dry weather discharges, the reasonable potential procedures used to develop effluent limits are defined in the State Implementation Policy. The City claims limits cannot be imposed in the absence of a reasonable potential analysis; therefore, the proposed receiving water limit can refer only to those water quality-based effluent limitations made "applicable" through the State Implementation Policy process or a similar process compliant with regulations. Regulatory procedures provide flexibility to address pollutants using other than numeric limits. For example, best management practices may be used when numeric limitations are infeasible. This is the approach when requiring implementation of the Long-Term Control Plan in lieu of numeric effluent limits.*

Response to City Comment 5.3

We disagree. The City incorrectly asserts that 40 C.F.R. section 122.44(d) forbids limits, including receiving water limits, on pollutants that do not exhibit reasonable potential. The City misinterprets 40 C.F.R. section 122.44(d), which requires effluent limitations for pollutants with reasonable potential to cause or contribute to exceedances of water quality standards. The City mischaracterizes the purpose of a reasonable potential analysis as an exercise in determining whether water quality standards apply. In fact, one must identify applicable water quality standards before starting a reasonable potential analysis. The reasonable potential analysis focuses regulatory oversight on pollutants of most concern.

We agree that 40 C.F.R. section 122.44(d) allows narrative effluent limits. The tentative order imposes narrative effluent limits during wet weather by requiring implementation of the Long-Term Control Plan in lieu of numeric effluent limitations. This does not address the appropriateness of receiving water limits as a backstop in the event that the reasonable potential analysis and resulting effluent limitations prove to be insufficient to maintain water quality standards.

City Comment 5.4

The proposed provision is inconsistent with the implementation of San Francisco's system and the CSO Policy. *The* Combined Sewer Overflow (CSO) Control Policy *mandates that technology-based effluent limitations for wet weather discharges from combined sewer systems are the Nine Minimum Controls, and that the water quality-based effluent limits are to be based on long-term control plans. The policy recognizes that compliance with numeric limitations may be inappropriate for wet weather discharges and, therefore, allows performance standards for combined sewer overflow control based on average design conditions. The policy provides flexibility to adapt water quality standards and implementation procedures to reflect site-specific conditions, including those related to combined sewer overflows, as long as beneficial uses are protected.*

The City claims the Regional Water Board and U.S. EPA created a special regulatory framework for the City's wet weather discharges. The City claims Order R2-79-67 stated the Regional Water Board's intent to allow wet weather exceptions to numeric water quality objectives, provided that beneficial uses are not adversely affected. That order found that beneficial uses would be protected if the City designed, built, and operated a system that reduced the frequency of combined sewer discharges to four in the North Shore, ten in the Central Basin, and one in the Southeast; ensured that the system's storage capacity is maximized prior to discharge; and equipped all overflow points with baffles or equivalent means to reduce floatables. The City says these implementation requirements were and are consistent with the Combined Sewer Overflow (CSO) Control Policy*'s "demonstration approach." In 1994, after U.S. EPA promulgated the* Combined Sewer Overflow (CSO) Control Policy*, the City claims the Regional Water Board and U.S. EPA confirmed that the City's controls satisfied the* Combined Sewer Overflow (CSO) Control Policy*'s "presumption approach," i.e., they determined that the City's performance was sufficient to meet water quality standards.*

The City claims Basin Plan section 4.9.1 codifies wet weather protection of beneficial uses through development and implementation of narrative requirements. The Basin Plan recognizes that numeric effluent limits cannot be readily established due to the unpredictability of storms, so requirements will be expressed as narrative limits, and the City's wet weather dischargers will be controlled using guidance for the design of overflow discharge structures. The City says the tentative order requires compliance with operational criteria designed to maximize treatment and storage, which ensures achievement of the long-term design criteria determined to be sufficient to protect beneficial uses. In the event that information becomes available demonstrating that (1) system performance deviates significantly from the design performance or (2) the design performance is insufficient to protect beneficial uses, then the City would have to update to its Long-Term Control Plan. The City asserts that, at present, no such information exists.

The City's concern is rooted in the Ninth Circuit's recent decision in Natural Resources Defense Council (NRDC) v. County of Los Angeles*, in which the Ninth Circuit required compliance with a similar receiving water limit.*

Response to City Comment 5.4

Our approach to technology-based and water quality-based effluent limitations is consistent with *Combined Sewer Overflow (CSO) Control Policy* requirements. We agree that the CWA allows site-specific water quality standards, but we note that it does not require them and, to date, the only site-specific water quality standards for waters near the City's outfalls relate to copper, mercury, and cyanide (see Basin Plan Tables 3-3A, 3-3B, and 3-3C). These site-specific standards do not differentiate between wet and dry conditions.

The City misconstrues Order R2-79-67. That order was an NPDES permit adopted 34 years ago for the North Point wastewater treatment plant and related wet weather diversion structures. It predates the Southeast Water Pollution Control Plant and the modern wastewater collection system in place today. When the Regional Water Board adopted that order, wet weather discharges were still completely untreated. Subsequent orders long ago superseded Order R2-79-67, and it contains no provisions that control the Regional Water Board's current actions.

Contrary to the City's portrayal, Order R2-79-67 did not express any intent to allow exceptions to numeric water quality objectives. Instead, that order found that the Basin Plan (at the time) recommended that exceptions to the Basin Plan's prohibition against discharge of untreated waste be allowed for wet weather discharges, provided that beneficial uses would be protected. In fact, a permit cannot provide for any exception to water quality standards not already approved through a regulatory process, such as a Basin Plan amendment. More to the point, Order R2-79-67 (Finding 20) indicated that further mitigation may be required in the future, after facilities are placed in operation, if beneficial uses are determined not to be adequately protected. Provision B.1 of that order contained language substantively the same as the receiving water limitation to which the City now objects:

> This discharge shall not cause a violation of any applicable water quality standard for receiving waters adopted by the Regional Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If revised applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act, or amendments thereto, the Board will revise and modify this Order in accordance with such standards.

Basin Plan section 4.9.1 does not "codify" that narrative requirements be used during wet weather to implement water quality standards, including protection of beneficial uses. Basin Plan section 4.9.1 simply explains the Regional Water Board's existing approach to permitting wet weather discharges (including compliance with water quality standards). The tentative order is wholly consistent with this approach.

We agree that the water quality-based effluent limitations in the tentative order (i.e., implementation of the Long-Term Control Plan) should be sufficient to ensure that receiving waters comply with water quality standards. In fact, the City should have no problem complying with Receiving Water Limitation III.C if implementation of the Long-Term Control Plan is indeed sufficient. The tentative order requires monitoring to confirm this presumption. Provision VI.C.5.c.v of the tentative order requires the City to synthesize and update its Long-Term Control Plan and, in doing so, requires the City to propose a plan for post-construction compliance monitoring of all wet weather discharges consistent with the *Combined Sewer Overflow (CSO) Control Policy*. The Regional Water Board may use the results of this monitoring, and the monitoring that Provision VI.C.5.b.ix requires, to evaluate how reasonable it is to presume that implementation of the Long-Term Control Plan will maintain compliance with water quality standards. The Regional Water Board could also use the results of this monitoring as a basis for findings regarding whether the City meets the *Combined Sewer Overflow (CSO) Control Policy*'s "demonstration approach" as it asserts.

The City claims the Ninth Circuit's recent ruling in *Natural Resources Defense Council (NRDC) v. County of Los Angeles* could be the impetus for similar lawsuits against the City because the Natural Resources Defense Council sued the County of Los Angeles for violating a municipal separate storm sewer system permit containing a similar receiving water limitation. We do not deny the possibility that the City could be sued on the same grounds; however, it does not appear likely. The facts underlying the County of Los Angeles permit and this tentative order are readily distinguishable. First, *Natural Resources Defense Council (NRDC) v. County of Los Angeles* involved a separate storm sewer system, not a combined sewer system. Second, Receiving Water Limitation III.C includes the phrase "as required by the CWA and regulations adopted thereunder," whereas the County of Los Angeles stormwater permit did not. The *Combined Sewer Overflow (CSO) Control Policy* sets forth an iterative process whereby dischargers install long-term controls and add additional controls if and when monitoring demonstrates a need for them. No parallel regulatory policy exists for stormwater. For clarity, we revised the tentative order to include an explicit reference to the *Combined Sewer Overflow (CSO) Control Policy* as an example of a regulation directing implementation of water quality standards.

