

ATTACHMENT 2

FACT SHEET

**NPDES Permit
No. NH0100170**

Dated July 11, 2013

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Nashua Wastewater Treatment Facility

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**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I - NEW ENGLAND
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MASSACHUSETTS 02109-3912**

FACT SHEET

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO
DISCHARGE TO WATERS OF THE UNITED STATES**

NPDES PERMIT NO: NH0100170

PUBLIC COMMENT PERIOD START AND END DATES: July 23, 2013 thru September 20, 2013

NAME AND ADDRESS OF THE APPLICANT:

**City of Nashua
Sawmill Road
Nashua, New Hampshire 03060**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS

**City of Nashua Wastewater Treatment Facility
Sawmill Road
Nashua, New Hampshire 03060**

**And from eight combined sewer overflows (CSOs) (discharge serial numbers 002 – 009 (See
Attachment A for individual outfall locations)**

**RECEIVING WATERS: Merrimack River (Wastewater Treatment Facility (outfall # 001),
CSOs # 002-005)**

Nashua River (CSOs # 006-009)

CLASSIFICATION: B

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I. PROPOSED ACTION

The City of Nashua, New Hampshire (the “City” or “permittee”), has applied to the United States Environmental Protection Agency (“EPA”) for reissuance of its National Pollutant Discharge Elimination System (“NPDES”) permit to discharge to the designated receiving waters.

The discharges are from the Nashua Wastewater Treatment Facility (“WWTF”), which is a publicly owned treatment works (“POTW”) that is engaged in the collection and treatment of wastewater generated by the residents, businesses and industries in the City of Nashua and the Town of Hudson, New Hampshire as well as from eight combined sewer overflow discharge points (“CSOs”). According to information supplied in the NPDES application submitted by the permittee, the facility accepts and treats wastewater from 133 industrial dischargers (users), including 23 significant industrial users, and maintains an active pretreatment program. The facility also accepts approximately 375,000 gallons of septage annually.

The most recent NPDES permit was issued to the City on May 31, 2000 and expired on May 31, 2005. This permit has been administratively continued, as a complete application for permit reissuance was filed by the City in accordance with the Administrative Procedures Act (5 U.S.C. 558(c)) and 40 CFR § 122.6. This permit is hereafter referred to as the “2000 permit” or the “existing permit”.

The draft permit, upon final issuance, shall supersede the 2000 permit.

II. TYPE OF FACILITY AND DISCHARGE LOCATIONS

1. Background

The original facility was constructed in 1959, underwent an expansion in 1974, was upgraded to secondary treatment in 1989, and upgraded again in 2000 to include anaerobic digestion. Ongoing construction projects include work to mitigate the discharge of untreated wastewater through the City’s eight combined sewer overflow outfalls (“CSOs”) into the Merrimack and Nashua Rivers, which are discussed in more detail below.

The Nashua WWTF has one outfall (outfall number 001) through which treated effluent is discharged to the Merrimack River (See Figure 1). Blended effluent, comprised of primary and secondary effluent, is also discharged through outfall 001 during wet weather events when the flow to the WWTF exceeds the plant’s secondary treatment capacity, as described below. The City also owns and operates a CSO treatment facility (Wet Weather Flow Treatment Facility, or “WWFTF”), located adjacent to the wastewater treatment facility. The discharge from this facility combines with secondary effluent (as well as combined secondary and primary effluents, when the secondary treatment process is bypassed) from the WWTF in the chlorine contact tank and is discharged through outfall 001. The operation of this facility is described in the *Wet Weather Flow* section.

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Discharges of combined sanitary wastewater and stormwater occur from the eight combined sewer overflow discharge outfalls identified in Attachment A when the hydraulic capacity of the wastewater treatment facility/collection system becomes overloaded during storm events. A second CSO treatment facility is expected to commence operation within the next few years. This facility will provide screening and disinfection to combined flows which currently discharge through CSO outfalls #005 and #006. Flows from this facility will discharge to the Merrimack River. These discharges are discussed in further detail in Part VIII of this fact sheet

2. Treatment Process

The Nashua WWTF uses an activated sludge process to provide secondary treatment to wastewater flows up to its 16 million gallons per day (MGD) annual average design flow capacity and up to its peak flow capacity of 38 MGD. A description of the normal dry weather flow operation of the treatment plant is included immediately below. A process diagram is shown in Figure 2. Facility operations during wet weather events are described later in this section and a corresponding schematic is shown in Figure 3.

Dry Weather Flow

Influent flows enter the treatment works through the main influent wet well, where larger solids and debris are removed by bar screens to minimize the potential for such objects to damage equipment farther along the process train. The materials removed are washed and conveyed to a closed top container for disposal. Flows are monitored by ultrasonic flow sensors, which relay the data to the Supervisory Control and Data Acquisition (SCADA) system and are then conveyed to the grit removal building by a force main. Inside the grit chambers, the introduction of coarse bubble aeration serves to decrease the flow velocity, which in turn allows for the settling of large inorganic solids and coarse debris. The settled material is washed and loaded into trucks for disposal at the City's landfill.

Next, the wastewater flows to primary sedimentation basins where the floatable (oil and grease) and settleable solids (sludge) are removed. The floatable solids are directed to a storage tank for disposal and the sludge is pumped to gravity thickeners. The primary effluent flows to the aeration basins, where it comes into contact with activated sludge, which consists of a mixture of biological organisms. Aeration of the wastewater facilitates the growth of aerobic bacteria, which reduce the organic load in the wastewater by converting it to energy and biomass. The wastewater then flows to the secondary clarifiers where suspended material (bacteria and remaining solids) settle out from the liquid portion of the wastewater (effluent). Floatable solids are removed by a rake arm and are pumped back to the head of the aeration basins. The settled material, which forms sludge at the bottom of the clarifiers, is collected by rotating rake arms. Most of the collected sludge is pumped back to the aeration tanks as return activated sludge ("RAS") to maintain biological treatment; a smaller portion is pumped to a holding tank for disposal (waste activated sludge, or "WAS"). From the secondary clarifiers, the treated effluent flows into the chlorine contact chambers where liquid sodium hypochlorite is added to kill any pathogenic organisms. A sample of the effluent is continuously analyzed, and the disinfected

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effluent is dechlorinated with a sodium metabisulfite solution prior to discharge. The effluent cascades to the outfall chamber and is discharged to the Merrimack River through outfall 001.

Solids Handling

The sludges created during the primary and secondary treatment processes are thickened by gravity thickeners and belt thickeners, respectively, to reduce the water content. The thickened sludge is then sent to the anaerobic digester complex. The hydraulic retention time in the 1.3 million gallon egg-shaped primary digester is approximately 20 days. During this time, the solids are further broken down into carbon dioxide, water and methane gas. The methane is sent to a generator to produce electricity and to a boiler to produce heat for the digestion process. The digested biosolids are then sent to three belt filter presses for dewatering, and are then loaded into trucks for distribution to farms within the state for use as a soil enhancer.

Wet Weather Flow

During wet weather events, flows up to 50 MGD are conveyed to the headworks of the wastewater treatment plant, with 38 MGD receiving full secondary treatment. The additional flow (up to 12 MGD) bypasses the secondary treatment process, receiving primary treatment before blending with secondary effluent for disinfection and dechlorination prior to being discharged through outfall 001, as discussed in further detail below.

The bypass of secondary treatment during wet weather events is considered an interim measure to control discharges of untreated wastewater through CSOs per the Consent Decree which was lodged in 2005 (see Part VIII.A. of this fact sheet for further discussion of the Consent Decree)¹. Use of this bypass is governed by the terms of the 2005 Consent Decree, which establishes conditions, monitoring requirements and effluent limitations.

Wet weather related flows that exceed the 50 MGD primary treatment capacity of the WWTF are diverted to a 60 MGD Wet Weather Flow Treatment Facility (WWFTF), which is located adjacent to the main wastewater treatment plant and commenced operation in 2009. The Wet Weather Flow Treatment Facility effectively expanded the City's wet weather treatment capacity to 110 MGD, in accordance with the 2010 High Flow Management Plan.

Flow is diverted to the Wet Weather Flow Treatment Facility when the main influent gate to the wastewater treatment facility is lowered. This typically occurs automatically when the flow rate through the main gate reaches 50 MGD. The lowering of the main influent gate activates a diversion structure located on the 72" North Merrimack interceptor. A 60 MGD pumping

¹ CSO-related bypass of treatment during wet weather may not be authorized in NPDES permits until a long term control plan has been approved by EPA and other conditions are met. Interim approval of a CSO-related bypass may be accomplished through an administrative order which outlines the conditions under which a bypass of secondary treatment may be operated (CSO Control Policy, Federal Register, Vol. 59, No. 75, April 19, 1994. Also see 40 CFR 122.41(m)). The conditions under which bypasses of secondary treatment at the Nashua WWTF may occur are prescribed in the City's High Flow Management Plan, dated 2010, per the 2005 Consent Decree.

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facility, which includes a screening facility to protect downstream equipment from being damaged by large objects and coarse debris, pumps the excess flows to the Wet Weather Flow Treatment Facility, which uses a ballasted flocculation process and consists of two 30 MGD treatment trains. The treatment process utilizes polymers in conjunction with micro sand to form a quick-settling floc. The effluent from the WWTF is then blended with primary and secondary effluent in the wastewater treatment plant's chlorine contact chamber for disinfection prior to being discharged to the Merrimack River through outfall 001.

The solids removed during the treatment process undergo vortex separation to recover the micro sand used in the ballasted flocculation process. Any remaining sludge is thickened and introduced into the existing sludge process train, including blending with primary and secondary thickened sludges.

III. DESCRIPTION OF THE DISCHARGE

A quantitative description of the discharge from outfall 001, in terms of significant effluent parameters based on monitoring data submitted by the permittee from 2007-2012, can be found in Attachment D of this fact sheet. This data represents the quality of secondary effluent as well as combined effluent, which consists of a combination of secondary, primary, and WWTF effluents.

As described earlier, the facility also experiences wet weather-related bypasses of secondary treatment, not authorized under the existing permit, that are provided with primary treatment and are then combined with secondary effluent ("combined effluent") for disinfection prior to discharge. Monitoring data of combined effluent is reported pursuant to a 2005 Consent Decree (*United States v. City of Nashua*, Civil Action No. 05-376-PB (December 2005, as amended)). Monitoring results for combined effluent from 2009-2011 are shown in Attachment E.

Annual discharge volumes from the City's combined sewer overflow outfalls from 2009-2011 are provided in Attachment F.

IV. LIMITATIONS AND CONDITIONS

The draft permit contains effluent limitations for outfall serial number 001 (WWTF outfall), including limits on 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), pH, *Escherichia coli* (*E. coli*), total residual chlorine, total recoverable lead, total recoverable copper, total phosphorus and whole effluent toxicity ("WET"); as well as monitoring requirements for hardness, ammonia nitrogen, alkalinity; and total recoverable aluminum, cadmium, copper, nickel, lead, and zinc. Additionally, the draft permit includes limitations and conditions authorizing discharges from CSOs, the Wet Weather Flow Treatment Facility and the future Screening and Disinfection Facility. These proposed limitations and conditions, which are discussed in further detail throughout this fact sheet, can be found in Part I, Sections A and B, of the draft permit.

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V. STATUTORY AND REGULATORY AUTHORITY

A. General Statutory and Regulatory Background

Congress enacted the Clean Water Act (“CWA” or, the “Act”) “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” (CWA § 101(a)). To achieve this objective, the CWA makes it unlawful for any person to discharge any pollutant into waters of the United States from any point source, except as authorized by specified permitting sections of the CWA, one of which is Section 402 (see CWA §§ 301(a) and 402(a)). Section 402 establishes one of the CWA’s principal permitting programs, the National Pollutant Discharge Elimination System (“NPDES”). Under this section of the CWA, EPA may “issue a permit for the discharge of any pollutant or combination of pollutants” in accordance with certain conditions (see CWA § 402(a)). NPDES permits generally contain discharge limitations and establish related monitoring and reporting requirements (see CWA § 402(a)(1) and (2)).

