

Section 5. Nature and Extent of Chemicals in Groundwater

The groundwater data from previous investigations and ongoing monitoring ([Section 3](#)) was used to define the nature and extent of groundwater contamination at Parcel E-2. This section evaluates all existing groundwater data (through April 2005) to support the risk assessment and remedial alternative analysis in this RI/FS report. This nature and extent evaluation documents that an adequate amount of data, of sufficient quality, exists to support the human health and ecological risk assessments, to provide the basis for the RAOs, and to evaluate a focused set of remedial alternatives for Parcel E-2. To that end, all of the Parcel E-2 groundwater data collected between 1990 and April 2005 have been compiled, evaluated and summarized in this report. Due to the large quantity of data collected, the groundwater evaluation was focused to discuss only those constituents that have concentrations above laboratory reporting limits, exceed ambient levels, or greater than human health risk-based criteria developed for the RI. Groundwater data collected through April 2005 were included in the risk assessments presented in this report. Additional groundwater data from the ongoing monitoring program will be incorporated into the Draft Final RI/FS report.

This section is organized as follows:

- **Subsection 5.1:** Data Evaluation Methodology
- **Subsection 5.2:** Groundwater Beneficial Reuse
- **Subsection 5.3:** Identification of Chemicals Detected in Groundwater
- **Subsection 5.4:** Hunters Point Groundwater Ambient Levels
- **Subsection 5.5:** Chemical Limits and Standards
- **Subsection 5.6:** Selection of Groundwater Evaluation Criteria
- **Subsection 5.7:** Focused Evaluation
- **Subsection 5.8:** Summary of Findings

5.1. DATA EVALUATION METHODOLOGY

To provide the most accurate evaluation of nature and extent, a thorough analysis was conducted of the existing data, including data collected during past investigations (i.e., the RI, the GDGI, and the ongoing BGMP [see [Subsection 3.5](#)]). The steps involved in the nature and extent evaluation are described below.

Step 1. Compilation of Groundwater Data

All groundwater monitoring data collected at Parcel E-2 between 1990 to April 2005 were compiled and grouped in tabular form, by chemical category (i.e., anions, metals, pesticides and PCBs, SVOCs, VOCs, and petroleum hydrocarbons). [Appendix J](#) contains the tables that list comprehensive analytical results for samples collected between 1990 and April 2005. The data set was “locked” in April 2005 in order to provide a consistent data set for the nature and extent evaluation and risk assessments presented in this Draft RI/FS. The data set will be rectified in the Draft Final RI/FS to include groundwater monitoring data since April 2005.

Step 2. Beneficial Reuse Analysis

The groundwater beneficial reuse evaluation, discussed in [Subsection 2.2.6](#), was performed to evaluate the potential future uses for the aquifers at Parcel E-2. A summary of the beneficial reuse evaluation is presented in [Subsection 5.2](#).

Step 3. Identification of Chemical Detections

The chemical data was analyzed to establish the extent of detectable concentrations of chemicals in Parcel E-2 groundwater. [Subsection 5.6](#) summarizes the detections by chemical category. All monitoring well data were evaluated to identify all chemical concentrations exceeding reporting limits at Parcel E-2. Quantitative data, such as the number, location, range of reporting limits, and magnitude and frequency of detections, are presented in the tables in [Appendix J](#). The detection statistics are summarized as part of the Data Evaluation Results ([Subsection 5.3](#)).

Step 4. Comparison to Hunters Point Groundwater Ambient Levels

Because metals naturally occur in groundwater, and site-specific ambient levels for metals are defined for the A-aquifer, concentrations of all metals detected in the A-aquifer were compared to the HGALs ([PRC, 1996b](#)). Metals that never exceeded HGALs in any Parcel E-2 well were not included in the nature and extent analysis, as they do not constitute a release of metals from the landfill or the adjacent areas (the Panhandle Area, East Adjacent Area, and Shoreline Area). All metals were included in the HHRA (presented in [Section 7](#)) regardless of whether their concentrations exceeded HGALs. The ambient metals screening results are presented in [Subsection 5.4](#).

Step 5. Selection of RI Evaluation Criteria

Based on the results of the groundwater beneficial use evaluation, applicable chemical concentration limits (based on regulatory standards and Hunters Point-specific criteria) were identified for the A- and B-aquifers at Parcel E-2. Because each of these aquifers has different beneficial uses, the applicable chemical concentration limits are distinct per aquifer. [Subsection 5.5](#) summarizes the regulatory limits and standards that apply to each aquifer. The chemical concentration limits and standards derived from the beneficial use evaluation were used to focus the nature and extent evaluation for Parcel E-2. In parallel with the soil evaluation process, the most conservative (lowest) concentration limit or standard

for each chemical was used to determine the RIEC for each chemical, in each aquifer. These evaluation criteria are referred to as RIECs throughout this section. In the case of metals present in the A-aquifer, a different approach was employed to assign RIECs. For each metal, the HGAL (if available) was selected as the RIECs, unless a limit or standard exceeding the HGAL exists. In such a case, the most conservative (lowest) concentration limit or standard above the HGAL was used as the RIEC. RIEC selection methodology is described in [Subsection 5.6](#), along with a listing of all the selected RIECs.

Step 6. Focused Data Evaluation

To focus the evaluation and data presentation on the target COPCs, sampling results were posted to determine the lateral, vertical, and temporal extent of chemicals in groundwater and to identify areas where groundwater chemicals exceed the RIECs. [Figures 5-1 through 5-65](#) show chemical detections for each analyte where at least one well had detected concentration exceeding RIECs. The results of the focused evaluation are included as part of the Data Evaluation Results ([Subsection 5.7](#)).