Moreover, to the extent that the City believes *Natural Resources Defense Council (NRDC) v. County of Los Angeles* may incentivize citizen lawsuits, that "threat" has been present for nearly twenty years with no suit filed against the City. In 1995, the Ninth Circuit decided *Northwest Environmental Advocates (NWEA) v. City of Portland*, a case more factually similar to the City's situation. This case involved a citizen suit brought by Northwest Environmental Advocates against the City of Portland (which operates a combined sewer system), claiming, "Portland's CSO events violated a permit condition prohibiting any discharges that would violate Oregon water quality standards."[1] To our knowledge, the City has not been the target of a citizen suit for wet weather violations of water quality standards even though most of its previous orders (e.g., Orders R2-79-67, R2-84-28, R2-95-039, and R2-2002-0073) contained essentially the same receiving water limit. Order R2-89-102 and the previous order (Order R2-2008-0007) contained more specific receiving water limits applicable during both dry and wet weather.

City Comment 5.5

A more justified permit provision would be to clarify that wet weather operations are regulated through the LTCP referenced in Chapter 4 of the Basin Plan rather than being regulated by direct application of the Chapter 3 objectives. *The City cites Order R2-79-67 findings pointing to the Basin Plan's text concerning wet weather discharges from combine sewer systems, then cites portions of the 1982 and current Basin Plans, saying the Basin Plan continues to apply "water quality-based performance standards" in lieu of numeric water quality criteria. For example, Basin Plan section 4.9 says:*

> *The second phase of the process involves implementation of the long-term control plan developed in the first phase. Such implementation must provide for the attainment of water quality objectives and may result in additional site-specific technology-based controls, as well as water quality-based performance standards that are established based on best professional judgment. While numeric water quality-based effluent limits are not readily established due to unpredictability of a storm event and the general lack of data, the CSO Control Policy requires immediate compliance with water quality standards expressed in the form of a narrative limitation.*

[1] The court never reached this question but focused instead on whether the Northwest Environmental Advocates had standing to bring such a claim (they did) and remanded the case back to the lower court. The parties entered into a settlement and consent decree, so the trial court did not decide the issue.

The City characterizes the receiving water limit's reference to all water quality standards, including the numeric objectives in Basin Plan chapter 3, as "new." The City requests that the tentative order contain findings similar to those in prior permits.

Response to City Comment 5.5
The City quotes Basin Plan section 4.9 as if that text imposes a regulatory mandate. It does not. Basin Plan section 4.9 simply describes the Regional Water Board's approach to permitting combined sewer discharges. The tentative order is wholly consistent with that approach.

The City quotes Order R2-79-67 out of context. Findings 5 and 6 of that order relate to untreated sewage discharges and predate the *Combined Sewer Overflow (CSO) Control Policy*. The City also quotes the 1982 Basin Plan, which is irrelevant now.

The City correctly interprets Receiving Water Limitation III.C as requiring compliance with both narrative and numeric water quality objectives. However, it requires compliance in receiving waters, not effluent *per se*, and a violation would only occur if a discharge could be shown to have caused an exceedance of a water quality objective. Over the years, the City's permit, through Orders R2-79-67, R2-84-28, R2-89-102, R2-95-039, R2-2002-0073, and R2-2008-0007, has contained variations of the same receiving water limit, applicable during both dry and wet weather.

City Comment 5.6
The proposed water quality standards provision is not feasible. *The City says its combined sewer discharges consist mainly of stormwater runoff and, as typical in urban runoff, contain pollutants at levels that exceed water quality standards at the point of discharge. The City notes that it removes about 80% of the pollutants in the stormwater it captures. To capture all stormwater runoff, remove all pollutants, and provide disinfection would be economically infeasible. The City claims the* Combined Sewer Overflow (CSO) Control Policy *recognizes the infeasibility of wet weather discharges meeting dry weather water quality standards and requests the modification shown in City Comment 5.*

Response to City Comment 5.6
Implementation of the Long-Term Control Plan is merely a means to an end—namely meeting water quality standards. The City suggests that its combined sewer discharges could cause receiving waters to violate water quality standards. Combined sewer discharges contain some wastewater and mostly stormwater. However, unlike stormwater from separate storm sewer systems, the City's combined wastewater receives equivalent-to-primary treatment. We reviewed available information and considered the potential for these discharges to cause violations of water quality standards. Fact Sheet section VI.C.5.b concludes:

> Over the previous order term, the Discharger monitored combined sewer discharges…. It found that average combined sewer discharge pollutant concentrations are below acute water quality objectives for metals and other priority pollutants, with the exceptions of copper and zinc. The average dissolved zinc concentration was 91 µg/L (based on the default CTR acute translator),

compared to the water quality objective of 90 µg/L. The average dissolved copper concentration was 19 µg/L (based on the Basin Plan Table 7.2.1-2 acute translator), compared to the water quality objective of 10.8 µg/L. Water quality objectives apply in the receiving water, not combined sewer discharges *per se*. Therefore, given the relatively short duration of combined sewer discharges (i.e., just a few hours each time), and accounting for the inevitable dilution within the receiving waters during wet weather, water quality standards appear to be maintained.

Provision VI.C.5.b.ix of the tentative order requires additional monitoring to verify that water quality standards are met. Provision VI.C.5.c.v requires the City to synthesize and update its Long-Term Control Plan and, in doing so, set forth additional measures, to the extent technically and economically feasible, to maximize pollutant removal and minimize combined sewer discharges. It must also propose a plan for post-construction compliance monitoring of all wet weather discharges consistent with the *Combined Sewer Overflow (CSO) Control Policy*.

We agree that the *Combined Sewer Overflow (CSO) Control Policy* provides flexibility to tailor and adapt controls to the circumstances at hand. However, it does not say wet weather discharges cannot meet water quality standards. To the contrary, it requires modifications to Long-Term Control Plans to ensure attainment of water quality standards.

In conclusion, we revised Provision V as follows:

RECEIVING WATER LIMITATIONS

A. ~~During dry weather, t~~<u>T</u>he discharge shall not cause the following conditions to exist in receiving waters at any place <u>outside the near-field mixing zone (i.e., where mixing is not controlled by effluent discharge momentum and buoyancy)</u>:

1. Floating, suspended, or deposited macroscopic particulate matter or foams;

⋮

B. ~~During dry weather, t~~<u>T</u>he discharge shall not cause the following limits to be exceeded in receiving waters at any place within one foot of the water surface <u>outside the near-field mixing zone (i.e., where mixing is not controlled by effluent discharge momentum and buoyancy)</u>:

1. Dissolved Oxygen 5.0 mg/L, minimum

⋮

C. The discharge shall not cause a violation of any water quality standard for receiving waters adopted by the Regional Water Board or State Water Board as required by the CWA and regulations adopted thereunder <u>(including the *Combined Sewer Overflow (CSO) Control Policy*) outside near-field mixing zones (i.e., where mixing is not controlled by effluent discharge momentum and buoyancy)</u>. If more stringent water quality standards are promulgated or approved pursuant to CWA section 303, or amendments thereto, the Regional Water Board may revise or modify this Order in accordance with the more stringent standards.

We also added Provision VI.C.5.d as follows:

> If the Executive Officer determines that the Discharger has caused a violation of any water quality standard for receiving waters, the Discharger shall evaluate its Long-Term Control Plan and its Combined Sewer Operations and Maintenance Plan, and submit a report identifying additional measures, considering its financial capabilities, to address the violation. The report shall include information on the technical and economic feasibility of the additional measures. The Discharger shall submit this report within 180 days after the Executive Officer provides notification of the violation, and the Discharger shall begin implementing the additional measures described in the report, as may be modified by the Executive Officer, within 60 days after report submittal.

We added Fact Sheet section VI.C.5.d as follows:

> This provision sets forth steps the Discharger must take if the Executive Offer finds that its discharges cause violations of water quality standards in receiving waters.

City Comment 6
Provisions and MRP language should clarify that the individual NPDES permit conditions govern if different from the standard Attachment G. *The City notes that the main body of the tentative order and Attachments E and G address overlapping concepts. In particular, it notes that portions of Attachment G were written with separate sanitary systems in mind. The City requests language clarifying that if there is a discrepancy between the order and Attachment G, the order will govern.*

Response to City Comment 6
No change is necessary. Provision VI.A.2 of the tentative order requires the City to comply with only the "applicable" provisions of Attachment G of the tentative order and names specific provisions of Attachment G that do not apply. Provision I.A of the Monitoring and Reporting Program (Attachment E) states that if any discrepancies exist between the Monitoring and Reporting Program and Attachment G, the Monitoring and Reporting Program will prevail. Attachment G appears in essentially every other individual NPDES permit in the San Francisco Bay Region. It has not resulted in confusion and taking the time to refine it simply for the City's permit would result in very little water quality benefit.