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits, technology-based effluent limitations and water quality-based effluent limitations (see CWA §§ 301, 303, and 304(b)). Also see 40 CFR Parts 122, 125, and 131. Technology-based limitations, generally developed on an industry-by-industry basis, reflect a specified level of pollutant reducing technology available and economically achievable for the type of facility being permitted (see CWA §301(b)). As a class, POTWs must meet performance-based requirements which are based upon secondary treatment. The secondary treatment technology guidelines (effluent limits) consist of effluent limitations for BOD₅, TSS, and pH (see 40 CFR Part 133). Water quality-based effluent limitations are developed and incorporated into NPDES discharge permits to ensure that state water quality standards are met regardless of the decision made with respect to technology and economics in establishing technology-based limits. In particular, Section 301(b)(1)(C) of the CWA requires achievement of “any more stringent limitation, including those necessary to meet water quality standards... established pursuant to any state law or regulation...” See 40 CFR §§ 122.4(d) and 122.44(d)(1) (providing that a permit must contain effluent limits as necessary to protect State water quality standards, “including State narrative criteria for water quality”) (emphasis added) and 40 CFR § 122.45(d)(5) (providing in part that a permit incorporate any more stringent limits required by Section 301(b)(1)(C) of the CWA). Under Section 301(b)(1) of the CWA, POTWs must have achieved effluent limitations based upon secondary treatment by July 1, 1977. Since all statutory deadlines for meeting technology-based effluent limitations established pursuant to the CWA have expired, the deadline for compliance with technology-based effluent limits for a POTW is the date of permit issuance (40 CFR § 125.3(a)). Extended compliance deadlines cannot be authorized by a NPDES permit if statutory deadlines have passed.

The CWA requires that states develop water quality standards for all water bodies within the state (see CWA § 303). Water quality standards consist of three elements: (1) one or more designated use for each waterbody or waterbody segment in the state; (2) water quality criteria consisting of numerical concentration levels and/or narrative statements specifying the amounts of various pollutants that may be present in each waterbody without impairing the designated use(s) of that waterbody; and (3) an antidegradation provision focused on protecting high quality

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waters and protecting and maintaining the level of water quality necessary to protect existing uses (CWA § 303(c)(2)(a) and 40 CFR § 131.12). The limits and conditions contained within the draft permit reflect the goal of the CWA and EPA to achieve and then to maintain water quality standards within the receiving water. The applicable state water quality standards can be found in the New Hampshire Surface Water Quality Regulations, Chapter Env-Wq 1700 et seq. See generally, Title 50, Water Management and Protection, Chapter 485A, Water Pollution and Waste Disposal, Section 485-A. The New Hampshire Surface Water Quality Regulations are hereinafter referred to as the “NH Standards”.

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from a state’s water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable instream pollutant concentrations. Acute and chronic aquatic life criteria are generally implemented through maximum daily limits and average monthly limits, respectively. When a state has not established a numeric water quality criterion for a specific pollutant that is present in the effluent in a concentration that causes or has the reasonable potential to cause or contributes to a violation of a narrative criterion within a water quality standard, the permitting authority must establish limits in one or more of the following ways: (1) based on a calculated numeric criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and fully protect the designated uses; (2) on a case-by-case basis using water quality criteria published under CWA § 304(a), supplemented as necessary by other relevant information; or (3) in certain circumstances, based on an indicator parameter (40 CFR § 122.44(d)(1)(vi)(A-C)).

The federal regulations governing EPA’s NPDES program are generally found at 40 CFR Parts 122, 124, and 136.

B. Development of Water Quality-based Effluent Limitations

Pursuant to 40 CFR § 122.44(d)(1), NPDES permits must contain any requirements in addition to technology-based limits necessary to achieve water quality standards established under Section 303 of the CWA. In addition, limitations “must control any pollutant or pollutant parameter (conventional, non-conventional, or toxic) 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 water quality standard, including State narrative criteria for water quality” (40 CFR § 122.44(d)(1)(i)). An excursion occurs if the actual or projected instream concentration exceeds the applicable criterion.

1. Reasonable Potential

In determining whether or not a discharge causes, has the reasonable potential to cause, or contributes to an excursion above a narrative or numeric criterion within a state water quality standard, EPA considers: (1) existing controls on point and non-point sources of pollution; (2) the variability of the pollutant or pollutant parameter in the effluent; (3) the sensitivity of the

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species to toxicity testing; (4) where appropriate, the dilution of the effluent in the receiving water; and (5) the statistical approach outlined in the *Technical Support Document for Water Quality-based Toxics Control*, Section 3 (USEPA, March 1991 [EPA/505/2-90-001])(see also 40 CFR § 122.44(d)(1)(ii)). In accordance with New Hampshire's Water Quality Standards (RSA 485-A:8 VI, Env-Wq 1705.02), the available dilution for rivers and streams is based on a known or estimated value of the lowest average flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10 flow) for aquatic life and human health criteria for non-carcinogens, or the long-term harmonic mean flow for human health (for carcinogens only) in the receiving water at the point just upstream of the outfall. Furthermore, ten percent of the receiving water's assimilative capacity is held in reserve for future needs in accordance with New Hampshire's Surface Water Quality Regulations (Env-Wq 1705.01).

C. Antibacksliding

Section 402(o) of the CWA generally provides that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. EPA has also promulgated anti-backsliding regulations, which are found at 40 CFR § 122.44(l). Unless applicable anti-backsliding requirements are met, the limits and conditions in the reissued permit must be at least as stringent as those in the previous permit. The limitations and conditions contained within the draft permit satisfy the antibacksliding requirements of 40 CFR § 122.44(l).

D. State Certification

Section 401(a)(1) of the CWA requires all NPDES permit applicants to obtain a certification from the appropriate state agency stating that the permit will comply with all applicable federal effluent limitations and state water quality standards. See CWA § 401(a)(1). The regulatory provisions pertaining to state certification provide that EPA may not issue a permit until a certification is granted or waived by the state in which the discharge originates (40 CFR § 124.53(a)). The regulations further provide that, "when certification is required... no final permit shall be issued... unless the final permit incorporated the requirements specified in the certification under § 124.53(e)" (40 CFR § 124.55(a)(2)).

VI. DESCRIPTION OF THE RECEIVING WATER

CSO outfalls #006-009 discharge into the Nashua River, which flows into the Merrimack River, with CSO outfall #008 being located the farthest upstream from the confluence of the Nashua and Merrimack Rivers. The Nashua WWTF (outfall 001) and CSOs #002-005 discharge to the Merrimack River, downstream from the confluence with the Nashua River. The Merrimack River flows for approximately 2.9 miles from the farthest CSO outfall (CSO outfall #003) to the Massachusetts border. The locations and relations of the CSO outfalls and WWTF to one another are shown in Figure 4.

Both the Nashua and Merrimack Rivers are classified by the State of New Hampshire as Class B waters. Class B waters shall be of the second highest quality and shall have no objectionable

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physical characteristics, and shall contain a dissolved oxygen content of at least 75 percent saturation (see RSA 485-A:8). The following designated uses apply to Class B waters: the protection and propagation of aquatic life and wildlife, for swimming and other recreational purposes; and, after treatment, for water supplies (RSA 485-A:8).

Sections 305(b) and 303(d) of the CWA require that States complete a water quality inventory and develop a list of impaired waters. Specifically, Section 303(d) of the CWA requires States to identify those water bodies that are not expected to meet surface water quality standards after the implementation of technology-based controls, and as such, require the development of a Total Maximum Daily Load (TMDL) for each pollutant that is prohibiting a designated use(s) from being attained. The results of the 305(b) assessments are used in the development of the State of New Hampshire's 303(d) lists, which are published every two years and identify the water bodies which are not meeting (or are not expected to meet) water quality standards, identify the designated use(s) which is impaired and also the pollutant(s) causing the impairment(s).

The segment of the Merrimack River into which the Nashua WWTF and the CSOs discharge (Assessment Unit ID: NHRIV700061206-24) is identified in the *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010) as not meeting the following designated uses (i.e., the uses are impaired and require the development of a TMDL for the identified causes of the impairment(s)): (1) aquatic life use for aluminum and pH; (2) primary contact recreation use for chlorophyll-a and *Escherichia coli* (*E. coli*); and (4) secondary contact recreation use for *E. coli*.

The segments of the Nashua River into which CSOs # 007 and #008 discharge (Assessment Unit ID: NHRIV700040402-08), and CSOs # 006 and #009 discharge (Assessment Unit ID: NHRIV700040402-09), as well as the intervening segment (Assessment Unit ID: NHIMP700040402-05) are not meeting the following designated uses, as identified in the *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010), as follows: (1) primary contact recreation use for *E. coli* and (2) secondary contact recreation use for *E. coli* (segment NHRIV700040402-08 only).

CSOs are listed as the source of the pollutant causing impairment of the primary contact designated use in the segments of the Merrimack and Nashua Rivers affected by the CSOs. A TMDL for the Merrimack and Nashua Rivers for *E. coli* has been completed (2010) and the requirements in the draft permit are consistent with the TMDL. TMDLs for the Merrimack River are scheduled to be completed as follows: aluminum-2019, pH-2016 and chlorophyll-a- 2019 (See *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010)).

With respect to the pollutants identified as causing or contributing to impairments of designated uses for which a TMDL has yet to be developed, EPA is required to use available information to establish water quality-based limits when issuing NPDES permits to facilities which discharge to impaired waters. See generally 40 CFR §122.44 (d).

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The Nashua WWTF (outfall 001) and CSOs #002-005 discharge to the last segment of the Merrimack River in New Hampshire. Therefore, the impacts of the discharges from the Nashua's WWTF and CSOs on the quality of the Merrimack River in Massachusetts were also considered during the development of the draft permit. The first segment of the Merrimack River in Massachusetts (segment 84A-01) is listed as impaired due to metals and pathogens in the final *Massachusetts Year 2010 Integrated List of Waters* (MassDEP 2010), which includes the 303(d) listing of waters not meeting or expected to meet water quality standards.

Based on the most current information available, EPA believes that the limitations and conditions contained in the draft permit represent the minimum level of control necessary to ensure protection of all designated uses in the receiving waters.

VII. PERMIT BASIS AND EXPLANATION OF EFFLUENT LIMITATION DERIVATION

A. Flow

The annual (long-term) average design flow of the Nashua WWTF (16 MGD) was used to determine the available dilution, which was used to calculate effluent limitations for total residual chlorine and whole effluent toxicity as well as the mass-based limits for BOD₅ and TSS, in accordance with the requirements found at 40 CFR § 122.45(b).

The draft permit maintains the requirement in the 2000 permit for the permittee to submit to EPA and NHDES a projection of loadings, a program for maintaining satisfactory treatment levels, and plans for facility improvements whenever the effluent flow exceeds 80 percent of the facility's design flow capacity (12.8 MGD) for three consecutive months. The draft permit also maintains the average monthly and maximum daily flow reporting requirements in the 2000 permit.

B. Conventional Pollutants

1. Five-Day Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS)

The average monthly and average weekly effluent limitations for BOD₅ and TSS of 30 mg/l and 45 mg/l, respectively in the draft permit are based on the secondary treatment regulations for POTWs found at 40 CFR § 133.102(a) and (b). The 50 mg/l maximum daily limitations for BOD₅ and TSS in the existing permit, which were based on state certification requirements, have been maintained in the draft permit. The draft permit also contains average monthly (4006 lbs/day), average weekly (6008 lbs/day), and maximum daily (6676 lbs/day) mass-based limits for BOD₅ and TSS, in accordance with the requirements of 40 CFR § 122.45(f). See Attachment C for the equations used to calculate these mass-based limits.

The draft permit also carries forth the requirement in the 2000 permit for obtaining an 85% reduction of BOD₅ and TSS, in accordance with the requirements of 40 CFR § 133.102(a)(4)(iii).

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The provisions of 40 CFR § 133.103(a) allows for the application of an exception to the 85% BOD₅ and TSS removal requirement in the event that a treatment works receiving flow from combined sewers is not able to achieve this level of BOD₅ and TSS reduction during wet weather events. Achieving such reductions is difficult during such periods when influent flows are diluted and the secondary treatment capacity at the plant is exceeded.

Therefore, an exception to the 85% BOD₅ and TSS removal requirement during wet weather events has been incorporated into the draft permit in accordance with 40 CFR § 133.103(a). Specifically, the draft permit requires that the 30-day average percent removal of BOD₅ and TSS be no less than 85% during periods of dry weather, which is defined as any calendar day on which there is less than 0.1 inch of rainfall and no snow melt.