Step 7. Lateral, Vertical, and Temporal Extent Assessment

The lateral, vertical, and temporal extent of all chemicals exceeding RIECs was determined to establish the current extent of groundwater contamination at Parcel E-2. This included an evaluation of whether the data adequately delineate the temporal, vertical, and horizontal extents of chemicals in groundwater. In areas where the extent of a contaminant may not have been delineated at a parcel boundary, data from beyond the boundary were included in the extent assessment. Those data are provided in tables in [Appendix J](#). A lateral, vertical, and temporal extent of contamination summary is provided in the Summary of Findings ([Subsection 5.8](#)).

Step 8. Resolution of Data Quality Objectives, Evaluation of Detection Limits and Summary of Data Gaps

[Subsection 5.8](#) presents an evaluation of whether the data satisfy the DQOs outlined in the BGMP, an evaluation of detection limits versus chosen RIECs, and a summary of data gaps to be considered during the remedial alternatives design, selection, and implementation process.

5.2. GROUNDWATER BENEFICIAL USE

As presented in the geologic/hydrogeologic descriptions in [Section 2](#) of this report, the Parcel E-2 hydrostratigraphy is composed of two aquifers, which are almost entirely separated by an aquitard composed of Bay Mud, and an underlying bedrock WBZ. As discussed in [Subsection 2.2.1](#), groundwater monitoring has not been required in the Parcel E-2 bedrock WBZ because the bedrock is relatively deep (greater than 55 feet bgs in the northern portion of Parcel E-2 to greater than 200 feet bgs in the southeast portion of Parcel E-2). In addition, the potential for the downward migration of contamination into the bedrock WBZ is low because of the site conditions that limit hydraulic communication between the uppermost B-aquifer zone and the lower B-aquifer zones. For this reason, the bedrock WBZ in Parcel E-2 was not evaluated as part of this report.

The A- and B-aquifers were evaluated to determine the potential beneficial uses. The results of these evaluations are presented in [Subsection 2.2.6](#). Based on the beneficial use evaluation, RIECs were selected for the A- and B-aquifers and used to evaluate the data and identify chemicals that should be the primary focus of the nature and extent evaluation. The selection of RIECs is discussed in [Subsection 5.5](#).

5.3. IDENTIFICATION OF CHEMICALS DETECTED IN GROUNDWATER

All groundwater data collected from monitoring wells at Parcel E-2 were evaluated to determine which analytes have been detected in the A- and B-aquifers. More specifically, these data were evaluated to determine which compounds have been detected above analytical reporting limits. The data tables in [Appendix J](#) list all groundwater results from monitoring wells sampled, by analyte group (i.e., anions, metals, pesticides and PCBs, SVOCs, VOCs, and petroleum hydrocarbons). Each table summarizes the statistics for each compound, such as the number of samples collected, the number of results that exceed the reporting limit, and the minimum and maximum concentrations detected. Each table also includes basic descriptive statistics, including the median, mean, and standard deviation of the results for each analyte.

Groundwater data from 1990 through April 2005 was included in the evaluation. Groundwater data from subsequent quarterly monitoring events was not available for incorporation into the Draft RI/FS, but will be incorporated into the Draft Final RI/FS, as appropriate.

The following subsection summarizes the results of previous groundwater investigations (conducted prior to this RI/FS) including a discussion of RI results ([Subsection 5.3.1.1](#)), GDGI results ([Subsection 5.3.1.2](#)), and the extent of dense non-aqueous phase liquid (DNAPL)/light non-aqueous phase liquid (LNAPL) in Parcel E-2 groundwater ([Subsection 5.3.2](#)). In addition, a thorough re-analysis of the entire data set included in [Appendix J](#) is provided in [Subsection 5.3.3](#). The goal of this subsection is to identify all chemicals detected in Parcel E-2 groundwater through April 2005.

5.3.1. Summary of Results from Past Evaluations

The groundwater data have been collected in multiple phases beginning the early 1990s with the Parcel E RI (TtEMI, LFR, and Uribe, 1997). As discussed in [Subsection 3.4](#), additional data gaps investigations were conducted in 2001 (TtEMI, 2001a) and 2002 (TtEMI, 2004c). RI and GDGI results are summarized in the following subsections.

5.3.1.1. Parcel E RI

The Parcel-E RI was the first comprehensive evaluation to present the spatial distribution of contaminants across Parcel E, including Parcel E-2 (TtEMI, LFR, and Uribe, 1997). The RI identified the following COPCs:

- Metals (including arsenic, chromium, copper, lead, manganese, and nickel) were detected at concentrations exceeding PRGs, MCLs, and/or HGALs in either or both the A- and B-aquifers.

- Elevated concentrations of Aroclor-1260 exceeded evaluation criteria exclusively in A-aquifer wells across Parcel E, including Parcel E-2 wells.
- Petroleum hydrocarbons (as diesel, gasoline, and motor oil) were detected in discrete areas at levels exceeding evaluation criteria across Parcel E-2.

5.3.1.2. Groundwater Data Gaps Investigations

Groundwater samples collected in 2001 from the Landfill Area exceeded Phase II GDGI evaluation criteria for the following chemicals (TtEMI, 2001a):

- Metals (including copper, nickel, and zinc)
- VOCs (various)
- Pesticides (including 4,4'- DDT and dieldrin)
- PCBs (including Aroclor-1260)

In 2002, the following contaminants were detected at concentrations exceeding Phase III GDGI evaluation criteria in the Landfill Area (TtEMI, 2004c):

- VOCs (including 1,1-dichloroethane [DCA]; 1,1-dichloroethene [DCE]; 1,2-DCA; 1,4-dichlorobenzene [DCB]; benzene; cis-1,2-DCE; PCE; TCE; and vinyl chloride)
- Cyanide
- Ammonia

Benzene (in the A- and B-aquifers) and 1,4-DCB (in the A-aquifer) were the only VOCs that had formed laterally extensive areas of contamination that exceeded the evaluation criteria. The presence of cyanide in groundwater, at concentrations exceeding evaluation criteria, was generally limited to the Landfill Area within the A-aquifer; ammonia concentrations were detected throughout the A- and B-aquifers, in the vicinity of the Landfill Area. Although other metals (arsenic, barium, copper, lead, nickel, silver, sodium, and zinc); SVOCs (benzo[a]pyrene and benzo[a]anthracene); pesticides (chlordane [alpha and gamma], dieldrin, 4,4'-DDT, endosulfan II, heptachlor, and lindane); and PCBs (Aroclor-1254 and Aroclor-1260) were detected at concentrations exceeding evaluation criteria, they did not form widespread areas of contamination (TtEMI, 2004c).