City Comment 7
For the effluent characterization, remedial measures should only be required for* new *situations where a concentration is above a water quality objective, and the cause of the exceedance is known. *The City note that, in situations where a concentration has already been observed above a water quality objective and "reasonable potential" has been triggered, there is already an effluent limit. However, the the tentative order indicates that remedial measures*

could be necessary if reasonable potential is triggered, regardless of whether a limit already exists. It notes that sometimes a single isolated measurement of a particular chemical triggers an effluent limit. If chemical constituents for which an effluent limit does not currently exist are consistently detected at concentrations that would result in reasonable potential to cause or contribute to an exceedance of applicable water quality standards, the cause of these higher concentrations should be investigated and addressed to the extent feasible. However, establishing remedial measures may be impossible if investigations are inconclusive. For all of these reasons, the City requests changes to Provision VI.C.2.a of the tentative order. The City also requests that "excursions" be replaced with "exceedance of" to avoid potential confusion with collection system "excursions."

Response to City Comment 7
No change is necessary because the preceding text of Provision VI.C.2.a restricts the sampling effort to priority pollutants "except for those priority pollutants with effluent limitations where the MRP already requires more frequent monitoring." We did revise Provision VI.C.2.a (third paragraph) to avoid confusion with collection system "excursions":

> The Discharger shall evaluate on an annual basis if concentrations of any of these priority pollutants significantly increase over past performance. … The Discharger shall establish remedial measures addressing any increase resulting in reasonable potential to cause or contribute to an exceedance of ~~excursion above~~ applicable water quality objectives during dry weather. This requirement may be satisfied through identification of the constituent as a "pollutant of concern" in the Discharger's Pollutant Minimization Program, described in Provision VI.C.3.

City Comment 8
Language related to implementing the Pollutant Minimization Program should be revised. *The City claims it already goes far beyond current requirements and has long been a leader in pollutant minimization. The City says improvements should be made on an as-needed basis, and continuous improvement should not be mandated without a need. It asks that it be required to "conduct" its Pollutant Minimization Program, rather than "improve" it.*

Response to City Comment 8
We disagree. We believe the tentative order should require continuous improvement of the pollutant minimization program. Essentially every other individual NPDES permit in the San Francisco Bay Region requires continuous improvement.

City Comment 9
San Francisco requests that the reporting requirements related to combined sewer system excursions be modified so as to be applicable to San Francisco's unique combined sewer system. *The City proposes specific changes to Provision VI.C.4.c.ii and Fact Sheet section VI.C.4.c.ii to make technical corrections and better tailor reporting requirements in relation to the reporting and recording of spills.*

Response to City Comment 9

We generally agree, but we wish to retain text clarifying that spills to drainage channels and surface waters are subject to Provision IX.B of the Monitoring and Reporting Program. We also wish to retain text allowing reporting to occur more than two hours after an incident if reporting sooner is impractical or would impede cleanup or emergency measures. We revised Provision VI.C.4.c.ii as follows:

> **Combined Sewer System.** For purposes of this Order, a combined sewer system "excursion" is a release or diversion of untreated or partially treated wastewater from the combined sewer system that exits the system temporarily and then re-enters it. …
>
> **(a) Excursion Database.** By January 1, 2014, the Discharger shall develop and maintain a database containing information about each excursion that occurs within the Southeast Plant service area. ... The database shall contain the following information for each excursion:
>
> (1) Location, including latitude and longitude, street address (if available), zip code, cross street, and asset ~~manhole~~ number;
>
> ⋮
>
> If the Discharger chooses to include information regarding releases from private sewer laterals, it should also record responsible party contact information, if known.
>
> **(b) Routine Reporting.** The Discharger shall report any excursion greater than 1,000 gallons, regardless of whether it enters a drainage channel or surface water, to the Regional Water Board and the San Francisco Department of Public Health not later than two hours after becoming aware of the discharge. ~~in accordance with MRP section IX.B, which modifies Attachment G section V.E.2. (All spills to drainage channels or surface waters are subject to MRP section IX.B.)~~ The Discharger shall make this report as soon as (1) it has knowledge of the excursion, (2) reporting is possible, and (3) a report can be provided without impeding cleanup or other emergency measures. The Discharger shall report excursions by calling the Regional Water Board's spill hotline (currently 510-622-2369) and following standard procedures developed by the San Francisco Public Utilities Commission and the San Francisco Department of Public Health. (Spills to drainage channels or surface waters are subject to MRP section IX.B, which modifies Attachment G section V.E.2.)
>
> **(c) Annual Report.** The Discharger shall submit a report no later than August 15 each year that compiles and summarizes information from the excursion database for the preceding 12 months ending June 30. ...

As the City and U.S. EPA requested, we revised Fact Sheet section VI.C.4.c.ii as follows; however, in doing so, we are not indicating that the previous text was incorrect:

Combined Sewer System. For purposes of this Order, an "excursion" is a release or diversion of untreated or partially treated wastewater from the combined sewer system that exits the system temporarily and then re-enters it. The Discharger and U.S. EPA developed the collection system excursion reporting requirement in this Order so the information would be available. ~~The Nine Minimimum Controls include conducting proper operations and maintenance programs, as required by Provision VI.C.5.b.i. Minimizing excursions is consistent with proper operations and maintenance of the combined sewer system. Water Code sections 13267 and 13383, 40 C.F.R. section 122.41(h), and the first and ninth of the Nine Minimum Controls authorize the Regional Water Board to require information about excursions. Such information is necessary to evaluate the Discharger's operations and maintenance practices. It is also necessary to determine whether any excursion results in a discharge to surface water or a drainage system, and whether any excursion could affect public health or result in a nuisance as defined in Water Code section 13050.~~

City Comment 10

The Nine Minimum Controls language should reflect the fact that San Francisco has completed its Long-Term Control Plan (one of the few cities in the nation to do so). *The City notes that U.S. EPA guidance requires wastewater collection and treatment systems to adopt nine minimum controls and develop long-term control plans. The City notes that it completed construction of its transport/storage units in 1997 and thus implemented its Long-Term Control Plan. It designed its controls based on long-term average annual frequencies for combined sewer discharges. The City says Order No.79-67 codified these frequency goals after determining that they would protect beneficial uses. The City requests changes to its Nine Minimum Controls requirements to delete the requirement that its system be operated and maintained "to reduce the magnitude, frequency, and duration of combined sewer discharges."*

Response to City Comment 10

We disagree. The tentative order requires the City to properly operate and maintain its facility to "reduce the magnitude, frequency, and duration of combined sewer discharges" because this wording appears in U.S. EPA guidance for implementing the Nine Minimum Controls (U.S. EPA, *Combined Sewer Overflows Guidance for Nine Minimum Controls*, EPA 832-B-95-003, May 1995).

For the record, Order R2-79-67 did not "codify" the combined sewer discharge frequency goals reflected in the City's Long-Term Control Plan. The Regional Water Board could change them. Nevertheless, the tentative order maintains the same goals as those in previous orders. We disagree that constructing and operating facilities that meet the design goals necessarily protects beneficial uses. We presume so, but the City must confirm this conclusion through post-construction compliance monitoring. Such monitoring is required whether implementing the *Combined Sewer Overflow (CSO) Control Policy*'s "presumption" and "demonstration" approaches.

City Comment 11

The Nine Minimum Controls language regarding dry weather overflows should be clarified. *The City notes that the fifth of the Nine Minimum Controls is to prohibit dry weather overflows, but the tentative order does not distinguish between wet and dry weather overflows. The City suggested revisions to Provision VI.C.5.b.v of the tentative order.*

Response to City Comment 11

For clarity, we revised Provision VI.C.5.v as follows because the fifth of the Nine Minimum Controls relates only to dry weather overflows:

> **Prohibit Dry Weather Combined Sewer Overflows.** Dry weather combined sewer overflows from Discharge Point Nos. 002 through 043 are prohibited. The Discharger shall respond to dry weather ~~prohibited~~ combined sewer overflows in accordance with MRP section IX.B, which modifies Attachment G section V.E.2. During any dry weather combined sewer overflow, the Discharger shall inspect the overflow point each day until the overflow stops. The Discharger shall document in the inspection log each combined sewer overflow event, its duration, its cause, and the corrective measures taken.

However, Prohibitions III.C and III.D of the tentative order go beyond this requirement and prohibit all combined sewer overflows that are not authorized combined sewer discharges. Provision IX.B of the Monitoring and Reporting Program applies to all prohibited combined sewer overflows, whether during dry or wet weather.