The limitations and requirements pertaining to BOD₅ and TSS in the draft permit are the same as those in the existing permit and are therefore consistent with the antibacksliding requirements of 40 CFR § 122.44(l).

2. pH

The limitation for pH in the draft permit is based on the State's water quality standards for Class B waters established at RSA 485-A:8 II, requiring that "The pH range for said (Class B) waters shall be 6.5-8.0 except when due to natural causes" and is required by the state as a condition for obtaining state certification. The pH limitation in the draft permit is the same as that in the existing permit in keeping with the antibacksliding requirements of 40 CFR § 122.44(l) and is at least as stringent as the requirements of 40 CFR § 133.102(c).

The special condition in the 2000 permit, which allows for a change in the pH limitation to outside of the range of 6.5 to 8.0 Standard Units (SU) upon meeting certain conditions, has not been included in the draft permit because of the listing of the aquatic life designated use for the segment of the Merrimack River in the vicinity of the discharge as impaired due to pH in the *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010)).

3. Escherichia coli (E. coli)

The limitations for *E. coli* at outfall 001 in the draft permit are an average monthly limit of 126 colonies per 100 milliliters (ml) and a maximum daily limit of 406 colonies per 100 ml. These limitations are based on requirements in the State's Statutes for Class B waters (non-designated beach areas) found at RSA 485-A:8 II, and Env-Wq 1703.06 (b), which requires that bacteria criteria shall be applied at the end of a wastewater treatment facility's discharge pipe.

The average monthly value shall be reported as the geometric mean of the sampling results for the reporting month. The draft permit requires the concurrent collection of *E. coli* and total residual chlorine samples. Compliance with the average monthly value shall be determined from the reported geometric mean. These limitations are identical to those in the existing permit in keeping with the anti-backsliding requirements of 40 CFR § 122.44(l).

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Page 14 of 36**C. Non-conventional and Toxic Pollutants**

Water quality-based effluent limitations for specific toxic pollutants are based on numeric chemical-specific criteria derived from extensive scientific studies. EPA has summarized and published toxicity criteria for specific toxic pollutants in the *Quality Criteria for Water* (USEPA 1986 [EPA440/5-86-001]), commonly referred to as the “Gold Book”. The Gold Book includes acute aquatic life criteria (to protect against the effects of short-term exposure, such as death) and chronic aquatic life criteria (to protect against the effects of long-term exposure, such as impaired growth). The State of New Hampshire adopted the Gold Book criteria (with certain exceptions) into the state’s surface water quality regulations on December 3, 1999 (see Env-Wq 1703.21). EPA uses the pollutant-specific criteria contained within the Gold Book (and adopted by the State of New Hampshire) along with the available dilution in the receiving water and other relevant information in the development of pollutant-specific water quality-based effluent limitations.

7Q10 Flow and Available Dilution

Water quality-based effluent limitations are established using a calculated dilution factor that represents the available dilution in the receiving water at the point of discharge. The dilution factor is derived from the design flow of the facility and the annual seven consecutive day mean low flow of the receiving water with a recurrence interval of once in every ten years (“7Q10 flow”) (see Env-Wq 1702.44). In calculating water quality-based effluent limitations, the available dilution is reduced by 10% to account for the State’s assimilative capacity reserve rule (see Env-Wq 1705.01).

The dilution factor used in the development of the 2000 permit was 28.0, which was based on an estimate of the 7Q10 flow at outfall 001 of 745.8 cubic feet per second (cfs) and the design flow of the facility, 16 mgd (24.8 cfs). The 7Q10 flow value was determined from flow measurements in the Merrimack River and estimates of the drainage basin area above the outfall.

For this draft permit, the dilution factor was recalculated to be 28.5, based on a revised estimate of the 7Q10 flow at outfall 001 of 784.1 cfs.

The revised 7Q10 value at the point of discharge resulted from recalculated 7Q10s for the upstream U.S Geological Survey (USGS) gage at Goffs Falls, Manchester, NH, and for several downstream USGS gages using more recent periods of record. Also, rather than using the ratio of the drainage areas to estimate the 7Q10 for the intervening drainage area between the USGS gages and the outfall, the new 7Q10 estimate uses the ratio of the flows calculated using the empirical equation for estimating flows in ungaged streams developed by Dr. Lawrence S. Dingman of UNH (Dingman Ratio Proration Method or DRPM). The calculations supporting the revised 7Q10 flow estimate and the derivation of dilution factor are shown in Attachment B.

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1. Total Residual Chlorine (TRC)

The New Hampshire water quality standards include freshwater chronic and acute aquatic-life criteria for chlorine which are established as 0.011 mg/l and 0.019 mg/l, respectively.

Chlorine and chlorine compounds, such as “organochlorines”, produced by the chlorination of wastewater can be extremely toxic to aquatic life. Section 101(a)(3) of the Act, and the New Hampshire standards at Env-Wq 1703.21(a), prohibit the discharge of toxic pollutants in toxic amounts. Therefore, to reduce the potential for the formation of chlorinated compounds during the wastewater disinfection process and to be protective of the States’ narrative standards, EPA-Region I has, historically, established a maximum Total Residual Chlorine (TRC) limitation of 1.0 mg/l for both the average monthly and the maximum daily limitations. These limitations may be more stringent, after considering the available dilution, than the limits determined using the State’s numeric water quality criteria.

The average monthly and maximum daily limitations for total residual chlorine (TRC) in the 2000 permit (0.308 mg/l and 0.532 mg/l, respectively) were based upon the acute and chronic aquatic life criteria specified in the state’s water quality standards and a dilution factor of 28.

The average monthly and maximum daily limits for TRC proposed in the draft permit are 0.31 mg/l and 0.54 mg/l, respectively. These limits are based on the revised dilution factor of 28.5, which reflects a 10% reduction in the available dilution to account for the State’s assimilative capacity reserve rule (see Env-Wq 1705.01), and the acute and chronic aquatic life criteria for TRC specified in the State’s water quality standards (19 µg/l and 11 µg/l, respectively [see Env-Wq. 1703.21, Table 1703.1]). These limits were calculated by multiplying the dilution factor by the criteria, as shown below.

$$\text{Acute TRC Limit} = 19 \mu\text{g/l} \times 28.5 = 540 \mu\text{g/l} (0.54 \text{ mg/l})$$

$$\text{Chronic TRC Limit} = 11 \mu\text{g/l} \times 28.5 = 314 \mu\text{g/l} (0.31 \text{ mg/l})$$

The draft permit requires the concurrent collection of total residual chlorine samples with *E. coli* samples.

2. Metals

The release of metals into surface waters from anthropogenic activities such as discharges from municipal waste water treatment facilities can result in their accumulation to levels that are highly toxic to aquatic life. Therefore, it is imperative to evaluate the downstream effects of discharges of metals from POTWs. The existing permit requires bimonthly effluent monitoring for copper. In addition, the existing permit requires concurrent analyses for aluminum, copper, lead, zinc, nickel, cadmium, and chromium on samples of the receiving water collected upstream from the discharge for use as dilution water in whole effluent toxicity (WET) tests, as well as on samples of the effluent, in conjunction with quarterly WET tests. The results of metals analyses conducted on samples of the effluent and upstream receiving water from 2007-2012 are shown in Attachment D.

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The risk of toxicity associated with copper, lead, zinc, nickel, cadmium and chromium in freshwater systems are hardness-dependent, with an increase in water hardness resulting in a decrease in the toxicity of the metal. The water quality criteria for these metals accounts for this relationship and are specific to the hardness of the water in which the criteria are being applied (see Env-Wq 1703.21, Table 1703.1).

A downstream hardness value of 16 mg/l as CaCO₃ was determined by applying a median upstream hardness value of 14 mg/l as CaCO₃ and a median effluent hardness value of 65 mg/l as CaCO₃, as reported in WET tests from 2007-2012 (Attachment D); the design flow of the facility and the receiving water 7Q10 flow to a mass balance equation. Since this downstream hardness is below 25 mg/l, a default value of 25 mg/l was used to determine the total recoverable metals criteria, in accordance with the New Hampshire Water Quality Standards (see Env-Wq 1703.22(f)). The factors used to determine the acute and chronic total recoverable criteria for each metal are presented in Table 1.

Table 1 Freshwater Metals Criteria (Total Recoverable)

| Metal | Parameter | | | | Total Recoverable Criteria | |
|--------------|-----------|---------|--------|---------|----------------------------|----------------------|
| | ma* | ba** | mc* | bc** | Acute (CMC) (ug/l) | Chronic (CCC) (ug/l) |
| Aluminum | — | — | — | — | 750 | 87 |
| Cadmium | 1.1280 | -3.6867 | 0.7852 | -2.7150 | 0.95 | 0.83 |
| Chromium III | 0.819 | 3.7256 | 0.819 | 0.6848 | 579.32 | 27.69 |
| Copper | 0.9422 | -1.7000 | 0.8545 | -1.702 | 3.79 | 2.85 |
| Lead | 1.273 | -1.46 | 1.273 | -4.705 | 13.98 | 0.54 |
| Nickel | 0.846 | 2.255 | 0.846 | 0.0584 | 145.21 | 16.14 |
| Zinc | 0.8473 | 0.884 | 0.8473 | 0.884 | 37.02 | 37.02 |

*Acute Criteria (CMC) = $\exp\{ma \cdot \ln(\text{hardness}) + ba\}$

**Chronic Criteria (CCC) = $\exp\{mc \cdot \ln(\text{hardness}) + bc\}$

Determining Reasonable Potential

The effluent was characterized using a statistical analysis of effluent metals data, as reported in monthly discharge monitoring reports and in WET tests from 2007-2012 (see Attachment D), to establish the 95th percentile of the lognormal distribution of the effluent data, which represents the maximum effluent concentration that can be expected to occur 95 percent of the time (i.e., the upper bound of the lognormal distribution of the data). These values are presented in Table 2. The statistical approach to characterizing the effluent is described in Attachment G.

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As indicated in Table 2, the upper bound effluent concentrations of nickel, chromium, and aluminum are below the relevant criteria, even without accounting for any dilution provided by the receiving water (100% effluent), suggesting that reasonable potential does not exist for the discharge of these metals to cause or contribute to excursions above the criteria, and no further analysis is necessary. Although the segment of the Merrimack River into which outfall 001 discharges is not meeting the aquatic life designated use for aluminum (*State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010)), EPA has determined that the discharge does not present reasonable potential to cause or contribute to this impairment, as the upper bound concentration of aluminum detected in samples of pure effluent from 2007-2012 is significantly less than both the chronic and acute criteria (see Table 2 and Appendix D).

In order to determine whether the effluent presents reasonable potential to cause or contribute to an exceedance above the in-stream water quality criteria for lead, copper, cadmium and zinc, the following mass balance equation, which accounts for ambient metals concentrations as reported in WET test reports submitted from 2007-2012 (see Appendix D), was used to project instream metal concentrations downstream from the discharge under 7Q10 flow conditions.

$$Q_d C_d + Q_s C_s = Q_r C_r$$

rewritten as:

$$C_r = (Q_d C_d + Q_s C_s) / Q_r$$

where:

C_r = resultant downstream metals concentration in ug/L

Q_d = effluent flow (design flow = 16 mgd = 24.75 cfs)

C_d = effluent metals concentration in ug/L (95th percentile)

Q_s = upstream 7Q10 flow (759.4 cfs)

C_s = median instream metals concentration, upstream from the discharge in ug/L

Q_r = 7Q10 flow just downstream from the discharge (784.1 cfs)

Reasonable potential is then determined by comparing this resultant in-stream concentration (for both acute and chronic conditions) with the criteria for each metal multiplied by the factor 0.9 to reserve 10% of the assimilative capacity of the receiving water in accordance with the requirements of Env-Wq 1705.01. If there is reasonable potential (the projected downstream concentration is greater than either an acute or chronic criterion multiplied by 0.9), the appropriate limit is then calculated by rearranging the above mass balance to solve for the effluent concentration (C_d) using the criterion multiplied by 0.9 as the resultant in-stream concentration (C_r). The results of these analyses are provided Table 2. An example reasonable potential determination is provided in Attachment H.