The specific conclusions presented in the Phase III GDGI were as follows:

Benzene

Concentrations exceeded the MCL for Benzene in the B-aquifer, in the northwestern corner of the site, where the A-aquifer is not separated from the B-aquifer by the Bay Mud aquitard. Benzene was present in the A-aquifer in 2002 at concentrations less than 7 micrograms per liter ($\mu\text{g/L}$) (IR01MW02B, IR01MW03A, and IR03MW16A).

Elevated concentrations of benzene have been detected in wells in the A- and B-aquifers within an area with approximate lateral dimensions of 2,250 by 1,200 feet, extending south and west from the landfill.

Although benzene is present in groundwater in a large lateral area, concentrations are less than 7 µg/L and appear to be decreasing.

Benzene has been detected in B-aquifer wells IR01MW09B, IR01MW47B, IR01MW02B, and IR01MW53B, indicating that benzene contamination has migrated vertically into the B-aquifer. IR01MW02B is located in an area where the B-aquifer is in direct contact with waste fill material. Benzene has likely migrated vertically into the B-aquifer in this area and then laterally, where it was detected in other B-aquifer wells.

1,4-Dichlorobenzene

1,4-DCB concentrations in 2002 exceeded the MCL at the southern/central portion of the landfill in an area with approximate lateral dimensions of 1,000 by 400 feet. In 2002, 1,4-DCB concentrations exceeded the MCL in the area southeast of the landfill with approximate lateral dimensions of 450 by 400 feet.

Concentrations of 1,4-DCB at A-aquifer well IR01MW03A in the northwestern portion of the landfill have decreased from 7 µg/L in 1991 to 0.15 µg/L in 2002. Although concentrations in downgradient wells IR01MW05A and IR01MW16A have increased during that time, they have remained below the evaluation criterion of 5 µg/L.

Chlorinated Solvents

Concentrations of the chlorinated solvents PCE, TCE, vinyl chloride, cis-1,2-DCE, 1,2-DCA, 1,1-DCE, and 1,1-DCA exceeding their MCL at the Landfill Area were detected in an area southeast of the landfill in well IR04MW13A. Concentrations of PCE and TCE in downgradient well IR12MW14A indicate that contamination is migrating laterally in the A-aquifer to the southeast.

Iron

The highest concentrations of iron exceeded the evaluation criterion in groundwater sampled from within the waste material. Concentrations of iron have increased in the southwest corner of the site, including in off-site A-aquifer well, IR01MW401A, which may indicate a separate source of iron off site. These concentrations may also be related to the metal slag located this area.

Cyanide

Elevated concentrations of cyanide have been detected in A-aquifer wells throughout the Landfill Area. The extent of persistent cyanide contamination at the Landfill Area could not be delineated during the Phase III GDGI because of fluctuations in 2002 concentrations and elevated reporting limits exceeded the evaluation criterion of 1 µg/L. The cause of fluctuating cyanide concentrations was not identified, and did not appear to correspond to nitrate concentrations, seasonal fluctuations, or analytical uncertainty.

Ammonia

Ammonia was detected at elevated concentrations throughout the A- and B-aquifers in the Landfill Area. These concentrations are indicative of the decomposition of organic waste material in the landfill. Wells located near the Bay contain elevated concentrations of un-ionized ammonia, based on data from well IR01MW48A (425 µg/L) approximately 100 feet from the shoreline. Ammonia levels calculated as un-ionized ammonia exceed the recommended evaluation criterion and may be harmful to aquatic life.

PCBs and Pesticides

Concentrations of PCBs exceeded the evaluation criteria in A-aquifer wells located near the sheet pile wall in the Landfill Area in 2002. Historical data indicate that PCB concentrations are generally decreasing across the site. This decrease may be attributed to low-flow sampling techniques, utilized during the GDGI and BGMP, which have reduced the amount of entrained sediment within water samples analyzed for PCBs.

During 2002, detected trace concentrations of the pesticides chlordane (alpha and gamma); dieldrin; 4,4'-DDT; endosulfan II; and heptachlor exceeded evaluation criteria. The presence of these pesticides may be related to facility-wide pest abatement programs and may be indicative of the routine use of these materials or possible disposal as waste materials in the landfill.

Petroleum Hydrocarbons

Petroleum hydrocarbons are not classified as a hazardous substance under CERCLA (Title 42 United States Code Section 9601[14]), and are therefore excluded from consideration under the CERCLA process unless it is commingled with hazardous substances regulated under the CERCLA program. A screening evaluation was conducted to identify areas where petroleum hydrocarbons are commingled with other organic and inorganic compounds that are regulated under CERCLA. The aquatic criterion used in this evaluation is based on the HPS-specific methodology established under the petroleum program (TtEMI, 2004b). This methodology sums all TPH categories (gasoline-range, diesel-range, and motor-oil range) and compares it against a total TPH criterion which ranges from 1,400 to 20,000 µg/L, depending on the distance from the shoreline.