City Comment 12

The permit language should acknowledge that street sweeping and catch basin cleaning are already part of San Francisco's Pollution Prevention Program. *Street sweeping and catch basin cleaning are not new programs. The City proposes changes to Provision Section VI.C.5.b.vii of the tentative order.*

Response to City Comment 12

We revised Provision VI.C.5.b.vii as follows:

> **Develop and Implement Pollution Prevention Program.** The Discharger shall continue to implement a Pollution Prevention Program focused on reducing the impact of combined sewer discharges and overflows on receiving waters. ...
>
> The Discharger shall also continue to implement a street sweeping program and clean ~~out~~ catch basins at a frequency sufficient to prevent large accumulations of pollutants and debris.

City Comment 13

San Francisco requests that the permit language be clarified to limit posting of warning signs to those beaches where recreational use has the potential to be affected by combined sewer discharges. *The City says the current language requires warning signs after combined sewer discharges regardless of the potential to affect recreational beaches. The City proposes changes that would require warning signs only at beaches and only when nearby combined sewer* *discharges could affect those beaches. The City indicates that no combined sewer overflows affect Aquatic Park or Crissy Field.*

Response to City Comment 13
The City is correct that the tentative order requires posting warning signs where water contact recreational uses occur. These locations are not limited to recreational beaches. The City has conducted recreational use surveys that demonstrate that water contact recreation occurs at locations such as Islais Creek and Mission Creek. The tentative order seeks to protect all water contact recreational uses, not only those that occur at beaches.

We agree, however, that posting is only necessary if a combined sewer discharge could affect a recreational use and revised Provision VI.C.5.b.viii as follows:

> **Notify Public of Combined Sewer Discharges.** The Discharger shall continue to implement a public notification plan to inform citizens of when and where combined sewer discharges occur. The plan shall include the following:
>
> **(a)** A mechanism to alert persons using receiving waters affected by combined sewer discharges for recreation.
>
> **(b)** A system to determine the nature and duration of conditions resulting from combined sewer discharges potentially harmful to receiving water users.
>
> Warning signs shall be posted at ~~beach~~ locations where water contact recreation occurs whenever a combined sewer discharge occurs <u>that could affect recreational users at that location</u>. Warning signs shall be posted on the same day as the combined sewer discharge event unless the combined sewer discharge occurs after 4:00 p.m., in which case, signs shall be posted by 8:00 a.m. the next day. The Discharger shall maintain records documenting public notification.

As discussed below, in response to City Comment 19, the City has not yet demonstrated that combined sewer discharges do not affect Aquatic Park and Crissy Field.

City Comment 14
The requirement to monitor each CSD location for priority pollutants at least once per year is inconsistent with past data collection efforts, and technically infeasible. *The tentative order requires priority pollutant monitoring at each combined sewer discharge location at least once per year. The City requests that we change this to one combined sewer discharge location once per year. The City describes some technical and safety challenges of obtaining combined sewer discharge samples. It notes that often samples cannot be preserved or refrigerated in accordance with standard sampling protocols. The City also requests revisions to require combined sewer discharge monitoring requirements only in the main body of the tentative order and not the Monitoring and Reporting Program. It also asks that the combined sewer discharge monitoring locations be referred to using the names and numbers as shown in Table 2 of the tentative order, not the monitoring location numbers assigned in the Monitoring and Reporting Program.*

Response to City Comment 14

We mostly agree, particularly regarding the priority pollutant monitoring. To clarify the relationships between discharge points and monitoring locations, we revised Monitoring and Reporting Program Table E-1 to change combined sewer discharge monitoring location names as follows (we also rearranged the rows numerically but have not indicated these changes below):

Table E-1. Monitoring Locations

Type of Sampling Location	Monitoring Location Name	Monitoring Location Description [1]
⋮		
Effluent	EFF-003	During wet weather, any point at the North Point Facility between Discharge Point Nos. 003 and 004 (Pier 33 outfalls) and 005 and 006 (Pier 35 outfalls) and the point at which all waste tributary to those outfalls is present and adequate disinfection is assured. *Latitude 37.806667 Longitude -122.407500*
Combined Sewer Discharge	CSD-010	During wet weather, any point between Discharge Point No. 010 (Pierce Street outfall) and the point at which all waste tributary to the outfall is present. *Latitude 37.806944 Longitude -122.440000*
Combined Sewer Discharge	CSD-025 ~~012~~	During wet weather, any point between Discharge Point No. 025 (Sixth Street North outfall) and the point at which all waste tributary to the outfall is present. *Latitude 37.071944 Longitude -122.396111*
Combined Sewer Discharge	CSD-029 ~~007~~	During wet weather, any point between Discharge Point No. 029 (Mariposa Street outfall) and the point at which all waste tributary to the outfall is present. *Latitude 37.764722 Longitude -122.385278*
Combined Sewer Discharge	CSD-031A ~~008~~	During wet weather, any point between Discharge Point No. 031A (North Islais North outfall) and the point at which all waste tributary to the outfall is present. *Latitude 37.747778 Longitude -122.387500*
Combined Sewer Discharge	CSD-041 ~~011~~	During wet weather, any point between Discharge Point Nos. 041 or 042 (Yosemite Avenue or Fitch Street outfalls) and the point at which all waste tributary to the outfalls is present. *Latitude 37.723889 Longitude -122.381389* or *Latitude 37.722222 Longitude -122.381389*
Combined Sewer Discharge	CSD-043 ~~009~~	During wet weather, any point between Discharge Point No. 043 (Sunnydale Avenue outfall) and the point at which all waste tributary to the outfall is present. *Latitude 37.747222 Longitude -122.386944*
Shoreline	S-202.5	Crissy Field West *Latitude 37.811667 Longitude -122.490000*
⋮		

To reduce the priority pollutant monitoring requirements, we revised Provision VI.C.5.b.ix(a)(2) of the tentative order as follows (we retained priority pollutant monitoring at Monitoring Location CSD-041 because U.S. EPA has expressed particular interest in discharges to Yosemite Creek):

Combined Sewer Discharges. The Discharger shall collect effluent samples representing Discharge Point Nos. 009 through 043 at Monitoring Locations CSD-010 ~~007~~ through CSD-043 ~~012~~, as defined in the MRP. ... In addition to the monitoring required in MRP Table E 5, the Discharger shall monitor each sample for the following:

- total suspended solids ~~sediment~~
- settleable matter
- pH
- metals (arsenic, cadmium, copper, lead, nickel, selenium, silver, and zinc)
- cyanide
- ammonia (total)

The Discharger shall also monitor a ~~each~~ combined sewer discharge at Monitoring Location CSD-041 ~~location~~ for the remaining priority pollutants listed in Attachment G, Table C, at least once per year.

For consistency with these changes, we also revised Provision IV.B.2 of the Monitoring and Reporting Program as follows:

Combined Sewer Discharge Outfalls. During wet weather, when combined sewer discharges are occurring, the Discharger shall monitor combined sewer discharges at Monitoring Locations CSD-010 ~~007~~ through CSD-043 ~~012~~ as follows.

[Table E-5 is unchanged.]

The Discharger shall also record and report in its self-monitoring reports the following information for each combined sewer discharge event at Monitoring Locations CSD-010 ~~007~~ through CSD-043 ~~012~~:

a. Date and time that combined sewer discharge started;

b. Rainfall intensity and amount (aggregated hourly data); and

c. Information supporting discharge volume estimate (if estimated).

We revised Fact Sheet Table F-11 as follows (these changes include revisions related to acute toxicity made in response to City Comment 16):

Table F-11. Monitoring Requirements Summary

Parameter	Influent INF-001	Effluent EFF-001A	Effluent EFF-001B, EFF-002, and EFF-003	Effluent CSD-010 ~~007~~ through CSD-043 ~~012~~	Biosolids BIO-001	Receiving Water
⋮						
Total Residual Chlorine		Continuous or 1/Hour	Continuous or 1/Hour			
Acute Toxicity		1/Month	1/Month [8]			Support RMP

Parameter	**Influent INF-001**	**Effluent EFF-001A**	**Effluent EFF-001B, EFF-002, and EFF-003**	**Effluent CSD-<u>010</u> ~~007~~ through CSD-<u>043</u> ~~012~~**	**Biosolids BIO-001**	**Receiving Water**
Chronic Toxicity		2/Year				Support RMP
⋮						
Settleable Matter				1/Event		
All other priority pollutants		1/Year	1/Year	1/Year [7]		Support RMP
Volatile Organic Compounds	2/Year	2/Year			2/Year	
⋮						

<u>Footnotes:</u>

[1] The following flow information is to be reported:

- Daily average flow (MGD)
- Monthly average flow (MGD)
- Total monthly flow volume (MG)
- Maximum and minimum daily average flow rates (MGD)

For Monitoring Locations CSD-<u>010</u> ~~007~~ through CSD-<u>043</u> ~~012~~, only total flow volume (MG) and event duration are to be reported.