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Page 18 of 36**Table 2 Mass Balance Equations for Determining Reasonable Potential and Effluent Limitations**

| Metal | Qd | Cd ¹ (95th Percentile) | Qs | Cs ² (Median) | Qr = Qs + Qd | Cr ³ = (QdCd+QsCs) /Qr | Criteria * 0.9 | | Reasonable Potential | Limit ⁴ = (QrCr*0.9- QsCs)/Qd | |
|--------------|-------|--------------------------------------|-------|-----------------------------|-----------------|---|-----------------|-------------------|-------------------------|---|-------------------|
| | cfs | ug/l | cfs | ug/l | cfs | ug/l | Acute (ug/l) | Chronic (ug/l) | Cr > Criteria | Acute (ug/l) | Chronic (ug/l) |
| Aluminum | 24.75 | 52.51 | 759.4 | 81 | 784.1 | NA | NA | NA | NA | N/A | NA |
| Cadmium | | 0.90 | | 0 | | 0.029 | 0.851 | 0.746 | N | N/A | N/A |
| Chromium III | | 3.156 | | 0 | | NA | NA | NA | NA | N/A | N/A |
| Copper | | 32.42 | | 2 | | 2.96 | 3.41 | 2.57 | Y (chronic) | N/A | 20.0 |
| Lead | | 2.59 | | 0.500 | | 0.566 | 12.68 | 0.490 | Y (chronic) | N/A | 0.54 ⁵ |
| Nickel | | 8.76 | | 0 | | NA | NA | NA | NA | N/A | N/A |
| Zinc | | 125.54 | | 9 | | 12.68 | 33.31 | 33.31 | N | N/A | N/A |

¹Values calculated from the results of metals analyses conducted on samples of the effluent in conjunction with whole effluent toxicity tests from 2007-2012 as well as the results of bi-monthly copper monitoring (see Attachment D).

²Median upstream data from analyses conducted on samples of the Merrimack River collected just upstream from the discharge for use as dilution water in Whole Effluent Toxicity (WET) tests from 2007-2012. (see Attachment D).

³Cr = instream metals concentration, downstream from the discharge

⁴Cr = Criteria * 0.9

⁵Establishing a limit equal to the criterion would be appropriate because the median upstream concentration exceeds 90% of this value.

As shown in the table above, reasonable potential exists for the discharge to cause or contribute to excursions above the chronic criteria for total recoverable copper and total recoverable lead, and limits for these metals are proposed in the draft permit.

However, there is no reasonable potential (under either acute or chronic conditions) that the discharge of aluminum, cadmium, chromium, nickel, or zinc will cause or contribute to an exceedance of applicable water quality criteria, and limitations for these metals are not included in the draft permit. The draft permit maintains the requirement in the existing permit for the monitoring for all of the aforementioned metals with the exception of chromium, as the current WET test protocol no longer requires its analysis. The results of copper and lead analyses conducted in conjunction with WET tests may be used to satisfy one of the twice per month monitoring requirements for copper and lead for the particular month in which the sampling is conducted.

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3. Phosphorus

Phosphorus is both an essential and limiting nutrient in freshwater systems which, when present in excess quantities, stimulate plant productivity within the system. The excessive growth of aquatic plants and algae within freshwater systems negatively impacts water quality and can interfere with the attainment of designated uses by (1) increasing the oxygen demand within the water body (to support an increase in both plant respiration and the biological breakdown of dead organic (plant) matter); (2) causing an unpleasant appearance and odor; (3) interfering with navigation and recreation; (4) reducing water clarity; and (5) reducing the quality and availability of suitable habitat for aquatic life. Cultural (or accelerated) eutrophication is the term used to describe excessive plant growth in a water body in response to excess nutrients entering the system as a result of human activities. Discharges from municipal and industrial wastewater treatment plants, agricultural runoff, and stormwater are examples of human-derived (i.e., anthropogenic) sources of nutrients in surface waters.

The New Hampshire Surface Water Quality Regulations do not contain numeric criteria for phosphorus and instead include a narrative criterion requiring that the phosphorus contained in an effluent shall not impair a water body's designated use. Specifically, Env-Wq 1703.14(b) states that "Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring". Env-Wq 1703.14(c) further states that "Existing discharges containing either phosphorus or nitrogen which encourage cultural eutrophication shall be treated to remove phosphorus or nitrogen to ensure attainment and maintenance of water quality standards". Cultural eutrophication is defined at Env-Wq 1702.15 as "...the human-induced addition of wastes containing nutrients to surface waters which results in excessive plant growth and/or a decrease in dissolved oxygen".

In the absence of numeric criteria for phosphorus, EPA uses nationally-recommended criteria and other technical guidance to develop effluent limitations for the discharge of phosphorus. EPA has published national guidance documents which contain recommended instream criteria for total phosphorus. EPA's 1986 *Quality Criteria for Water* (the "Gold Book") (USEPA 1986 [EPA 440/5-86-001]) recommends that instream phosphorus concentrations not exceed 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly into lakes or impoundments, and 0.025 mg/l within the lake or reservoir.

EPA released recommended ecoregional nutrient criteria in December 2000, which were established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published criteria represent conditions in waters within ecoregions that are minimally impacted by human activities (reference conditions), and thus free from the effects of cultural eutrophication. Nashua is located within Ecoregion VIII, Nutrient Poor Largely Glaciated Upper Midwest and Northeast. The recommended criteria for this ecoregion is a total phosphorus concentration of 10 µg/l (0.01 mg/l) and a chlorophyll *a* concentration of 0.63 µg/l (0.00063 mg/l) (*Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion VIII* (USEPA December 2001 [EPA 822-B-01-015])).

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In conjunction with the New England States, Mitchell, Liebman, Ramseyer, and Card developed potential nutrient criteria for rivers and streams in New England (in draft 2004). Using several river examples representative of typical conditions for New England streams and rivers, they investigated several approaches for the development of river and stream nutrient criteria that would be dually protective of designated uses in both upstream reaches and downstream impoundments. Based on this investigation, an instream total phosphorus concentration of 0.020 mg/l – 0.022 mg/l was identified as being protective of designated uses for New England rivers and streams. The development of these New England-wide total phosphorus criteria was based on more recent data than that used in the development of the Ecoregional nutrient criteria, and has been subject to quality assurance measures. Additionally, the development of the New England-wide criteria included the use of reference conditions presumed to be protective of designated uses.

EPA has decided to apply the Gold Book criterion (0.100 mg/l) when developing effluent limitations for NPDES permits because it was developed from an effects-based approach rather than the reference conditions-based approach used in the derivation of the ecoregional criteria. The effects-based approach is preferred in this case because it is more directly associated with an impairment of a designated use (i.e., recreation, aquatic life, etc.). The effects-based approach provides a threshold value above which adverse effects (i.e., water quality impairments) are likely to occur. It applies empirical observations of a causal variable (i.e., phosphorus) and a response variable (i.e., algal growth) associated with impairment of designated uses. Reference-based values are statistically derived from a comparison within a population of rivers in the same ecoregional class. They are a quantitative set of river characteristics (physical, chemical, and biological) that represent minimally impacted conditions.

While phosphorus is a causal indicator of eutrophication (its presence in excess quantities in freshwater systems results in accelerated macrophyte growth), chlorophyll *a* and dissolved oxygen are response indicators whose quantities may be correlated with the amount of phytoplankton (suspended plant biomass) present within the system (USEPA 2000, Chapra 1997, Thomann & Mueller 1987). Elevated concentrations of chlorophyll *a*, excessive algal and macrophyte growth, and low levels of dissolved oxygen are all effects of nutrient enrichment. The relationship between these factors and high instream total phosphorus concentrations is well documented in scientific literature, including guidance developed by EPA to address nutrient over-enrichment (*Nutrient Criteria Technical Guidance Manual – Rivers and Streams* (USEPA July 2000 [EPA-822-B-00-002])). The values used to correlate mean chlorophyll *a* concentrations with the trophic status of freshwater systems have been summarized from the scientific literature and are presented in Table 3.

As previously discussed, Chlorophyll *a* is identified as causing impairment of the primary contact recreation designated use in the segment of the Merrimack River into which the Nashua WWTF discharges in the *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (Assessment Unit ID: NHRIV700061206-24; see *State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010)). A TMDL for chlorophyll *a* for this segment

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| Trophic Status | Wetzel (2001) | Ryding and Rast (1989) | Smith (1998) | Novotny and Olem (1994) |
|----------------|---------------|------------------------|--------------|-------------------------|
| Eutrophic | > 10 µg/l | 6.7-31 µg/l | ----- | > 10 µg/l |
| Mesotrophic | 2-15 µg/l | 3-7.4 µg/l | 3.5-9 µg/l | 4-10 µg/l |
| Oligotrophic | 0.3-3 µg/l | 0.8-3.4 µg/l | ----- | < 4 µg/l |

¹ Adapted from *Ambient Water Quality for Dissolved Oxygen, Water Clarity, and Chlorophyll *a* for Chesapeake Bay and its Tidal Tributaries* (USEPA 2003)

of the Merrimack River is scheduled to be completed by 2019 (*State of New Hampshire Final 2010 Section 303(d) Surface Water Quality List* (NHDES 2010)). In the absence of a TMDL, EPA is required to use available information to establish water quality-based limits when issuing NPDES permits to facilities which discharge to impaired waters. See generally 40 CFR §122.44(d). Although the New Hampshire water quality standards do not include numeric criteria for chlorophyll *a*, NHDES applies a threshold chlorophyll *a* concentration of 15 µg/l when determining whether to list a fresh water body as impaired for the primary contact recreation designated use (*State of New Hampshire 2010 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology (CALM)*, (NHDES 2010). It should be noted that the 15 µg/l threshold value is only a guidance value used for determining support/non-support of recreational uses, not for determining support/non-support of aquatic life uses.

Although the Merrimack River is not listed as impaired due to phosphorus at the segment beginning at the Massachusetts border, total phosphorus is identified as causing impairment of water quality in the next downstream segment (segment MA84A-02) in Massachusetts. This segment of the Merrimack River is impounded by the Pawtucket Dam, approximately 9 miles downstream from the discharge. The various physical, chemical, and biological processes occurring within or at an impoundment affects the flux of nutrients in the water column. Phosphorus that has sequestered by aquatic plants and/or in sediments may be released into and/or re-suspended in the water column, rendering it available for biological uptake either within the impoundment or in downstream waters (see *Water Quality Criteria for Water*, pg. 241 (USEPA 1986) and *Nutrient Criteria Technical Guidance Manual – Rivers and Streams*, Chapt. 1, pg. 3 (USEPA 2000 [EPA822-B-00-002])). Therefore, phosphorus loadings to the receiving water from upstream sources, including the Nashua WWTF, might negatively impact water quality in the downstream segments as a function of the dynamics of the impoundment.

The results of phosphorus and chlorophyll *a* analyses conducted on samples collected within the segment of the receiving water into which the Nashua WWTF discharges (both upstream and downstream from the discharge) between 2005-2011 by NHDES as part of their Ambient River Monitoring Program (ARMP), and in 2010 by the United States Army Corps of Engineers (USACE) as part of the *Upper Merrimack and Pemigewasset River Study* (U.S. Army Corps of

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Engineers, January 2011 (prepared by CDM))², are summarized in Table 4. The results suggest that the ecoregional chlorophyll *a* criterion of 0.63 µg/l as well as threshold chlorophyll *a* value of 15 µg/l used by NHDES in listing surface waters as impaired for the primary contact recreation designated uses are being exceeded in the receiving water in the vicinity of the discharge. These results are also within the ranges identified in the literature as indicative of mesotrophic-eutrophic conditions (see Table 3). The data presented also indicate that the instream phosphorus concentrations downstream from the discharge exceeded the recommended target of 0.090 mg/l (the Gold Book Criterion of 0.100 mg/l multiplied by a factor of 0.9 to reserve 10% of the assimilative capacity of the receiving water in accordance with the New Hampshire Water Quality Standards found at Env-Wq 1705.02) on two occasions, and that the ecoregional criterion of 0.63 µg/l (0.00063 mg/l) was exceeded on all occasions.

While these sampling events were conducted during the months of the year in which the Merrimack River typically experiences lower flows, it should be noted that from 2005-2011, the flows recorded at the nearest United States Geological Survey (USGS) gaging station located upstream from the Nashua WWTF (USGS gaging station No. 01092000, Merrimack River near Goffs Falls, below Manchester) on the sampling dates for the data presented in Table 4, were on average five times the 7Q10 flow for that gage (638.7 cfs).