Historical TPH concentrations in groundwater in wells IR01MWI-3, IR01MW43A, and IR01MW44A have exceeded TPH criteria in samples collected in 1992 and/or 1996. The TPH criterion for these wells near the shoreline is 1,400 µg/L, calculated as the sum of TPH fractions. Results were below the TPH criterion in subsequent sampling in 2001 in wells IR01MWI-3 and IR01MW43A. Well IR01MW44A was not sampled for TPH in 2001.

Radionuclides

During the Phase III GDGI, 47 groundwater samples were collected from monitoring wells in Parcel E-2, to assess the absence or presence of radionuclides (TtEMI, 2004c). The analytical data were evaluated by simple (nonstatistical) threshold comparisons to a fixed standard (such as drinking water standards) and

by statistical tests comparing the site data to background data (two-sample statistical tests) and to fixed standards (one-sample statistical tests). Statistical testing comparing groundwater data from Parcel E-2 for radionuclides with drinking water or other standards (one-sample t-test) showed that no standards were statistically exceeded at the 95 percent confidence level. Statistical testing comparing groundwater data from Parcel E-2 and background areas (parametric and nonparametric two-sample tests) indicated that differences between background and site data sets for potassium-40, radium-226, and strontium-90 are statistically significant in at least one of the tests. Other radionuclides that were detected infrequently in groundwater samples from Parcel E-2 did not exceed background levels. The results of the radiological investigations at Parcel E-2 are discussed further in [Subsection 3.6](#), and will be evaluated in more detail in a forthcoming addendum to this RI/FS report.

5.3.2. DNAPL and LNAPL in Parcel E-2 Groundwater

Prior to implementation of the BGMP, Parcel E-2 groundwater had not been systematically surveyed for the presence of LNAPL and DNAPL. Monitoring wells sampled under the BGMP are surveyed for the presence of immiscible phase liquids, as specified in the BGMP Sampling and Analysis Plan (SAP) ([TtEMI, 2004e](#)). The results of previous evaluations for LNAPL and DNAPL are summarized in the following subsections.

5.3.2.1. Previous DNAPL Evaluations

Based on the nature of the historical activities conducted at Parcel E-2, there is a potential for DNAPL contamination to exist in Parcel E-2 groundwater. The following paragraphs describe the findings from past investigations and briefly assess the possible presence, and nature and extent of DNAPL contamination at Parcel E-2.

The Parcel E RI concluded that PAH concentrations detected at Parcel E-2, relative to their aqueous solubility limits, may be indicative of DNAPL in groundwater; however, the report also concludes that this assumption may be false because the types of wastes released at Parcel E-2 do not typically result in DNAPL plumes. The presence of PAHs at Parcel E-2 is due to releases of waste fuels containing mixtures of PAHs and other petroleum hydrocarbons. Because waste fuels are lighter than water, they float on the water table and, therefore do not migrate to the bottom of the A-aquifer, as they would if they behaved as DNAPLs ([TtEMI, LFR, and Uribe, 1997](#)).

Elevated PCB concentrations in Parcel E-2 groundwater also may be indicative of DNAPL in groundwater; however, again, the characteristics of the wastes released at Parcel E-2 do not typically result in DNAPL plumes. The presence of PCBs at Parcel E-2 is mainly due to releases of waste oils containing PCBs. The fraction of PCBs in these waste oils is insufficient to result in a DNAPL in groundwater. PCB concentrations were probably detected in groundwater samples because the presence of petroleum hydrocarbons in these samples enhances the solubility of the PCBs ([TtEMI, LFR, and Uribe, 1997](#)).

Another factor that reduces the likelihood of PCB DNAPL presence in groundwater is the fact that past groundwater sampling for PCBs at Parcel E-2 did not employ low-flow sampling techniques to minimize entrained sediments in samples (IT, 2001). PCB concentrations detected in Parcel E-2 groundwater, mostly notably during the RI sampling, have been shown to exceed the typical solubility limits of PCB compounds (2.7 µg/L) (IT, 2001). Entrained sediment introduced into samples by turbulent well water pumping may have yielded results that are not representative of dissolved phase PCB concentrations. This is because PCBs very readily adsorb to entrained sediment in an aqueous sample, but will also readily desorb during the extraction process associated with analytical testing.

To further ascertain the presence of PCBs as DNAPL, Parcel E-2 wells with possible DNAPL were identified by comparing historic groundwater data against the corresponding aqueous solubility limits. Wells with chemical concentrations that exceeded one percent of the corresponding aqueous solubility limit were identified for a focused field measurement, conducted during the Phase III GDGI program. An oil-water interface probe was used to assess the potential presence of DNAPL in 15 A-aquifer wells in Parcel E-2 that had PCB concentrations exceeding one percent of the corresponding aqueous solubility limit. No DNAPL was observed in these wells during the Phase III GDGI (TtEMI, 2004c). This finding has been confirmed by subsequent oil-water interface measurements collected as part of the ongoing BGMP (Kleinfelder and CDM, 2004a; Kleinfelder and CDM, 2004b; Kleinfelder and CDM, 2004c).

5.3.2.2. Previous LNAPL Evaluations

Based on the nature of the historical activities conducted at Parcel E-2, most notably the disposal of waste oils, there is a potential for LNAPL contamination to exist in Parcel E-2 groundwater. The following paragraph describes the findings from past LNAPL investigations and briefly assesses the possible presence, nature, and extent of LNAPL contamination at Parcel E-2. Past LNAPL investigations were conducted using oil-water interface probes, which are used to identify the presence, and measure the depth and thickness of free-phase product (e.g., LNAPL) in monitoring wells.