[2] The metals are arsenic, cadmium, copper, lead, nickel, selenium, silver, and zinc.

⋮

[6] Monitoring is to be once per day following nearby combined sewer discharges. Otherwise, monitoring is to be sufficient to characterize ambient background conditions (e.g., weekly).

[7] <u>Monitoring is only required at Monitoring Location CSD-041.</u>

[8] <u>Monitoring is only required at Monitoring Locations EFF-001B and EFF-003.</u>

City Comment 15

Dry weather shoreline monitoring requirements should be deleted from the ninth of the Nine Minimum Controls. *The City claims the Regional Water Board has no authority to require dry weather shoreline monitoring because it is not directly associated with any discharges and State law AB1876 does not apply. The City says sufficient data already exist to characterize ambient conditions. The City requests that shoreline monitoring requirements be removed from the tentative order.*

Response to City Comment 15

We disagree. The Code of Federal Regulations (40 C.F.R. § 122.48) and Water Code sections 13267 and 13383 unambiguously authorize the Regional Water Board to require technical and monitoring reports necessary to understand the nature of wastewater discharges. In this case, we need ambient receiving water monitoring to provide context for discharge monitoring results. We agree that ambient data already exist, but ambient conditions can change and monitoring will determine if changes occur. The tentative order only requires monitoring at a frequency “sufficient to characterize ambient conditions” and provides “weekly” as an example. This seems quite reasonable since the City already collects shoreline samples weekly.

We do not rely on Health and Safety Code sections 115875 and 115880 (AB 1876) as a basis for requiring ambient shoreline monitoring.

City Comment 16

The acute toxicity monitoring requirement for wet weather effluent EFF-002 should be deleted because it has not shown toxicity. *The City notes that 80 tests over 10 years have resulted in a mean survival rate of 99.3% and a minimum survival of 90%. It therefore requests that the acute toxicity monitoring requirement for Discharge Point No. 002 be deleted from the tentative order.*

Response to City Comment 16

We agree and have removed the requirement to monitor acute toxicity at Monitoring Location EFF-002. Specifically, we revised Monitoring and Reporting Program Table E-4, footnote 3, as follows:

> Acute bioassay tests shall be performed only at Monitoring Locations EFF 001B and EFF-003 in accordance with MRP section V.A.

We revised Provision V.A.1 (second paragraph) of the Monitoring and Reporting Program as follows:

> During wet weather, acute toxicity at Discharge Point Nos. 001 and 003 through 006 (Monitoring Locations EFF-001B~~, EFF-002,~~ and EFF-003) shall be evaluated by measuring survival of test organisms exposed to 96-hour static bioassays.

We revised Monitoring and Reporting Program Table F-11 as shown in our response to City Comment 14.

City Comment 17

Language should be modified to be consistent with the Basin Plan's Conceptual Approach for determining consistency with the CSO Control Policy. *The City proposes changing the monitoring requirements in Provision VI.C.5.b.ix(b)(2) of the tentative order (the ninth of the Nine Minimum Controls) to focus only on the design goals for the combined sewer system. It also seeks to limit the data reported to combined sewer discharges, as opposed to all wet weather discharges. The City also suggests deleting some specific requirements for comparing combined sewer discharge data to water quality objectives.*

Response to City Comment 17

We disagree. The required report must reflect all available information necessary to evaluate the impacts and efficacy of the Nine Minimum Controls. Moreover, it must also serve as post-construction compliance monitoring pending the synthesis and update to the Long-Term Control Plan that Provision VI.C.5.c.v of the tentative order requires.

The *Combined Sewer Overflow (CSO) Control Policy* relates to all wet weather discharges, not only combined sewer discharges; therefore, monitoring data for all wet weather discharges should be included. The specific requirements for combined sewer discharges (i.e., comparing average and maximum discharge and receiving water monitoring data with water quality objectives) are included to address shortcomings in the City's recent *Special Study: Overflow Impacts and Efficacy of Combined Sewer Overflow Controls for the San Francisco Bayside*

System, Southeast Water Pollution Control Plant, North Point Wet Weather Facility and Bayside Wet Weather Facilities (June 29, 2012). This study did not report maximum data and did not consider translators or water effects ratios. This additional information is necessary to evaluate the reasonableness of presuming that implementing the Long-Term Control Plan maintains water quality standards.

City Comment 18
San Francisco requests that the definition for wet weather be modified to more accurately represent the start of wet weather events at the Southeast Treatment Plant. *The tentative designates wet weather to occur when the Southeast Plan influent flow reaches 110 MGD. The City proposes changing this to designate wet weather to occur when there is discharge at Discharge Point No. 002.*

Response to City Comment 18
We mostly agree; however, we maintain that instantaneous influent flow to the Southeast Plant must exceed 110 MGD for wet weather conditions to occur. We revised Attachment A as follows:

> **Wet Weather**
> Weather in which any one of the following conditions exists as a result of rain (determined on a day-by-day basis):
>
> 1. Instantaneous influent flow to the Southeast Plant (at Monitoring Location INF-001 as defined in the Monitoring and Reporting Program) exceeds 110 MGD <u>and discharge occurs at Discharge Point No. 002</u>;
> 2. Average influent biochemical oxygen demand (BOD_5) or total suspended solids (TSS) concentration at the Southeast Plant is less than 100 mg/L; or
> 3. North Shore storage/transport wastewater elevation exceeds 100 inches.

City Comment 19
CSD monitoring should continue to be addressed as part of the Nine Minimum Controls rather than as routine compliance monitoring. Shoreline monitoring required by this permit should be limited to shoreline monitoring in association with CSDs. *The City requests that we remove combined sewer discharge monitoring locations from Monitoring and Reporting Program Table E-1 and delete Table E-5. The result would be that all combined sewer monitoring requirements would appear in the main body of the order, not the Monitoring and Reporting Program. The City views combined sewer discharge monitoring more as a study than compliance monitoring, and describes data collection challenges such as meeting sample preservation, refrigeration, or holding time requirements. It thinks having all the combined sewer discharge monitoring requirement in one place would also be less confusing.*

The City requests that we remove Crissy Field and Aquatic Park shoreline monitoring locations from Monitoring and Reporting Program Table E-1 because monitoring at these locations does not currently occur after combined sewer discharges. It provides ambient monitoring results for these locations and claims there is no correlation between combined sewer discharges and exceedances of bacteriological standards. The City also requested that the monitoring location *descriptions for shoreline Monitoring Locations S 301.1 and S-301.2 in Table E-1 indicate when these locations are to be monitored.*

The City also requests that Candlestick Park State Recreation Area shoreline monitoring requirements be clarified so monitoring is required only when nearby combined sewer discharges occur.

Response to City Comment 19
We disagree, with a few exceptions noted below. Some combined sewer discharge monitoring is appropriate for the Monitoring and Reporting Program. The tentative order contains combined sewer discharge monitoring requirements in Provision VI.C.5.b.ix of the tentative order and Provision IV.B.2 of the Monitoring and Reporting Program, but the requirements are not redundant. We ask for very basic data (i.e., event duration and flow volume, as listed in Monitoring and Reporting Program Table E-5) to be uploaded to the California Integrated Water Quality System (CIQWS) through electronic self-monitoring reports. Event durations and flow volumes (which may be estimated) should not pose significant data collection challenges. Such data do not depend on sample preservation, refrigeration, or holding times. We ask for more complex data (i.e., those in Provision VI.C.5.b.ix of the tentative order) to be submitted in a separate report where more context can be provided. Fact Sheet Table F-11 is intended to help the City keep track of all these requirements.

Shoreline monitoring at Crissy Field and Aquatic Park appears to be appropriate at this time. The City asserts that bacteria sampling is unwarranted at these locations because no correlation exists between combined sewer discharges and exceedances of bacteriological standards. However, the City did not provide sufficient supporting evidence. Attachment B of the City's comments presents weekly monitoring results. The City says no monitoring occurred after combined sewer discharges. Without such monitoring, no data exist from which to evaluate correlation. We retained shoreline monitoring at Crissy Field and Aquatic Park so the Regional Water Board may draw a proper conclusion in the future. Since combined sewer discharges occur only a few times per year, this requirement will not impose an undue burden on the City.