Table 4 Instream Chlorophyll *a* and Total Phosphorus Concentrations Upstream and Downstream From the Nashua WWTF

| Station ¹ | Date | Chlorophyll <i>a</i> ² (µg/l) | Total Phosphorus (µg/l) |
|--------------------------------|------------|---|-------------------------------|
| Upstream of Nashua WWTF | | | |
| 03-MER | 10/05/2007 | 0.2 | 110 |
| 02M-MER | 07/27/2010 | 20.85 | 36 |
| Min. | | 0.2 | 36 |
| Max. | | 20.85 | 110 |
| Avg. | | 10.53 | 73 |
| Median | | 10.53 | 73 |

| Station ¹ | Date | Chlorophyll <i>a</i> ² (µg/l) | Total Phosphorus (µg/l) |
|------------------------------------|------------|---|-------------------------------|
| Downstream From Nashua WWTF | | | |
| 01-MER | 06/21/2007 | 9.539 | 48 |
| 01-MER | 07/19/2007 | 3.966 | 63 |
| 01-MER | 08/23/2007 | 9.629 | 91 |
| 01-MER | 08/23/2007 | 10.29 | 90 |
| 01-MER | 10/05/2007 | 1.977 | 12 |

²Upper Merrimack and Pemigewasset River Study by the U.S. Army Corps of Engineers, January 2011 (prepared by CDM) ftp://ftp.usace.army.mil/pub/nae/UMRB-REPORTJAN2011/UMPRS_Year1%20Data%20Report%20Appendix_Jan2011.pdf

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| | | | |
|---------|------------|---------|-------|
| 01-MER | 06/19/2008 | 11.433 | 64 |
| 01-MER | 07/17/2008 | 13.395 | 67 |
| 01-MER | 08/25/2008 | 3.439 | 37 |
| 01-MER | 06/24/2009 | 2.164 | 51 |
| 01-MER | 07/21/2009 | 2.7972 | 35 |
| 01-MER | 06/22/2010 | 11.6329 | 57 |
| 01-MER | 07/20/2010 | 22.54 | 40 |
| 02K-MER | 07/27/2010 | 16.09 | 46 |
| 01X-MER | 07/27/2010 | 19.26 | 55 |
| 01X-MER | 07/27/2010 | 17.45 | 51 |
| 01-MER | 08/17/2010 | 15.02 | 91 |
| 01-MER | 06/21/2011 | 12.47 | 47 |
| 01-MER | 07/19/2011 | 15.23 | 55 |
| 01-MER | 08/23/2011 | 6.24 | 55 |
| Min. | | 1.98 | 12 |
| Max. | | 22.54 | 91 |
| Avg. | | 10.77 | 55.53 |
| Median | | 11.43 | 55 |

¹ NHDES Sampling Stations – 03-MER, 1.2 miles upstream of Nashua WWTF, Rt. 111 bridge, E. Hollis St., Nashua; and 01-MER, 5.7 miles downstream of Nashua WWTF, Rt. 113 bridge, Tyngsborough MA. ACOE Sampling Stations – 02M-MER, approximately 100 feet upstream of Nashua WWTF; 01X-MER and 02K-MER, approximately 500 feet and 8,250 ft downstream of Nashua WWTF, respectively.

The results of phosphorus analyses conducted on samples of the Nashua WWTF's effluent in conjunction with the USACE's *Upper Merrimack and Pemigewasset River Study* (U.S. Army Corps of Engineers, January 2011) were 2.10 mg/l (July 2010) and 2.16 mg/l (September 2010). The median of the upstream data and the maximum of the effluent data were factored into the equation shown below to project the instream phosphorus concentration that can be expected to occur downstream from the discharge under critical (7Q10) stream flow conditions.

$$Q_d C_d + Q_s C_s = Q_r C_r$$

Where:

C_r = resultant downstream phosphorus concentration (mg/l)

Q_d = effluent flow (design flow = 16 mgd = 24.75 cfs)

C_d = maximum effluent phosphorus concentration (2.16 mg/l)

Q_s = upstream 7Q10 flow (759.4 cfs)

C_s = median instream phosphorus concentration, upstream from the discharge (0.073 mg/l)

Q_r = 7Q10 flow just downstream from the discharge (784.1 cfs)

$$C_r = (Q_s C_s + Q_d C_d) / Q_r$$

$$C_r = [(759.4 \text{ cfs} * 0.073 \text{ mg/l}) + (24.75 \text{ cfs} * 2.55 \text{ mg/l})] / 784.1 \text{ cfs} = 0.139 \text{ mg/l}$$

The projected downstream concentration of 0.139 mg/l is greater than the recommended target of 0.090 mg/l (the Gold Book Criterion of 0.100 mg/l multiplied by a factor of 0.9 to reserve

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10% of the assimilative capacity of the receiving water in accordance with the New Hampshire Water Quality Standards found at Env-Wq 1705.02). This indicates that reasonable potential exists for the discharge of phosphorus from the Nashua WWTF to cause or contribute to violations of water quality standards in the downstream receiving water.

Given that reasonable potential exists for the discharge to cause or contribute excursions above the in stream phosphorus criterion as well as the impairment in this segment of the receiving water due to chlorophyll *a*, which is indicative of nutrient enrichment, the draft permit includes proposes a monthly average phosphorus effluent limitation of 0.600 mg/l, which was calculated as shown below.

$$C_d = (Q_r C_r - Q_s C_s) / Q_d$$

Where:

C_r = resultant downstream phosphorus concentration, equal to Gold Book criterion * 0.9 (0.090 mg/l)

Q_d = effluent flow (design flow = 16 mgd = 24.75 cfs)

C_d = maximum effluent phosphorus concentration (limit) (mg/l)

Q_s = upstream 7Q10 flow (759.4 cfs)

C_s = median instream phosphorus concentration, upstream from the discharge (0.073 mg/l)

Q_r = 7Q10 flow just downstream from the discharge (784.1 cfs)

$$C_d = [(784.1 \text{ cfs} * 0.090 \text{ mg/l}) - (759.4 \text{ cfs} * 0.073 \text{ mg/l})] / 24.75 \text{ cfs} = 0.600 \text{ mg/l}$$

This is a seasonal limitation, which shall be in effect from April 1st – October 31st.

D. Whole Effluent Toxicity (WET)

EPA's *Technical Support Document for Water Quality Based Toxics Control* (USEPA 1991 [EPA/505/290-001]) recommends using an "integrated strategy" containing both pollutant (chemical) specific approaches and whole effluent (biological) toxicity approaches to control toxic pollutants in effluent discharges from entering the nation's waterways. EPA-Region I adopted this "integrated strategy" on July 1, 1991, for use in permit development and issuance. These approaches are designed to protect both aquatic life and human health. Pollutant-specific approaches such as those found in the Gold Book and state regulations address individual chemicals, whereas whole effluent toxicity (WET) approaches evaluate interactions between pollutants, thus rendering an "overall" or "aggregate" toxicity assessment of the effluent. Furthermore, WET measures the "additive" and/or "antagonistic" effects of individual chemical pollutants, which pollutant-specific approaches do not; thus, the need for both approaches. In addition, the presence of an unknown toxic pollutant can be discovered and addressed through this process.

Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts and New Hampshire law states that, "all waters shall be free from toxic substances or

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chemical constituents in concentrations or combination that injure or are inimical to plants, animals, humans, or aquatic life;" (NH RSA 485-A:8, VI and the New Hampshire Code of Administrative Rules, Part Env-Wq 1703.21). The federal NPDES regulations found at 40 CFR §122.44(d)(1)(v) require whole effluent toxicity limits in a permit when reasonable potential exists for a discharge to cause or contribute to an excursion above state narrative criteria for toxicity. Furthermore, the results of toxicity tests may be used to demonstrate compliance with the "no toxics in toxics amounts" requirement found in both the CWA and in the State of New Hampshire's regulations.

The current policy of EPA-Region I is to require toxicity testing in all NPDES permits issued to POTWs, with the type of whole effluent toxicity test(s) (acute and/or chronic) and the effluent limitation(s) required by the permit being based on the available dilution. NPDES permits issued to municipal (i.e., POTWs) discharges having a dilution factor between 20 and 100 typically include an acute (LC₅₀) WET limit. The acute limit (LC₅₀) is the percentage of effluent in a sample that must not cause more than a 50% mortality rate in the test organisms. Therefore, an acute (LC₅₀) limit of 100% means that a sample of 100% effluent (no dilution) shall be lethal to no more than 50% of the test organisms. The results of WET tests conducted from 2007-2012 are shown in Attachment D.

The draft permit includes an acute (LC₅₀) limit of 100 % which was based on the revised dilution factor of 28.5. This limit is the same as the WET limit in the 2000 permit, in keeping with the antibacksliding requirements of 40 CFR § 122.44(1).

The existing permit contains a provision which would allow for a reduction in the frequency of WET testing if specific conditions are met. In response to a request submitted by the City requesting such a reduction, WET test reports for tests conducted from December through March 2012 were evaluated. This evaluation found consistent compliance with the WET limits in the 2000 permit and that test acceptability criteria were consistently achieved. Therefore, the quarterly WET testing frequency that is required under the 2000 permit has been reduced to twice per year in the draft permit. Samples for use in WET tests shall be collected and the tests completed by the calendar quarters ending March 31st and September 30th, using the daphnid, *Ceriodaphnia dubia* (*C. dubia*) and the fathead minnow, *Pimephales promelas* (*P. promelas*) as test organisms.

If the results of WET tests indicate that the discharge presents a risk of toxicity, the monitoring frequency and/or testing requirements may be increased. The permit may also be modified, or alternatively revoked and reissued, to incorporate additional toxicity testing requirements or chemical-specific limits. These actions will occur if the Regional Administrator determines that the New Hampshire water quality standards are not adequately enforced and users of the receiving water are not adequately protected during the remaining life of the permit. Results of development"; therefore, the permitting authority is allowed to use said information to modify an issued permit under the authority granted in 40 CFR §122.62(a)(2).

Additional Analyses

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The draft permit maintains the requirement in the 2000 permit for the reporting of several selected parameters, including ammonia nitrogen (as N); hardness; alkalinity; and total recoverable aluminum, cadmium, copper, lead, nickel, and zinc, the results of which are determined through analyses conducted on samples of the 100 % effluent sample in conjunction with WET tests. The requirement in the existing permit for the analysis of chromium in addition to the aforementioned parameters has not been included in the draft permit, as it is no longer required in accordance with the current WET test protocol (see Attachment B, *Freshwater Acute Toxicity Test Procedure and Protocol*, USEPA February 2011). The results of additional analyses conducted in conjunction with WET tests from 2007-2012 are shown in Attachment D.

As discussed in Part VII.C.2. of this fact sheet, limitations for total recoverable aluminum, zinc, nickel, cadmium, and chromium are not included in the draft permit because the potential for the discharge of these metals from the Nashua WWTF to cause or contribute to an excursion above water quality criteria does not exist. However, the draft permit does include limitations and monitoring requirements for total recoverable copper and lead because potential does exist for the discharge of these metals to result in excursions above water quality criteria (also see Part VII.C.2. of this fact sheet). The results of the copper and lead analyses conducted in conjunction with WET tests may be used to satisfy one of the monthly sampling requirements specified in Part I.A. of the draft permit for the particular month in which sampling is conducted.

VIII. COMBINED SEWER OVERFLOWS

A. Nashua's Combined Sewer System

The City of Nashua owns and operates a wastewater collection system comprised of 75 percent sanitary sewers, which carry domestic, industrial, and commercial wastewater; and 25 percent combined sewers, which carry domestic, industrial, and commercial wastewater plus stormwater runoff. Under normal flow conditions, wastewater is conveyed to the POTW through three interceptor sewers: the North Merrimack Interceptor, the South Merrimack Interceptor and the Salmon Brook Interceptor. During certain wet weather events, discharges of untreated sanitary wastewater and stormwater occur from the City's eight combined sewer overflow outfalls (CSOs) listed in Attachment A into the Nashua and Merrimack Rivers, as shown in Figure 4. Discharges from CSOs have been identified as significant sources of pollution to the Nashua and Merrimack Rivers (*State of New Hampshire Final 2010 Section 303(d) Lists* (NHDES 2010)).