The potential presence of LNAPL was investigated during basewide well inspections conducted during the Phase I GDGI (from March to April 2000). These results were subsequently used for focused LNAPL inspections that were conducted as part of the petroleum hydrocarbon program in June to October 2000 (TtEMI, 2002f). These inspections did not identify any measurable LNAPL at Parcel E-2. This finding has been confirmed by subsequent measurements collected as part of the ongoing BGMP (Kleinfelder and CDM, 2004a; Kleinfelder and CDM, 2004b; Kleinfelder and CDM, 2004c). However, LNAPL consisting of oily waste was encountered and removed during PCB Hot Spot excavation within the East Adjacent Area (BRAC PMO West, 2005e). This was the likely source of PCBs in groundwater. In addition, over three million gallons of groundwater and surface water were extracted from the excavation and treated, which removed all remaining traces of LNAPL.

5.3.3. Comprehensive List of Chemical Detections

The comprehensive data presentation referenced in [Subsection 5.1](#), and included (in tabular form) in [Appendix J](#), includes all data from all groundwater investigations performed at Parcel E-2. Currently, the presence and distribution of contaminants in Parcel E-2 groundwater is being monitored under the BGMP (TtEMI, 2004e). Analytical data for the first four sampling events under the BGMP (June/July 2004, September/October 2004, December 2004/January 2005, and March/April 2005) were added to data collected prior to 2003, and evaluated in this nature and extent assessment. The following subsections present summaries, by analyte group, of all the chemicals detected (at or above reporting limits) in Parcel E-2 groundwater.

5.3.3.1. Anions

Since 1990, Parcel E-2 groundwater has been sampled and analyzed for a variety of anions, including:

- Chloride
- Cyanide
- Fluoride
- Nitrite
- Nitrate
- Orthophosphate
- Sulfate
- Sulfide
- Total Kjeldahl Nitrogen (TKN)
- Unionized ammonia (calculated)

Each of these analytes has been detected in groundwater at the site. [Table 5-1](#) summarizes the anion data presented in [Appendix J](#), including the detection frequency, range of reporting limits, and range of results for each anion.

5.3.3.2. Metals

The dissolved metals in groundwater, listed below, have been detected in both A-aquifer and B-aquifer groundwater wells at Parcel E-2.

- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Calcium
- Cadmium
- Cobalt
- Copper
- Chromium
- Chromium VI
- Iron
- Lead
- Manganese
- Magnesium
- Mercury
- Molybdenum
- Nickel
- Potassium
- Selenium
- Silver
- Sodium
- Thallium
- Vanadium
- Zinc

[Table 5-2](#) summarizes the metals data presented in [Appendix J](#), including the detection frequency, range of reporting limits, and range of results for each metal. [Table 5-2](#) also contains information that allows for comparison of metals data to HGALs. This evaluation is presented in [Subsection 5.4](#).

5.3.3.3. Pesticides and PCBs

Pesticides and PCBs in groundwater have been consistently detected in the A-aquifer, but rarely in the B-aquifer. All pesticides and PCBs listed below, with the exception of chlorpyrifos, were detected in the A-aquifer.

- | | | |
|-----------------------------------|----------------------|---------------------------|
| ▪ 4,4' DDD | ▪ Diazanone | ▪ Endrin aldehyde |
| ▪ 4,4' DDE | ▪ Dieldrin | ▪ Alpha-chlordane |
| ▪ 4,4' DDT | ▪ Endosulfan I | ▪ Gamma-chlordane |
| ▪ Chlorpyrifos | ▪ Endosulfan II | ▪ Heptachlor |
| ▪ Beta-benzene hexachloride (BHC) | ▪ Endosulfan sulfate | ▪ Heptachlor epoxide |
| ▪ Delta-BHC | ▪ Endrin | ▪ Total PCBs (calculated) |
| ▪ Gamma-BHC (lindane) | ▪ Endrin ketone | |

Table 5-3 summarizes the pesticide and PCB data presented in Appendix J, including the detection frequency, range of reporting limits, and range of results for each pesticide/PCB. The only pesticides detected in the B-aquifer were 4-4'-DDE (detected in one of 68 samples), Beta BHC (detected in one of 68 samples), and chlorpyrifos (detected in three of 44 samples).

5.3.3.4. SVOCs

SVOCs in groundwater have been detected in both the A- and B-aquifers. The list below identifies SVOCs that were detected in Parcel E-2 groundwater.

- | | | |
|---------------------------|------------------------------|--------------------------|
| ▪ 1,2-DCB | ▪ Acenaphthene | ▪ Chrysene |
| ▪ 1,3-DCB | ▪ Acenaphthylene | ▪ Dibenz(a,h)anthracene |
| ▪ 1,4-DCB | ▪ Anthracene | ▪ Dibenzofuran |
| ▪ 2,4-dichlorophenol | ▪ Benzo(a)anthracene | ▪ Fluoranthene |
| ▪ 2,4-dimethylphenol | ▪ Benzo(a)pyrene | ▪ Fluorine |
| ▪ 2-chlorophenol | ▪ Benzo(b)fluoranthene | ▪ Indeno(1,2,3-CD)pyrene |
| ▪ 2-methylnaphthalene | ▪ Benzo(g,h,i)perylene | ▪ Naphthalene |
| ▪ 2-methylphenol | ▪ Benzo(k)fluoranthene | ▪ N-nitrosodiphenylamine |
| ▪ 2-nitroaniline | ▪ Benzoic acid | ▪ Pentachlorophenol |
| ▪ 2-nitrophenol | ▪ Benzyl alcohol | ▪ Phenanthrene |
| ▪ 4-chloro-3-methylphenol | ▪ Bis(2-ethylhexyl)phthalate | ▪ Phenol |
| ▪ 4-methylphenol | ▪ Carbazole | ▪ Pyrene |
| ▪ 4-nitrophenol | | |

Table 5-4 summarizes the SVOC data presented in Appendix J, including the detection frequency, range of reporting limits, and range of results for each SVOC. As seen in Table 5-4 and the data presented in Appendix J, a wider range of SVOCs was detected in the A-aquifer than in the B-aquifer.