We did not revise the monitoring location descriptions for shoreline Monitoring Locations S-301.1 and S-301.2 to indicate when these locations are to be monitored. Provision VI.B of the Monitoring and Reporting Program already contains this information. However, we revised Provision VI.B as follows to clarify which combined sewer discharges are to trigger monitoring at which locations:

> **Shoreline Monitoring.** Following any combined sewer discharge event at Discharge Point Nos. 009, 010, 011, 013, or 015, the Discharger shall monitor shoreline receiving waters at Monitoring Locations S-202.4, S-202.5, S-210, and S-211. Following any combined sewer discharge event at Discharge Point Nos. 040, 041, or 042, ~~or 043,~~ the Discharger shall monitor at Monitoring Location~~s S-300.1, S-301.1, and~~ S-301.2. Following any combined sewer discharge event at Discharge Point No. 043, the Discharger shall monitor at Monitoring Locations S-300.1 and S-301.1. Monitoring shall be conducted at each location as follows for up to seven days or until the single-sample

> bacteriological standards of Cal. Code of Regs. tit. 17, section 7958(a)(1), are met at that location (i.e., the enterococcus density is less than 104 most probable number (MPN)/100 mL and the fecal coliform density is less than 400 MPN/100 mL). Samples shall be collected between 8:00 a.m. and 4:00 p.m.

City Comment 20

San Francisco requests that the dry weather monitoring frequency for 1,2-Diphenylhydrazine remain twice per year and not increase. *The City claims that detection of 1,2-diphenylhydrazine was an isolated incident that could have been a laboratory error. The City has not detected it since. The City asserts that there is no need for monthly monitoring and asks for changes to Monitoring and Reporting Table E-3.*

Response to City Comment 20

We disagree. There is reasonable potential for 1,2-diphenylhydrazine, and the tentative order contains daily and monthly effluent limits. At least monthly monitoring is appropriate to evaluate compliance with these limits.

City Comment 21

Several revisions are needed for the wet weather monitoring requirements. *The City requests that we limit wet weather oil and grease monitoring to Monitoring Location EFF-003 and remove this requirement at Monitoring Locations EFF-001B and EFF-002. The City also asks that we limit wet weather acute toxicity monitoring to Monitoring Locations EFF-001B and EFF-003, and remove this requirement Monitoring Location EFF-002. Finally, the City suggests revising when it may choose to continue an acute toxicity test during wet weather based on the revised wet weather definition it proposed in City Comment 18.*

Response to City Comment 21

We disagree in part. The City provided no basis for its request to limit oil and grease sampling to Discharge Point No. 003. Oil and grease sampling is required during dry weather and is also appropriate for all wet weather outfalls because it is indicative of the effectiveness of primary treatment. Some effluent at Discharge Point No. 001 may receive only primary treatment. Effluent at Discharge Point No. 003 receives primary treatment.

Regarding acute toxicity monitoring, see our response to City Comment 16.

We revised Provision V.A.1 of the Monitoring and Reporting Program as follows to reflect the change to the “wet weather” definition described in our response to City Comment 18:

> During dry weather, acute toxicity at Discharge Point No. 001 (Monitoring Location EFF 001A) shall be evaluated by measuring survival of test organisms exposed to 96-hour continuous flow-through bioassays. The Discharger may stop a bioassay if wet weather occurs during a 96-hour test. If so, the Discharger shall initiate another test as soon as possible (i.e., as soon as approximately 96 hours of dry weather is forecasted). The Discharger may choose to continue a test during wet weather unless the instantaneous influent flow to the Southeast Plant (at

> Monitoring Location INF-001 as defined in the MRP) exceeds 110 MGD <u>and discharge occurs at Discharge Point No. 002</u>.

City Comment 22

The due date for the USEPA Biosolids Annual Report should be consistent with federal regulations. *The City notes that wastewater treatment plants with influent flows over 1 MGD must submit its annual biosolids report to U.S. EPA on or before February 19 each year. The City recommends specifying the date in Provision VIII.B.2.b of the Monitoring and Reporting Program.*

Response to City Comment 22

We disagree. The biosolids annual report deadline does not belong in Provision VIII.B.2.b because that provision describes the annual self-monitoring report due February 1 each year and other reports due February 1. Provision VI.C.4.b of the tentative order sets forth sludge and biosolids management requirements, citing 40 C.F.R. sections 258 and 503. U.S. EPA oversees these requirements and establishes deadlines independent of Regional Water Board actions. Therefore, the tentative order need not specify the biosolids annual report deadline.

City Comment 23

San Francisco requests the hard copy DMR reporting requirement be removed. *The City says the requirement to submit the original and one copy of each DMR is inconsistent with current DMR Processing Center directions.*

Response to City Comment 23

We agree and revised Provision VIII.C.2 of the Monitoring and Reporting Program as follows:

> Once notified by the State Water Board or Regional Water Board, the Discharger shall submit hard copy DMRs. The Discharger shall sign and certify DMRs as Attachment D requires. The Discharger shall submit ~~the~~ original DMR<u>s</u> ~~and one copy of the DMR~~ to one of the addresses listed below:

City Comment 24

San Francisco requests several changes to the Modifications to Attachment G. *The City claims that Attachment G sections I.I.2, I.J., and III.A.3.c do not apply to combined sewer systems and suggests their removal. The City also proposes a new "biosolids" definition.*

Response to City Comment 24

We disagree. Provision I.I.2 of Attachment G applies to separate sanitary sewer systems and combined sewer systems alike. It requires that collection, treatment, storage, and disposal systems be operated in a manner that precludes public contact with wastewater, except where infeasible. It also requires posting warning signs. The previous order (as amended by Order No. R2-2010-0054) contained this requirement. Provision VI.A.2 of the tentative order already states that Provisions I.J and III.A.3.c of Attachment G do not apply.

We acknowledge that the definitions of "sludge" and "biosolids" in Fact Sheet section VI.C.4.b and the definition of "biosolids" in Provision VIII.2 of Attachment G are not perfectly consistent, but we do not find the differences to be so confusing that we need to modify Attachment G in this and future permits. The definitions in section VI.C.4.b apply to the sludge and biosolids provisions of the tentative order, and the definition in Provision VIII.2 applies to the biosolids requirements in Attachment G. We note that the City's proposed modification to Attachment G is also inconsistent with Fact Sheet section VI.C.4.b.

We revised Provision IX.A as follows to avoid confusion because the City does not blend primary-treated and secondary-treated wastewater during dry weather:

> **Attachment G sections V.C.1.f and V.C.1.g are revised as follows, and section V.C.1.h (Reporting data in electronic format) is deleted.**
>
> f. Annual self-monitoring report requirements
>
> By the date specified in the MRP, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year. The report shall contain the following:
>
> 1) Annual compliance summary table of treatment plant performance~~, including documentation of any blending events~~ (this summary table is not required if the Discharger has submitted the year's monitoring results to CIWQS in electronic reporting format by EDF/CDF upload or manual entry);

City Comment 25
The dilution series under "Chronic Toxicity Screening Phase Requirements" in the MRP should be corrected. *The dilution series for whole effluent chronic toxicity Provision V.B.1.e of the Monitoring and Reporting Program is correct. The City asserts that it is inconsistent with the dilution series in Monitoring and Reporting Program Appendix E-1, Provision II.B. The City recommends changing Appendix E-1.*

Response to City Comment 25
No change is necessary since the tentative order provides adequate flexibility for the City to propose and use a different dilution series if appropriate. Provision II.B.5 of the appendix states, "Dilution series of 100%, 50%, 25%, 12.5%, 6.25%, and 0%, where '%' is percent effluent as discharged, or as otherwise approved by the Executive Officer if different dilution ratios are needed to reflect discharge conditions." Provision II.C states, "(t)he Discharger shall submit a screening phase proposal. The proposal shall address each of the elements listed above. If within 30 days, the Executive Officer does not comment, the Discharger shall commence with screening phase monitoring."