The current permit authorizes these eight CSOs subject to technology-based requirements (the nine minimum controls described in Part VIII.B. of this fact sheet) and to requirements that the discharges may not cause violations of water quality standards.

Since the issuance of the 2000 permit, the City entered into a Consent Decree with EPA and NHDES concerning sanitary sewer overflows (SSOs) and CSOs (Civil Action No. 05-376-PB, December 26, 2005; as amended on March 31, 2009; "Consent Decree"). The overall goal of the Consent Decree is to ultimately bring all wet weather discharges from CSOs into compliance with the requirements of the CWA and applicable state water quality standards. The main elements of the Consent Decree include: milestones for achieving levels of CSO control which

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are expected to result in no discharges of untreated CSOs during a typical year³, the development and implementation of a High Flow Management Plan (HFMP) for optimizing the treatment of wet-weather flows as well as interim limits and conditions for flows that bypass secondary treatment; the development and implementation of a program for the preventative maintenance of the collection system; and investigation into the sources and quantities of excessive infiltration and inflow (I/I) to the collection system. Ongoing wastewater-related construction projects in the City include the construction and implementation of the following controls that will reduce discharges of untreated wastewater through the CSOs in accordance with the Consent Decree: Partial separation of the combined system, increasing the capacity for the off line storage of combined flows, screening and disinfection, system optimization measures, and the Wet Weather Flow Treatment Facility.

CSO discharges have been significantly reduced since 2009, which appears to correlate with the implementation of the CSO controls described above, particularly the operation of the Wet Weather Flow Treatment Facility (see Attachment F).

B. Regulatory Framework

As noted above, Section 301(b)(1)(C) of the CWA of 1977 mandated compliance with water quality standards by July 1, 1977. Technology-based permit limits must be established for CSOs for best conventional pollutant control technology (BCT) and best available technology economically achievable (BAT) based on best professional judgment (BPJ) in accordance with Section 301(b) and Section 402(a) of the Water Quality Act Amendments of 1987 (WQA). Additionally, permit conditions must also achieve compliance with applicable state water quality standards.

The framework for compliance with Clean Water Act requirements for CSOs is set forth in EPA's National CSO Control Policy ("CSO Policy"), which was published in the Federal Register on April 19, 1994 (59 Fed. Reg. 18688) and sets forth the following objectives:

- (1) To ensure that if the CSO discharges occur, they are only as a result of wet weather,
- (2) To bring all wet weather CSO discharge points into compliance with the technology-based requirements of the Clean Water Act (CWA) and applicable federal and state water quality standards, and
- (3) To minimize water quality, aquatic biota, and human health impacts from wet weather flows.

Among the elements established to achieve these objectives, the CSO Policy set forth the minimum BCT/BAT controls (i.e., technology-based limits) that represent the BPJ of the Agency

³ The MOUSE hydrologic model was used in determining levels of CSO control that will ultimately achieve no discharges of untreated CSOs during the largest storm in a typical year. The specific levels of CSO control for each outfall are described in the Long Term Control Plan (LTCP) submitted by the City in 2003, as amended in 2004.

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on a consistent, national basis. These are the Nine Minimum Controls (“NMCs”) defined in the CSO Policy and set forth in Part I.B. of the draft permit: (1) proper operation and regular maintenance programs for the sewer system and the combined sewer overflows; (2) maximum use of the collection system for storage; (3) review and modification of the pretreatment programs to assure CSO impacts are minimized; (4) maximization of flow to the POTW for treatment; (5) prohibition of dry weather overflows; (6) control of solid and floatable materials in CSOs; (7) pollution prevention programs which focus on contaminant reduction activities; (8) public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts; and (9) monitoring to effectively characterize CSO impacts and the efficacy of CSO controls.

The City of Nashua submitted documentation of its plan for implementing the Nine Minimum Controls, titled “High Flow Management Plan for the Nashua Wastewater Treatment Plant”, in November 1999. This document has since undergone several revisions, with the most recent revision occurring in April 2010 to include updated bypass procedures which incorporate the use of the Wet Weather Flow Treatment Facility.

The CSO Policy also recommended that each combined sewer system develop and implement a long-term CSO control plan (“LTCP”) that will ultimately result in compliance with the requirements of the CWA. The City submitted a draft LTCP to EPA in September of 1997, which was revised in January of 2003. A re-evaluation of the CSO controls selected for CSOs #005 and 006 in the 2003 LTCP was submitted to EPA in 2009. The controls identified in the re-evaluation study were incorporated into the 2005 Consent Decree through a modification in 2009.

Pursuant to the Clean Water Act and the CSO Policy, the untreated CSOs, Screening and Disinfection Facility (“SDF”) and the Wet Weather Flow Treatment Facility (“WWFTF”) are CSOs, meaning they are not subject to the secondary treatment standards that apply to the POTW treatment plant, but are required to achieve technology based requirements as defined in the CSO policy (the nine minimum controls) and limitations necessary to achieve water quality standards. Therefore, the draft permit includes applicable technology and water quality based limitations on discharges from the Wet Weather Flow Treatment Facility and from the Screening and Disinfection Facility. In addition, the draft permit includes monitoring requirements which will provide information necessary for evaluating the effectiveness of the WWFTF’s and screening and disinfection facility’s use as CSO control measures. Water quality-based limits apply to the combined effluent at outfall 001.

C. Permit Requirements

In accordance with the National CSO Policy, the draft permit contains the following conditions for the CSO discharges:

- (i) Dry weather discharges from CSO outfalls are prohibited. Dry weather discharges must be immediately reported to EPA and NHDES.

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- (ii) During wet weather, the discharges must not cause any exceedance of water quality standards.
- (iii) The permittee shall meet the technology-based Nine Minimum Controls described above and shall comply with the implementation levels as set forth in Part I.B. of the draft permit.
- (iii) Discharges from CSO outfalls to non-tidal waters shall not exceed 1,000 colonies per 100 ml of *Escherichia coli* bacteria in accordance with the New Hampshire Surface Water Quality Regulations (See Env-Wq 1703.06(c)).
- (iv) The permittee shall review its entire NMC program and revise it as necessary. Documentation of this review and any resultant revisions made to the NMC program shall be submitted to EPA and NHDES **within 6 months of the effective date of the permit**. An annual report shall be provided by March 1st of each year which describes any subsequent revisions made to the NMC program and shall also include monitoring results from CSO discharges, and the status of CSO abatement projects.

In addition to the requirements described above, the operation of the SDF and the WWFTF are subject to additional technology-based effluent limitations and monitoring requirements. These CSO treatment facilities represent enhancements of the Nine Minimum Controls, allowing for greater use of the collection system for storage (NMC #2) and return of the flow to the POTW for treatment (NMC #4), removal of floatable and solid materials (NMC #6), and reduction of pathogenic bacteria through disinfection (NMC #7).

EPA has determined additional BCT/BAT effluent limitations using its best professional judgment (BPJ) that are consistent with the design parameters for the WWFTF as provided to NHDES and EPA. In making this determination EPA considered the factors identified in 40 C.F.R. § 125.3(d), including the cost and benefits of the facility (analyzed in connection with the development of the city's LTCP); the newness of the facility, and the fact that the facility was engineered to meet the design parameters. The proposed BPJ limits in the draft permit are an average monthly TSS concentration of 30 mg/l and a minimum of 80 % reduction. The draft permit also proposes monitoring requirements for flow and BOD₅ for the WWFTF.

Water quality-based limitations for *E. coli* and total residual chlorine apply to the discharge from the Screening and Disinfection Facility, and are based on state water quality standards (see Env-Wq 1703.6(c) and Env-Wq. 1703.21, Table 1703.1, respectively). The proposed *E. coli* limit in the draft permit is 1,000 colonies/100 mL. The proposed limits for total residual chlorine are an average monthly concentration of 0.055 mg/l and a maximum daily concentration of 0.095 mg/l, respectively. These limits were derived from the TRC criteria established in the New Hampshire Water Quality Standards at Env-Wq 1700.21, Table 1703.1, and the available dilution in the vicinity of the discharge. The derivations of the dilution factor and the proposed TRC limits are provided in Attachment I.

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The draft permit requires the permittee to notify EPA and NHDES in writing 60 days prior to the commencement of operation of the SDF and to include the outfall discharge number in this notification. The authorization to discharge and associated conditions which apply to the SDF shall become effective on the first day of the calendar month immediately following the date on this notification. EPA recognizes that the permittee will not have established an operational history of the SDF upon its commencement of operation which would allow for the identification and implementation of any operational changes that may be necessary for optimizing the treatment process so as to meet the effluent limitations proposed in the draft permit. The New Hampshire Water Quality Standards do not include a provision for the incorporation of schedules for achieving compliance with permit limits in NPDES permits. Such schedules may be implemented through an Administrative Consent Order ("ACO"), and the permittee may contact the EPA Region I Compliance Office to explore this option.

Effluent from the WWTF flows to the chlorine contact chamber of the WWTF, where it is combined with secondary effluent (and primary effluent, in the case of a bypass of secondary treatment) before being discharged to the Merrimack River through outfall 001 (Figure 3). Therefore, the "combined effluent" must meet the water quality-based limitations which apply to outfall 001.

In order to ensure the collection of data which will allow for a determination to be made regarding whether the operation of the WWTF facility is consistent with the objectives and assumptions underlying the LTCP, the draft permit also requires the reporting of flow (treated flow as well as flow drained back to the POTW for secondary treatment), BOD₅, TSS, and precipitation data. Similarly, reporting of flow, BOD₅, activation frequency and duration is proposed for the screening and disinfection facility.

This monitoring will provide information necessary for understanding the operation of the collection system during wet weather and will allow for determinations to be made with respect to the effectiveness of its operation consistent with the Nine Minimum Controls.

D. Reopener/Additional CSO Control Measures

The draft permit requires an annual certification no later than January 15th of each year that states that all discharges from combined sewer outfalls were recorded, and other appropriate records and reports maintained for the previous calendar year.

In accordance with Part II.A.4. of the draft permit, this permit may be modified or reissued upon the completion of a long-term CSO control plan. Such modification may include performance standards for the selected controls, a post construction water quality assessment program, monitoring for compliance with water quality standards, and a reopener clause to be used in the event that the selected CSO controls fail to meet water quality standards. Section 301(b)(1)(C) requires that a permit include limits that may be necessary to protect federal and state water quality standards.

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IX. OPERATION AND MAINTENANCE

Regulations regarding proper operation and maintenance are found at 40 CFR § 122.41(e). These regulations require, "that the permittee shall at all times operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of the permit." The treatment plant and the collection system are included in the definition "facilities and systems of treatment and control" and are therefore subject to proper operation and maintenance requirements.

Similarly, a permittee has a "duty to mitigate" pursuant to 40 CFR § 122.41(d), which requires the permittee to "take all reasonable steps to minimize or prevent any discharge in violation of the permit which has a reasonable likelihood of adversely affecting human health or the environment."

General requirements for proper operation and maintenance and mitigation have been included in Part II of the permit. Specific permit conditions have also been included in Parts I.B., I.C., and I.D. of the draft permit. These requirements include mapping of the wastewater collection system, reporting of unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling inflow and infiltration to separate sewers to the extent necessary to prevent SSOs and I/I-related effluent violations at the wastewater treatment plant, and for maintaining alternate power where necessary.

X. INDUSTRIAL USERS

The permittee is required to administer a pretreatment program based on authority granted under 40 CFR Part 403 and Section 307 of the CWA. The permittee's pretreatment program received EPA approval on July 17, 1990 and, as a result, appropriate pretreatment program requirements were incorporated into the existing permit which were consistent with the approval and federal pretreatment regulations in effect when the permit was issued.

Periodically, the Federal Pretreatment Regulations in 40 CFR Part 403 are amended. Those amendments establish new requirements for implementation of the pretreatment program. Upon reissuance of this NPDES permit, the permittee is obligated to modify its pretreatment program to be consistent with the current Federal regulations. Those activities that the permittee must address include, but are not limited to, the following: (1) develop and enforce EPA approved specific effluent limits (technically-based local limits); (2) revise the local sewer use ordinance or regulation, as appropriate, to be consistent with Federal regulations; (3) develop an enforcement response plan; (4) implement a slug control evaluation program; (5) track significant noncompliance for industrial users; and (6) establish a definition of and track significant industrial users. These requirements are necessary to ensure continued compliance with the NPDES permit.