5.3.3.5. VOCs

VOCs in groundwater have been detected in both the A- and B-aquifers. The list below identifies VOCs that were detected in Parcel E-2 groundwater.

- | | | |
|-------------------------------|------------------------|---------------------|
| ▪ 1,1,1-trichloroethane | ▪ 2-hexanone | ▪ Isopropyl benzene |
| ▪ 1,1,1,2,2-tetrachloroethane | ▪ 4-methyl-2-pentanone | ▪ Methylcyclohexane |
| ▪ 1,1-DCA | ▪ Acetone | ▪ Naphthalene |
| ▪ 1,1-DCE | ▪ Benzene | ▪ O-xylene |

- | | | |
|--------------------------|------------------------|-------------------------------|
| ▪ 1,2,3-trichloropropane | ▪ Bromomethane | ▪ Propylbenzene |
| ▪ 1,2,4-trichlorobenzene | ▪ Carbon disulfide | ▪ Tertiary-butyl methyl ether |
| ▪ 1,2,4-trimethylbenzene | ▪ Carbon tetrachloride | ▪ PCE |
| ▪ 1,2-DCB | ▪ Chlorobenzene | ▪ Toluene |
| ▪ 1,2-DCA | ▪ Chloroethane | ▪ Trans-1,2-DCE |
| ▪ 1,2-DCE (total) | ▪ Chloroform | ▪ Trans-1,3-dichloropropene |
| ▪ 1,3,5-trimethylbenzene | ▪ Chloromethane | ▪ TCE |
| ▪ 1,3-DCB | ▪ Cis-1,2-DCE | ▪ Trichlorofluoromethane |
| ▪ 1,4-DCB | ▪ Cyclohexane | ▪ Vinyl chloride |
| ▪ 2-butanone | ▪ Ethylbenzene | ▪ Xylenes (total) |

Table 5-5 summarizes the VOC data presented in Appendix J, including the detection frequency, range of reporting limits, and range of results for each VOC. Similar to SVOCs, Table 5-5 and the data presented in Appendix J show a wider range of VOCs detected in the A-aquifer than in the B-aquifer.

5.3.3.6. Petroleum Hydrocarbons

Petroleum hydrocarbons in groundwater have been detected in both the A- and B-aquifers. The specific ranges of petroleum hydrocarbon compounds detected are listed below.

- | | | |
|---------|----------|-------|
| ▪ TPH-d | ▪ TPH-mo | ▪ TPH |
| ▪ TPH-g | ▪ TOG | |

Table 5-6 summarizes the petroleum hydrocarbon data presented in Appendix J, including the detection frequency, range of reporting limits, and range of results for each petroleum hydrocarbon range.

5.4. HUNTERS POINT GROUNDWATER AMBIENT LEVELS

Metals naturally occur in groundwater; thus, they are regularly detected in Parcel E-2 aquifers. Because the presence of metals in groundwater does not constitute contamination, a comparison between detected concentrations and ambient levels was warranted. Table 5-2 includes a comparison of detected metals concentration ranges to HGALs. Based on this comparison, it is apparent that some metals detected in Parcel E-2 groundwater are less than the corresponding HGAL, and therefore are not included in the nature and extent evaluation. Because HGALs only apply to the A-aquifer, the comparison to B-aquifer detections was merely for informational purposes, and did not influence the nature and extent evaluation of B-aquifer metals detections.

In the A-aquifer, the following metals were never detected at concentrations exceeding HGALs: magnesium, molybdenum, potassium, and thallium. Therefore, these metals were not included in the nature and extent evaluation. Some A-aquifer metals only occasionally exceeded the HGALs (in less than 2 percent of all samples collected); these included manganese, selenium, silver, and sodium. Although these metals likely are within the ambient range for the site, they were included in the focused analysis, along with any other metals detected in the A-aquifer that exceeded HGALs.

In the B-aquifer, the following metals were never detected at concentrations exceeding HGALS: barium, beryllium, cobalt, copper, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc. Because HGALS are not valid evaluation criteria for the B-aquifer, these metals were included in the nature and extent evaluation.

5.5. CHEMICAL LIMITS AND STANDARDS

Groundwater chemical concentration limits and standards considered for each aquifer at Parcel E-2 include (if available):

- Federal and State MCLs for drinking water ([DHS, 2005](#))
- Federal and State water quality criteria for the protection of marine life (aquatic criteria) ([RWQCB, Central Valley Region, 2003](#))
- RWQCB ESLs, for both drinking water and non-drinking water sources, which are based on human health and ecological criteria ([RWQCB, San Francisco Bay Region, 2005](#))
- HGALS for dissolved metals ([PRC, 1996b](#))

Different evaluation criteria were considered for the A- and B-aquifers at Parcel E-2, consistent with the beneficial use evaluation. The sections below provide more detail on the limits and standards that were considered for the A- and B-aquifers. The following tables have been included, summarizing all of the limits and standards that were considered for the A- and B-aquifers:

- Anions ([Table 5-7](#))
- Metals ([Table 5-8](#))
- Pesticides and PCBs ([Table 5-9](#))
- SVOCs ([Table 5-10](#))
- VOCs ([Table 5-11](#))
- Petroleum hydrocarbons ([Table 5-12](#))

These tables also identify the chosen RIECs used in the focused evaluation. RIEC selection is discussed in [Subsection 5.6](#), and the focused evaluation is presented in [Subsection 5.7](#). All criteria identified in this section were used solely to support the nature and extent evaluation. Remediation goals for groundwater are identified in Section 9 and 10 of this RI/FS.