City Comment 26
All appropriate tests must be included in Table AE-1 to avoid subverting the intent of the requirement. *The City asks that the chronic toxicity screening procedures be updated to include the larval development test for echinoderms.*

Response to City Comment 26

We agree and revised Appendix E-2 Table AE-1 of the Monitoring and Reporting Program as follows:

Table AE-1. Critical Life Stage Toxicity Tests for Estuarine Waters

Species	(Scientific Name)	Effect	Test Duration	Reference
⋮				
Oyster Mussel	*(Crassostrea gigas)* *(Mytilus edulis)*	Abnormal shell development; percent survival	48 hours	2
Echinoderms - Urchins Sand dollar	*(Strongylocentrotus purpuratus, S. franciscanus)* *(Dendraster excentricus)*	Percent fertilization <u>or larval development</u>	1 hour <u>(fertilization) or 72 hours (development)</u>	2
Shrimp	*(Americamysis bahia)*	Percent survival; growth	7 days	3
⋮				

We will endeavor to make this change in other individual NPDES permits as they come up for reissuance.

City Comment 27

Rainbow trout should be shown in the fact sheet as an approved test species for whole effluent toxicity testing. *Since the Monitoring and Reporting Program approves both rainbow trout and fathead minnow for acute toxicity tests, the City requests that Fact Sheet section IV.C.5.b refer to rainbow trout as well as fathead minnow.*

Response to City Comment 27

We agree and revised Fact Sheet section IV.C.5 as follows:

> This Order includes dry weather effluent limitations for whole effluent acute toxicity based on Basin Plan Table 4-3. All bioassays are to be performed according to the U.S. EPA approved method in 40 C.F.R. section 136, currently Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Edition (EPA-821-R-02-012). The approved test species specified in the MRP ~~is the~~ <u>are rainbow trout (*Oncorhynchus mykiss*) and</u> fathead minnow (*Pimephales promelas*).

City Comment 28

The test species for previous semiannual chronic toxicity testing should be corrected. *The City used the echinoderm larval development test for chronic toxicity testing and requests that the chronic toxicity reasonable potential analysis in Fact Sheet section IV.C.6.b refer to the echinoderm larval development test.*

Response to City Comment 28
We agree and revised Fact Sheet section IV.C.6.b as follows:

> **Reasonable Potential Analysis.** The Discharger conducted semiannual chronic toxicity tests during the previous order term using the echinoderm larval development test ~~sand dollar (*Dendraster excentricus*)~~. The previous order contained chronic toxicity triggers (three-sample median of 10 TUc or single-sample maximum of 20 TUc) for accelerated chronic toxicity testing. ...

U.S. ENVIRONMENTAL PROTECTION AGENCY

U.S. EPA Comment 1
U.S. EPA supports the tentative order's provisions based on the Nine Minimum Controls and the City's Long-Term Control Plan. *U.S.EPA is pleased that the tentative order requires the City to synthesize and update its Long-Term Control Plan.*

Response to U.S. EPA Comment 1
No response is necessary.

U.S. EPA Comment 2
U.S. EPA supports Provision VI.C.4.c of the tentative order. *U.S. EPA supports requiring the City to track and report combined sewer system excursions. However, it recommends changes to Fact Sheet section VI.C.4.c.ii similar to those the City requested in City Comment 9.*

Response to U.S. EPA Comment 2
We agree. See our response to City Comment 9.

U.S. EPA Comment 3
U.S. EPA agrees with the tentative order's effluent limitations, receiving water limitations, and reasonable potential analysis. *The U.S.EPA agrees with the reasonable potential determinations, which properly incorporate all certified data and address backsliding. U.S.EPA also supports the effluent and receiving water limitations.*

Response to U.S. EPA Comment 3
No response is necessary.

BAY AREA CLEAN WATER AGENCIES

Agencies Comment 1
All appropriate tests must be included in Table AE-1 to avoid subverting the intent of the chronic toxicity testing requirement. *The Agencies reiterate City Comment 26, requesting that*

the 72-hour echinoderm larval development test be added to the standard chronic toxicity screening requirements.

Response to Agencies Comment 1
We agree. See our response to City Comment 26.

Attachment C – Supplemental Sewer Overflows in the Combined Sewer System Comments

These supplemental comments address: (i) the proposed definition of sewer overflows from the combined sewer system (SOCSS) in Attachment A – Definitions to the Tentative Order; (ii) the proposed mechanisms in the Tentative Order in Paragraph VI.C.5(a)(viii)(b) associated with monitoring and reporting SOCSS; and (iii) the discussion about SOCSS reporting in the draft Fact Sheet at Section VI.C.5.a.

As a starting point, the SFPUC recognizes that the Regional Water Board and EPA have an interest in including SOCSS monitoring and reporting terms in the final Oceanside permit. The SFPUC emphasizes, subject to these comments, that it is prepared to work with the agencies to develop a workable framework for the monitoring and reporting of SOCSS. Broadly stated, the SFPUC is committed to developing a monitoring and reporting program for SOCSS that: (i) reports SOCSS associated with operation, maintenance, or other combined sewer system failures; and (ii) uploads reportable data to the California Integrated Water Quality System. The SOCSS monitoring and reporting terms needs to be clearly laid out in the permit (as opposed to incorporated by reference) and those terms must be developed with specific consideration of the nature of the SFPUC's system (i.e., a combined sewer system as opposed to a sanitary sewer system). Further, a reasonable approach to SOCSS reporting will not impose a burdensome and unnecessary requirement to collect and report events resulting solely from storm events that exceed the combined sewer system's level of service.

For the reasons summarized here, the proposed terms addressing SOCSS in the Tentative Order are unworkable, ambiguous, inconsistent with applicable law, confusing and rely upon an inapplicable technical and legal framework by erroneously incorporating terms developed and solely applicable to sanitary sewer systems.

Specific Comments

The definition of SOCSS on page A-5 must be revised to exclude SOCSS occurring as a result of storms exceeding the system's level of service. By definition, as a result of the inherent nature of a combined sewer system, SOCSS may occur when the design capacity of the system is exceeded by a storm event. There is no material benefit in collecting data on these occurrences because it is known in advance that they will occur. To the extent that there is a reasonable need to evaluate the performance of the combined system during events in excess of the design criteria, this can be reasonably accomplished via modeling and other engineering evaluation. The burden of doing so would be substantially less than monitoring and reporting these events (which can be widespread during exceptional storm events) and would provide data of equivalent or better value. The requested revision can be incorporated into the permit text with the following edit:

> … Sewer overflows from the combined sewer system do not include releases due to**: (i)** failures in privately-owned sewer laterals**, (ii) overflows resulting solely from storm events in excess of the system's design capacity where the system is otherwise operating as designed,** or **(iii)** authorized combined sewer

discharges at Discharge Point Nos. CSD-001, CSD-002, CSD-003, CSD-004, CSD-005, CSD-006, or CSD-007.

The SFPUC provides the following comments associated with proposed reporting mechanism in the Tentative Order in Paragraph VI.C.5(a)(viii)(b):

1. The proposed reporting mechanism for SOCSS incorporates by reference the sanitary sewer overflow notification and reporting requirements of State Water Board Order No. 2006-0003-DWQ (Order 2006-0003) and any amendments thereto. This is not reasonable. Order 2006-0003 is specifically designed to address overflows from sanitary sewer systems. In fact, Order 2006-0003 was specifically adopted by the State Water Board to meet its obligation to take action pursuant to Water Code section 13193 (2001, A.B. 285). *See Fact Sheet* at https://www.waterboards.ca.gov/water_issues/programs/sso/docs/fs_wqo20130058.pdf). In adopting this section of the Water Code in 2001, the California legislature specifically directed the State Water Board to "develop a uniform overflow event report form to be used for reporting of sanitary sewer system overflows …" Water Code 13193(b); AB 285 (2001) (requiring "the state board, … in consultation with specified entities, to develop report forms for spills or overflows from a sanitary sewer system."). Had the legislature intended the resulting regulations to apply to combined sewer systems, it would have so stated. It did not. And, as a result, none of the reporting or monitoring requirements specified in Water Code 13193(b), and incorporated into Order 2006-0003, are applicable to combined sewer systems and the legislature has not authorized the State Water Board to impose those requirements on a combined sewer system. To the extent that a monitoring and reporting system for SOCSS is going to be required, it must be based upon a reasonable technical analysis of the operations relevant to a combined sewer system and cannot reasonably rely upon an order adopted pursuant to a legislative directive to regulate sanitary sewer systems.

2. Combined sewer systems are distinct from sanitary sewer systems and require separate regulatory schemes recognizing the technical differences. This is uniformly recognized by sewer systems nationwide and accepted by regulatory agencies, including by EPA, which regulate sanitary systems separate from combined sewer systems. See, e.g., https://www3.epa.gov/region1/sso/ ("A combined sewer overflow or CSO is different from an SSO"); EPA's Combined Sewer Overflow Control Policy, 59 Fed. Reg. 18,688 (April 19, 1994). It is, therefore, arbitrary to impose requirements on a combined sewer system that were specifically prepared for and adopted to regulate a sanitary system.