In addition to the requirements described above, the draft permit requires the permittee to submit to EPA in writing, within 180 days of the effective date of the permit, a description of proposed changes to the permittee's pretreatment program deemed necessary to assure conformity with

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current federal pretreatment regulations. These requirements are included in the draft permit to ensure that the pretreatment program is consistent and current with all pretreatment requirements in effect. Lastly, the permittee must continue to submit an annual pretreatment report by **March 1st**, detailing the activities of the program for the twelve month period ending 60 days prior to the due date.

XI. SLUDGE

Section 405(d) of the Clean Water Act (CWA) requires that EPA develop technical standards regulating the use and disposal of sewage sludge. These regulations were signed on November 25, 1992, published in the Federal Register on February 19, 1993, and became effective on March 22, 1993. Domestic sludge which is land applied, disposed of in a surface disposal unit, or fired in a sewage sludge incinerator is subject to Part 503 technical standards and to State Env-Wq 800 standards. Part 503 regulations have a self-implementing provision, however, the CWA requires implementation through permits. Domestic sludge which is disposed of in municipal solid waste landfills are in compliance with Part 503 regulations provided the sludge meets the quality criteria of the landfill and the landfill meets the requirements of 40 CFR Part 258.

The draft permit has been conditioned to ensure that sewage sludge use and disposal practices meet the CWA Section 405(d) Technical Standards. In addition, EPA-Region I has prepared a 72-page document entitled "*EPA Region I NPDES Permit Sludge Compliance Guidance* (USEPA 1999)" for use by the permittee in determining their appropriate sludge conditions for their chosen method of sewage sludge use or disposal practices. This guidance document is available upon request from EPA Region 1 and may also be found at:
<http://www.epa.gov/region1/npdes/permits/generic/sludgeguidance.pdf>.

The permittee is required to submit an annual report to EPA-Region I and NHDES-WD, by February 19th each year, containing the information specified in the *Sludge Compliance Guidance* document for their chosen method of sewage sludge use or disposal practices.

XII. ESSENTIAL FISH HABITAT

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any essential fish habitat (16 U.S.C. § 802(10)).

The Amendments broadly define "essential fish habitat" (EFH) as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. § 1802(10)). "Adverse impact" means any impact which reduces the quality and/or quantity of EFH (50 CFR § 600.910(a)). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences or actions.

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Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b)(a)(A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

Atlantic salmon (*Salmo salar*) is the only species for which EFH has been designated in the Merrimack River. According to the New Hampshire Fish and Game Department (NHF&G), no salmon fry are stocked in the Nashua River. In addition, NHF&G has reported that Atlantic salmon are not stocked in the Merrimack River in the area influenced by the discharge from the WWTF. This species is stocked further upstream in the Merrimack River watershed. The stretch of the river in the vicinity of the WWTF is used by salmon smolts in spring months for downstream passage to the sea. Adult Atlantic salmon returning to the river from the ocean do not travel upstream as far as the WWTF discharge area. They are collected at a dam in Lawrence, Massachusetts, primarily for use as broodstock.

EPA has determined that the draft permit has been conditioned in such a way so as to minimize any adverse impacts to EFH for the following reasons:

- This permit action is a reissuance of an existing NPDES permit;
- The WWTF has a dilution factor of 28.5;
- The WWTF withdraws no water from the Merrimack River; therefore, no life stages of EFH species are vulnerable to impingement or entrainment from this WWTF;
- The draft permit prohibits the WWTF discharge from causing a violation of State water quality standards;
- The draft permit contains water quality-based limits for total residual chlorine;
- The draft permit prohibits the discharge of pollutants or combinations of pollutants in toxic amounts;
- The permit requires toxicity testing two times per year to ensure that the discharge does not present toxicity problems;

EPA believes that the conditions and limitations contained within the proposed permit adequately protect all aquatic life, including those with designated EFH in the receiving water, and that further mitigation is not warranted. If adverse impacts to EFH are detected as a result of this permit action, or if new information is received that changes the basis for these conclusions, EPA will contact NMFS Habitat Division.

XIII. ENDANGERED SPECIES ACT

Section 7(a) of the Endangered Species Act (ESA) of 1973, as amended (the "Act"), grants authority to and imposes requirements upon federal agencies regarding endangered or threatened species of fish, wildlife, or plants ("listed species") and the habitats of such species that have been designated as critical ("critical habitat").

Section 7(a)(2) of the Act requires every federal agency, in consultation with and with the assistance of the Secretary of the Interior, to ensure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence

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of any listed species or result in the destruction or adverse modification of critical habitat. The National Marine Fisheries Service (NMFS) administers Section 7 consultations for marine species and anadromous fish. The United States Fish and Wildlife Service (USFWS) administers Section 7 consultations for freshwater species.

EPA has reviewed the federal endangered or threatened species of fish and wildlife to determine if any such listed species might potentially be impacted by the re-issuance of this NPDES permit. Shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus*) are the only two federally-protected fish species that have been documented in the Merrimack River. However, the upstream movement of these two species is restricted by the Essex Dam, in Lawrence, Massachusetts. This dam is approximately 13 river miles downstream of the influence of the Nashua WWTF discharge. Based on the normal distribution of these species, it is highly unlikely that they would be present in the vicinity of this discharge. Therefore, no Section 7 consultation with NMFS is required.

XIV. ANTIDEGRADATION

The New Hampshire water quality standards include an antidegradation provision which states that the existing designated uses and the level of water quality necessary to protect the existing uses shall be maintained and protected (Env-Wq 1708).

The draft permit contains limitations and conditions which are at least as stringent as those contained in the existing permit. The State of New Hampshire has indicated that there will be no lowering of water quality and no loss of existing designated uses in the receiving water as a result of this permit action, and that additional antidegradation review is not warranted at this time.

XV. MONITORING AND REPORTING REQUIREMENTS

The effluent monitoring requirements in the draft permit have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41 (j), 122.44 (l), and 122.48.

The draft permit includes new provisions related to Discharge Monitoring Report (DMR) submittals to EPA and the State. Specifically, the draft permit requires that, no later than one year following the effective date of the permit, the permittee submit all monitoring data and other reports required by the permit to EPA using NetDMR, unless the permittee is able to demonstrate a reasonable basis, such as technical or administrative infeasibility, that precludes the use of NetDMR for submitting DMRs and reports ("opt-out request").

NetDMR is a national web-based tool for regulated CWA permittees to submit DMRs electronically via a secure internet application to EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR §§ 122.41 and 403.12. NetDMR is accessed from: <http://www.epa.gov/netdmr>. EPA currently conducts free training on the use of NetDMR, and anticipates that the availability of this training will continue to assist permittees with the transition to use of NetDMR. To

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participate in upcoming trainings, visit <http://www.epa.gov/netdmr> for contact information for New Hampshire.

The draft permit requires the permittee to report monitoring results obtained during each calendar month using NetDMR, no later than the 15th day of the month following the completed reporting period. All reports required under the permit shall be submitted to EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit hard copies of DMRs or other reports to EPA or to NHDES.

The draft permit also includes procedures for requesting an "opt-out". Permittees who believe they cannot use NetDMR due to technical or administrative infeasibilities, or other logical reasons, must demonstrate the reasonable basis that precludes the use of NetDMR. These permittees must submit the justification, in writing, to EPA at least sixty (60) days prior to the date the facility would otherwise be required to begin using NetDMR. Opt-outs become effective upon the date of written approval by EPA and are valid for twelve (12) months from the date of EPA approval. The opt-outs expire at the end of this twelve (12) month period. Upon expiration, the permittee must submit DMRs and reports to EPA using NetDMR, unless the permittee submits a renewed opt-out request sixty (60) days prior to expiration of its opt-out, and such a request is approved by EPA.

Until electronic reporting using NetDMR begins, or for those permittees who receive written approval from EPA to continue to submit hard copies of DMRs, the draft permit requires that submittal of DMRs and other reports required by the permit continue in hard copy format. Hard copies of DMRs shall be postmarked no later than the 15th day of the month following the completed reporting period.

XVI. STATE CERTIFICATION REQUIREMENTS

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving water(s) either certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards or waives its right to certify as set forth in 40 CFR §124.53. State Water Quality Standards contain three major elements: Beneficial uses; Water Quality Criteria; and an Antidegradation Policy, all of which are part of the State's Water-Quality Certification under Section 401 of the Act. The only exception to this is that sludge conditions/requirements are not part of the Section 401 State Certification.

The staff of the NHDES-WD has reviewed the draft permit and advised EPA-Region I that the limitations are adequate to protect water quality. EPA-Region I has requested permit certification by the State and expects that the draft permit will be certified. Regulations governing state certification are set forth in 40 CFR §§124.53 and §124.55.

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XVII. COMMENT PERIOD, REQUESTS FOR PUBLIC HEARINGS AND PROCEDURES FOR FINAL DECISIONS

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period to:

Meridith Timony
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (Mail Code OEP06-01)
Boston, Massachusetts 02109-3912
Telephone: (617) 918-1533
Fax: (617) 918-0533

Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the state agency. Such requests shall state the nature of the issue proposed to be raised at the hearing. A public hearing may be held after at least thirty (30) days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at the EPA office listed above.

Following the close of the comment period, and after a public hearing (if applicable), the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice.

Information concerning the draft permit may be obtained between the hours of 9:00 am and 5:00 pm (8:00 a.m. and 4:00 p.m. for the state), excluding holidays.

July 11, 2013

Date:

Ken Moraff, Acting Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

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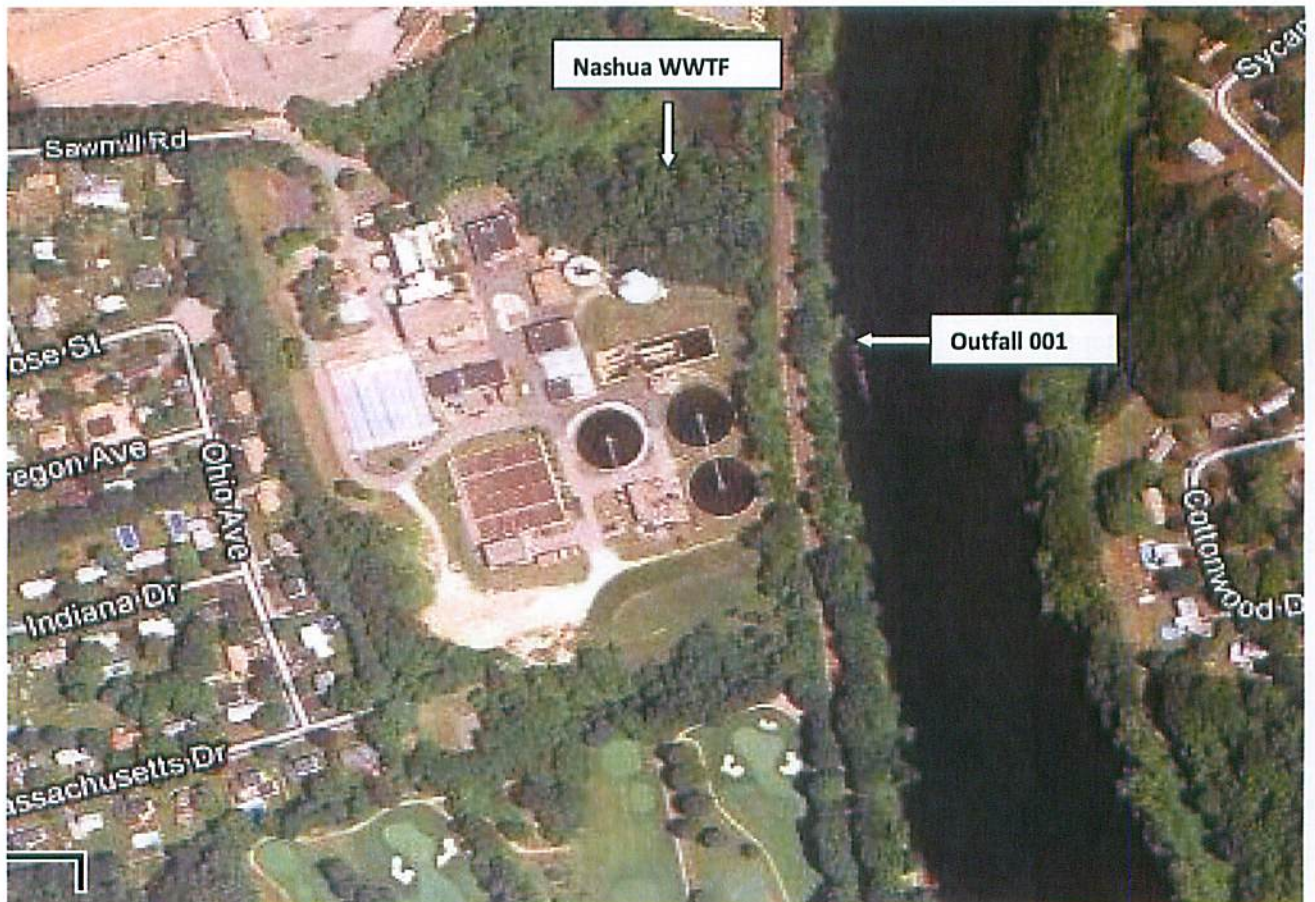