5.5.1. A-Aquifer

Non-drinking water ESLs were used as the primary evaluation criteria for the A-aquifer. The non-drinking water ESLs incorporate aquatic criteria which are primarily applicable in areas where groundwater discharges to surface waters (e.g., the Bay or wetlands). To evaluate the data conservatively, the non-drinking water ESLs were applied to all wells screened in the A-aquifer, not just those wells that are along or near the shoreline. This evaluation methodology was performed strictly for the nature and extent evaluation presented in this section. The first issue with this comparison is that it is not reflective of potential exposures when groundwater discharges into the Bay. A quantitative method for comparing

groundwater data for comparison to aquatic criteria, in a manner that accounts for chemical attenuation and the near-shore mixing process, is required to assess the downgradient impact of shoreline groundwater contamination on the Bay. Such a method has not been agreed to by the Navy and the regulatory agencies. The second issue associated with this comparison is that the non-drinking water ESLs, conservatively use a combination of freshwater and saltwater aquatic criteria and include both promulgated and non promulgated criteria. While use of such conservative criteria is considered appropriate for this nature and extent evaluation, potential risk to aquatic receptors in the Bay is more accurately evaluated by using only promulgated criteria for saltwater aquatic life.

MCLs are not applicable evaluation criteria for most of the A-aquifer because the A-aquifer is not suitable for use as a drinking water supply (Subsection 2.2.6). MCLs were only used as evaluation criteria for some analytes, namely VOCs, detected in the A-aquifer in the northwest area of the Parcel E-2 Landfill where the Bay Mud confining unit (aquitard) does not separate the A-aquifer from the B-aquifer. In this area, the aquifers are hydraulically connected, so there is the potential for contaminants to migrate from the A-aquifer to the B-aquifer (a potentially suitable municipal or domestic drinking water supply) when downward flow gradient occurs. As explained in Subsection 2.2.2, typically, the vertical gradients are upward from the B-aquifer to the A-aquifer in this area, which minimizes the potential for impacts to the B-aquifer from the A-aquifer (Figure 2-17).

Non-drinking water ESLs also address human health risk via the vapor intrusion pathway, and were used as evaluation criteria for VOCs detected in the A-aquifer. The A-aquifer is at relatively shallow depth with no overlying confining layer, so SVOCs and VOCs could potentially migrate to the surface and volatilize into the air.

HPS-specific HGALs are applicable as evaluation criteria for metals in A-aquifer groundwater, as explained in Subsection 5.4.

5.5.2. B-Aquifer

Drinking water ESLs were used as the primary evaluation criteria for the B-aquifer because this unit is considered to have a moderate potential for use as a municipal or domestic water supply (Subsection 2.2.6). The non-drinking water ESLs incorporate aquatic criteria which are primarily applicable in areas where groundwater discharges to surface waters (e.g., the Bay or wetlands). To evaluate the data conservatively, the non-drinking water ESLs were applied to all wells screened in the B-aquifer; however, B-aquifer groundwater discharges into permeable zones underlying the Bay and does not result in direct exposures to aquatic receptors in the Bay.

5.6. SELECTION OF GROUNDWATER EVALUATION CRITERIA

As stated in the nature and extent evaluation methodology (Subsection 5.1), all detected chemicals were compared to RIECs to define the past and current nature and extent of groundwater contamination. To assign RIECs to each detected chemical in each aquifer, either the ambient level (if applicable) or the

most conservative single limit/standard per compound per aquifer was selected from the limits and standards identified in [Subsection 5.5](#). [Tables 5-7 through 5-12](#) contain a comprehensive list of all applicable evaluation criteria for each aquifer, along with the selected RIEC for each sampled analyte, organized by chemical group. A summary of all RIECs for Parcel E-2 groundwater is included in [Table 5-13](#). This table also lists the number of detections that exceed the RIECs.

5.7. FOCUSED EVALUATION

The purpose of the focused data evaluation was to identify and describe the groundwater contaminants present at levels requiring a more thorough assessment, so that the lateral, vertical, and temporal extents of contamination in Parcel E-2 groundwater could be characterized. As established in the nature and extent evaluation methodology ([Subsection 5.1](#)), further assessment of the nature and extent of a chemical was conducted if detected concentrations of that chemical ever exceeded the RIEC. To facilitate the focused evaluation, spatial and temporal data maps were created and evaluated for each chemical that exceeded RIECs. The maps were created using all the groundwater data included in [Appendix J](#). These maps, along with the results of the focused evaluation, are presented in this subsection.

5.7.1. Graphical Presentation of Groundwater Data

The focused data evaluation was performed for the following analyte groups: anions, metals, pesticides and PCBs, SVOCs, VOCs, and petroleum hydrocarbons. Each map displays wells with no data, non-detect data, detection data, and data that exceed RIECs. For wells with data that exceed RIECs, a data table is included to display the magnitude and temporal distribution of those exceedances. To further focus the evaluation, selected monitoring wells were informally designated as Parcel E-2 perimeter wells and were evaluated in more detail. The Parcel E-2 perimeter wells include all of the wells along the south, east, and west Parcel E-2 property boundaries. The Parcel E-2 perimeter wells were selected based on water table mapping included in quarterly BGMP reports. The Parcel E-2 perimeter wells are part of the well network used in the BGMP ([TiEMI, 2004e](#)). A focused evaluation of upgradient and downgradient monitoring wells is considered appropriate for landfill sites.

The maps were used to determine whether chemical concentrations in groundwater exceed RIECs, with the greatest focus on Parcel E-2 perimeter wells. If contamination was identified in groundwater, the maps were further used to determine if the contamination:

- is short-lived or persistent over time
- is invariable, increasing, or decreasing over time
- is present over a contiguous area, or is scattered, occurring in single unrelated locations
- is adequately delineated in its lateral and vertical extents

5.7.2. Graphical Data Analysis Results

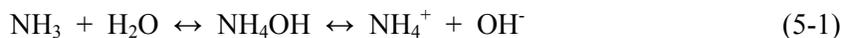
The following subsections describe the results of the graphical analysis of each chemical that exceeded its RIEC. Each subsection deals with one chemical group (i.e., anions, metals, pesticides/PCBs, SVOCs, VOCs, or petroleum hydrocarbons).