3. The terminology used in Order 2006-0003 is entirely inapplicable to a combined sewer system. For example, the Order: (i) does not define combined sewer overflow; (ii) does not define a combined sewer system; (iii) specifically relates to the regulation of untreated or partially treated wastewater which is defined as "waste discharged from the sanitary sewer system" and is different in kind and nature than the flow in a combined sewer system during storm events. As a result, incorporating the Order (and any amendments thereto) by reference results in ambiguity and a lack of fair notice to San Francisco because the terminology cannot be directly applied to the SFPUC's combined

sewer system and it is unclear how the governments intend to apply the requirements in Order 2006-0003 to a distinct and separate system.

4. San Francisco has been denied reasonable notice and opportunity to comment on, challenge, or influence the terms in Order 2006-0003 (or any existing amendments thereto incorporated into the Tentative Order). This is because the SFPUC had no reasonable notice that a reporting requirement designed for sanitary systems would be, over a decade in the future, applied to its combined sewer system. In fact, the legislature recognized the importance of having the State Water Board work cooperatively with the regulated community to develop Order 2006-0003, but the consulted community naturally consisted of only sanitary sewer systems. *See* Water Code 13193(b) ("the state board, in consultation with representatives of cities, counties, cities and counties, special districts, public interest groups, the State Department of Public Health, and the regional boards shall develop a uniform overflow event report form to be used for reporting of sanitary sewer system overflows"). Because the regulated community involved in consultation with the State Water Board during adoption of Order 2006-0003 consisted of sanitary sewer systems, which are different in kind and nature, their consultation with the State Water Board and participation in the public comment process cannot be deemed to address San Francisco's unique position as the operator of a combined sewer system. Similarly, applying the legislatively mandated reporting requirements for sanitary sewer systems to San Francisco's combined system nearly two decades after adoption of Water Code 13193 arbitrarily and capriciously deprives San Francisco of the protections otherwise afforded to the regulated community by the legislature in mandating that the State Water Board adopt a sanitary sewer overflow reporting requirement. *See, e.g.,* AB 285 (2001) (providing that "… if the Commission on State Mandates determines that the bill contains costs mandated by the state, reimbursement for those costs shall be made pursuant to these statutory provisions…").

5. It is inappropriate to seek to incorporate, by reference, future amendments to Order 2006-0003 into the Oceanside Permit. Incorporation by reference of unknown future terms into the permit do not provide the SFPUC an adequate opportunity to comment on all applicable requirements of the permit in advance of its finalization because the terms in the permit can be modified in the future by separate regulatory action. This also causes an unacceptable delegation from EPA to the Regional Water Board because the Regional Water Board can effectively amend this Oceanside Permit unilaterally by amending Order 2006-0003 whereas, due to the nature of discharges from the permitted system, EPA has concurrent authority over the permit. *See, e.g.,* Tentative Order at Section II. ("This Order is also issued pursuant to federal Clean Water Act (CWA) section 402 and implementing regulations adopted by U.S. EPA and …"). As a result, any future amendment of the permit adopted solely by the State Water Board's amendment of Order 2006-0003 would be contrary to the requirements of the Clean Water Act and its implementing regulations that require public notice and comment. It would also run afoul of the NPDES Memorandum of Agreement Between the U.S. Environmental Protection Agency and the California State Water Resources Control Board, which requires that EPA have an opportunity to comment upon or object to the issuance of a

permit or the terms or conditions therein. All of these concerns are amplified here because Order 2006-003 is, on its face, only applicable to sanitary sewer systems. In fact, in adopting and amending Order 2006-003, the legislature has mandated that the requirements be tailored to sanitary sewer systems. Therefore, not only are the requirements inapplicable to a combined system – as discussed above – but the State Water Board does not have the authority to make changes to an order adopted to implement Water Code 13193, including future amendments to Order 2006-003, to accommodate the distinct engineering and other technical issues associated with a combined sewer system.

Finally, the SFPUC objects to the unqualified characterization in Section VI.C.5.a. of the Fact Sheet that regulators have a need to collect information about SOCSS to "establish whether sewer overflows from the combined sewer system result in a nuisance as defined by Water Code Section 13050" in the fact sheet. As discussed above, there is only a reasonable basis to collect information about SOCSS that result from operation, maintenance, and other system failures. There is no reasonable need or basis to collect information about SOCSS that occur solely due to storm events in excess of the SFPUC's level of service and associated design capacity. Any overflows from the combined system that occur due to storm events in excess of design capacity cannot be, under state law, a nuisance for a number of reasons, including that San Francisco is authorized to operate a combined sewer system, operation of that system is pursuant to a permit issued by regulatory agencies, operation of a combined sewer system is not objectively unreasonable, and San Francisco is further protected by design immunity granted pursuant to the California Government Code. The fact sheet needs to be amended to recognize that any collection of information about SOCSS is limited to events resulting from a system failure or other operation and/or maintenance issue and not due to storm events in excess of design capacity.

Attachment D – Supplemental Combined Sewer Discharge Monitoring Comments

The SFPUC requests the removal of monitoring locations EFF-CSD-1, EFF-CSD-2, and EFF-CSD-7 and retaining the current CSD monitoring location EFF-CSD.

The SFPUC requests replacement of Monitoring Locations EFF-CSD-1, EFF-CSD-2, and EFF-CSD-7 with a single monitoring location EFF-CSD that reflects the current EFF-CSD sampling location. The Tentative Order requires the SFPUC to abandon the current EFF-CSD monitoring location and construct three new field-based monitoring locations: EFF-CSD-1, EFF-CSD-2, and EFF-CSD-7. The need for the water quality monitoring data at these locations is unclear, and the implementation of this new requirement will cost more than $400,000 over the 5-year permit cycle.

The SFPUC has an established CSD sampling station, secured within the Westside Pump Station, that has been used since 2004. The station is hydraulically downstream of the Lake Merced Tunnel (Discharge Point No. CSD-001), Westside Transport/Storage Structure (Discharge Point Nos. CSD-002, CSD-003), and the Richmond Transport/Storage Tunnel (Discharge Point Nos. CSD-005, CSD-006, CSD-007). The EFF-CSD samples collected at this station are effectively a composite of wet weather flows from the catchments that drain to these three structures and, therefore, representative of discharges from the associated outfalls. The Tentative Order proposes three new monitoring locations, but there is likely little benefit to characterizing each of these three outfall areas individually because each of the tributary watersheds are largely residential with some commercial usage. (As demonstrated by the data collected to date at EFF-CSD, the CSDs have pollutant concentrations similar to or slightly below those found in stormwater runoff.) Typically, monitoring is added in an NPDES permit to answer a specific question of scientific importance. However, the rationale of adding these new monitoring locations has not been communicated and is unclear to SFPUC.

The proposed requirement also will require construction of secure sampling stations on land not owned by the SFPUC as well as hiring on-call staff to perform intensive on-call storm tracking and immediate sample collection. Below is a summary of the estimated costs of performing the proposed field monitoring. This estimate was prepared by ADH Environmental, a consultant with regional expertise in stormwater and surface water quality monitoring. The cost estimates below do not include property acquisition, sampler maintenance, and false starts (mobilization for storm events that do not generate a CSD), all of which may increase costs significantly.

Monitoring Scenario	Equipment Purchase, Installation & Set-up	Storm Tracking & Sample Collection	Sample Analyses
One Monitoring Event, 1 site	$27,000	$4,500	$2,600
One Monitoring Event, 3 sites	$81,000	$13,500	$7,800
One Year of 3/Year Monitoring, 3 sites	$81,000	$40,500	$23,400
Five Years of 3/Year Monitoring, 3 sites	$81,000	$202,500	$117,000
TOTAL	**$400,500**		

The Tentative Order already includes a substantial increase in required monitoring at the treatment plant as it adds six new effluent monitoring locations. Introducing these three new CSD monitoring locations in the Monitoring and Reporting Program suggests that they will be permanent monitoring locations to be maintained in perpetuity. The costs associated with implementing the CSD monitoring required by the Tentative Order are very substantial. In the absence of a clear monitoring objective, and a monitoring plan designed to meet that objective, the SFPUC is concerned that the data collected will be of little to no benefit. Alternatively, if the Regional Water Board and USEPA insist upon collecting water quality data to help determine whether there is variability in the water quality of the three outfall areas, SFPUC is amenable to collaborating with the Regional Water Board and USEPA to develop a work plan to conduct a special study to characterize the water quality of the combined sewer discharges in these three locations.