Figure 1 Nashua WWTF and Outfall 001

Aerial Image obtained from Google Maps (<http://maps.google.com>)

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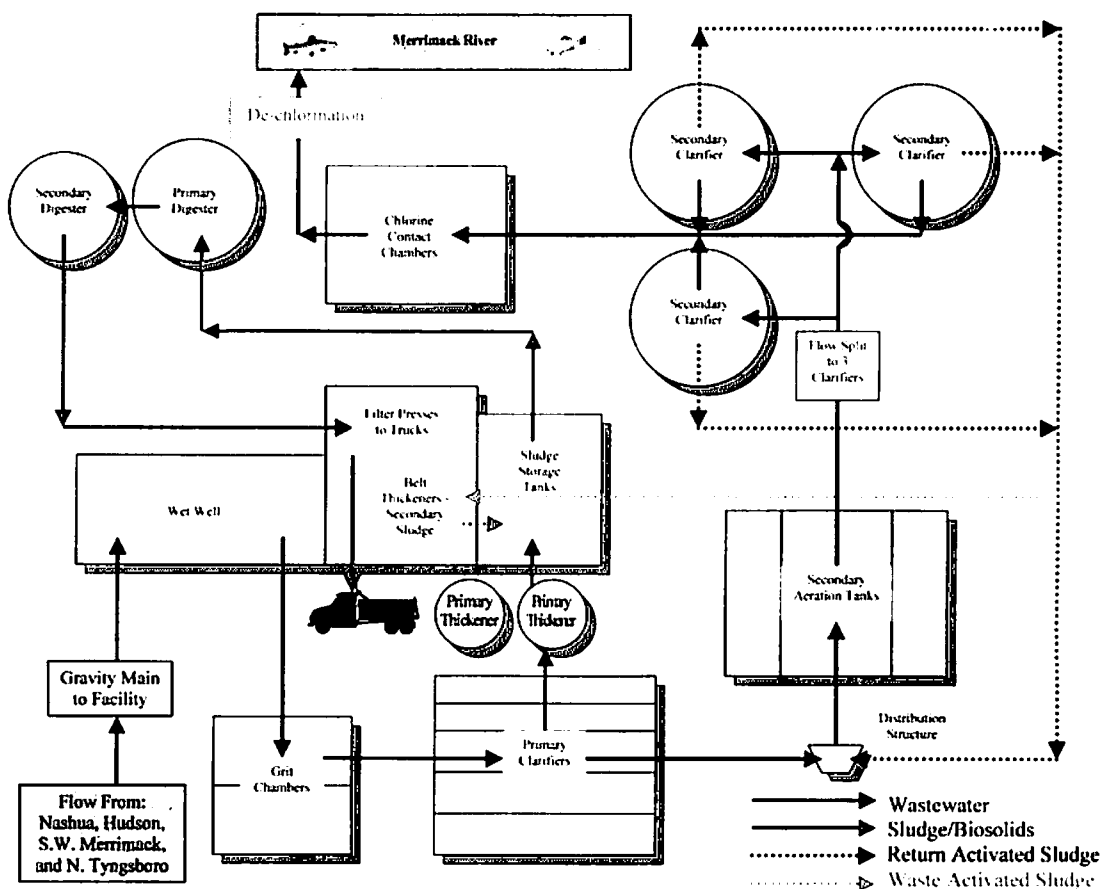
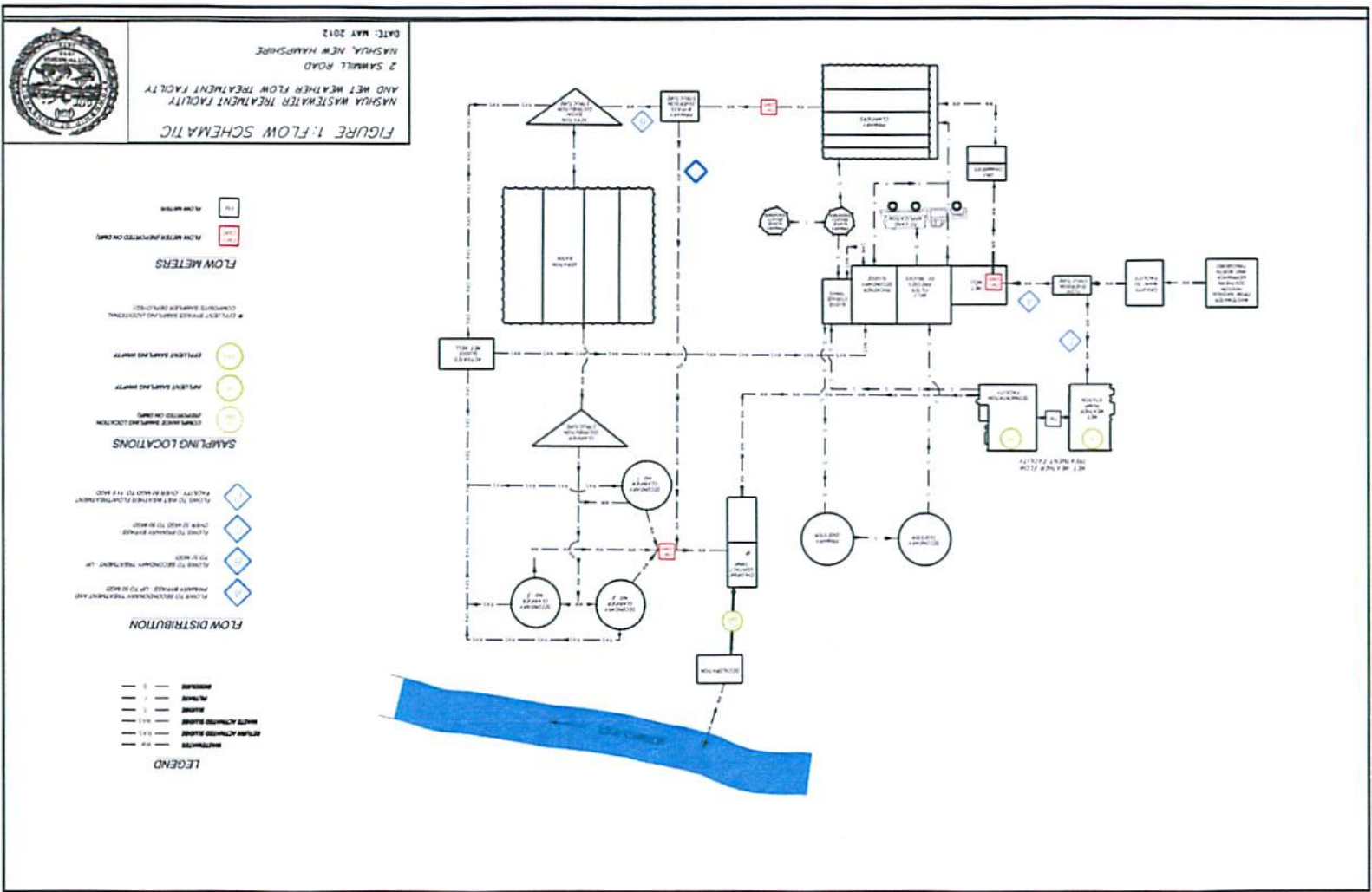


Figure 2 Nashua WWTF Process Flow Diagram

Figure 3 Wet Weather Flow Schematic



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Nashua CSO Location Map

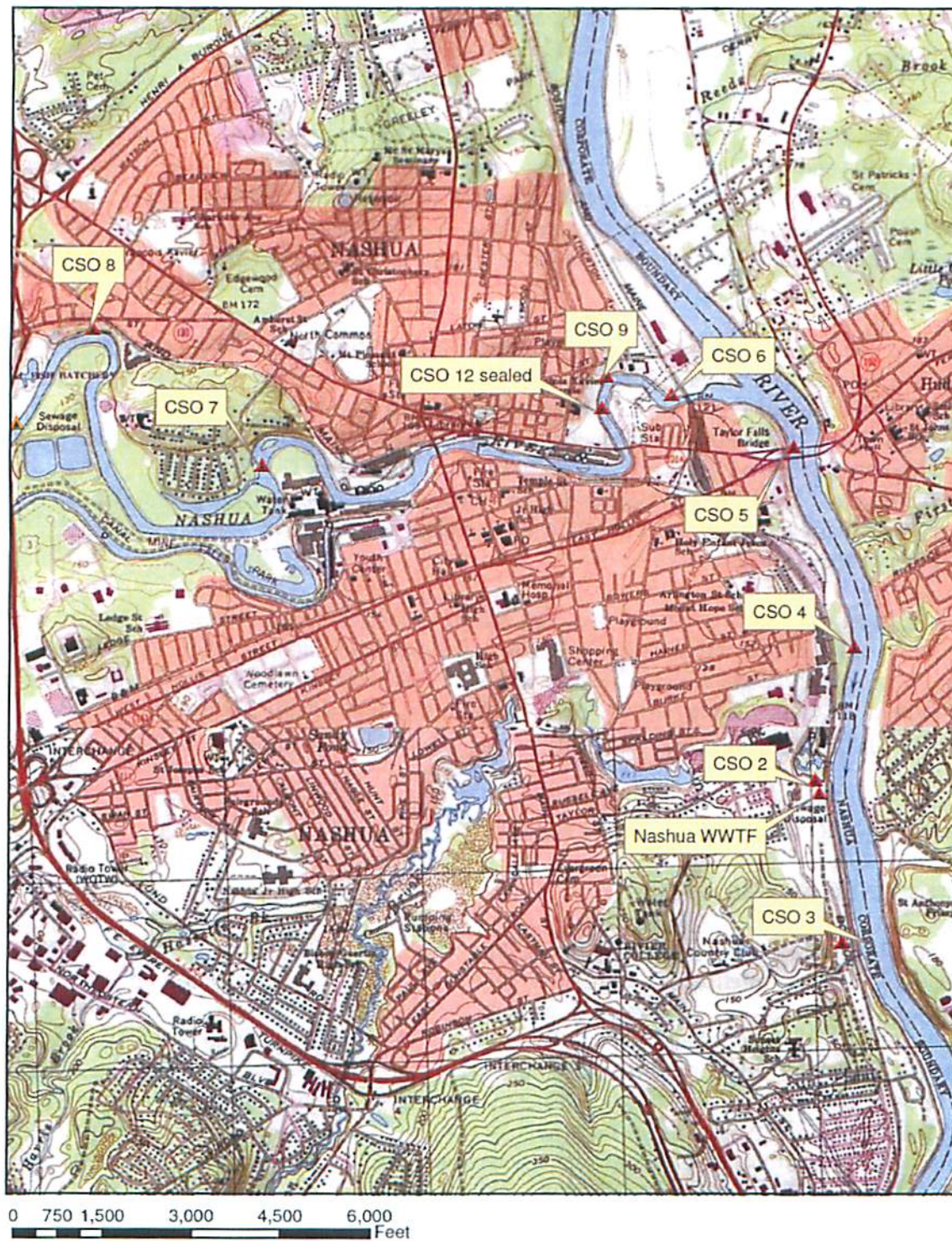


Figure 4 Nashua CSO Discharge Outfall Locations