5.7.2.1. Anions

Because most of the anions occur naturally in areas of high TDS, only those detected at levels exceeding promulgated criteria were selected for additional evaluation. These include cyanide, unionized ammonia, and nitrite. The mapping of the selected anion data revealed the following:

Cyanide (Table 5-1, Figure 5-1): Between 1990 and 2005, 229 samples from 40 Parcel E-2 monitoring wells were analyzed for cyanide, a carbon-nitrogen chemical unit which combines with many organic and inorganic compounds. Cyanide was detected in nine A-aquifer and three B-aquifer wells. The highest concentrations of cyanide were from samples collected from wells within the estimated extent of landfill waste. Cyanide concentrations exceeded the A- and B-aquifer RIEC (1 µg/L) in three A-aquifer (IR01MW31A, IR01MWI-6 and IR01MW48A) and two B-aquifer (IR01MW47B and IR01MW09B) Parcel E-2 perimeter monitoring wells, only one of which contained cyanide at a concentration exceeding the RIEC after 2002 (IR01MW47B). This well had a single sample that exceeded the RIEC in December 2004 (the first cyanide detection in this well). With the exception of well IR01MW47B, the extent of cyanide in groundwater is adequately delineated by concentrations below RIECs.

Un-ionized Ammonia (Table 5-1, Figure 5-2): At Parcel E-2, the oxygenation state of groundwater is reducing and most nitrogen present at the site is ionized ammonia (NH₄⁺, also referred to as the ammonium ion) or un-ionized ammonia (the gas ammonia, NH₃, which dissolves readily in water and forms ammonium hydroxide, NH₄OH). Ammonification of nitrogen occurs during the decomposition of organic compounds, including naturally occurring organic matter and organic waste material. Ionized ammonia is generally harmless to aquatic life whereas un-ionized ammonia is toxic to aquatic life. The relationship between ionized and un-ionized ammonia is governed by the following equilibrium reaction:



where

NH ₃	=	ammonia gas (un-ionized; dissolves readily in water to form NH ₄ OH)
H ₂ O	=	water
NH ₄ OH	=	ammonium hydroxide (un-ionized)
NH ₄ ⁺	=	ammonium ion
OH ⁻	=	hydroxyl ion

The equilibrium reaction for ammonia is dependent on water quality parameters that are measured in the field, specifically pH, temperature, and salinity. In general, the concentration of un-ionized ammonia (as

a percentage of total ammonia concentration) increases with increased pH levels and temperature (Horne and Goldman, 1994).

Between 2002 and 2005, 130 samples from 31 wells were analyzed for total ammonia. Un-ionized ammonia (calculated from total ammonia results and other field parameters [pH, temperature and specific conductance]) was detected at concentrations exceeding the RIEC (25 µg/L) in 14 A-aquifer wells and 5 B-aquifer wells at Parcel E-2. Un-ionized ammonia concentrations within Parcel E-2 fluctuate considerably from one sampling round to another. Some results are not consistent with the preceding sampling event, and some results are not consistent with the results from the same season of the preceding year. Because un-ionized ammonia concentrations are calculated using field parameters, the potential exists for error to be introduced into the results.

Of the 14 Parcel E-2 perimeter wells sampled at the site, 6 wells (4 A-aquifer and 2 B-aquifer) had un-ionized ammonia concentrations that exceed the A-aquifer and B-aquifer RIEC (25 µg/L). Detections exceeding the RIEC in Parcel E-2 perimeter wells are focused along the shoreline, and are persistent in wells IR01MW48A and IR01MW47B. The extent of un-ionized ammonia in groundwater is not adequately delineated by concentrations below the RIEC along the shoreline of Parcel E-2 in wells IR01MW48A, IR01MWI-3, IR01MW43A, and IR01MW47B, where elevated concentrations of un-ionized ammonia in groundwater may migrate to the Bay.

Nitrite (Table 5-1, Figure 5-3): Between 1990 and 2005, 264 samples from 42 wells were analyzed for the nutrient nitrite (as nitrogen). Nitrite was detected at concentrations exceeding the B-aquifer RIEC (1,000 µg/L) in two B-Aquifer wells at Parcel E-2 (IR01MW403B and IR01MW09B). Both wells are Parcel E-2 perimeter monitoring wells. Each well had a single detection exceeding the RIEC throughout its sampling history. A nitrite sample collected from well IR01MW403B exceeded the RIEC in July 2004, but the concentration of nitrite in this well (over the last two sampling events in September and December 2004) has since declined to below the RIEC. The elevated nitrite concentration in IR01MW09B (from March 2005) was accompanied by a duplicate sample result that was well below the RIEC (160 µg/L). Given the lack of detections exceeding the RIEC in this well (over 11 sampling events between 1992 and 2005), it is possible that the single elevated result (exceeding the RIEC) is anomalous. The extent of nitrite in groundwater is adequately delineated by concentrations below the RIEC.

5.7.2.2. Metals

Maps were created for the following metals because their concentrations exceeded HGALs in the A-aquifer and/or exceeded the RIECs in the A- or B-aquifers: aluminum, antimony, arsenic, barium, beryllium, cadmium, total chromium, chromium VI, cobalt, copper, iron, lead, manganese, mercury, nickel, potassium, selenium, silver, sodium, vanadium, and zinc. Results from the mapping of metals concentrations revealed the following:

Aluminum (Table 5-2, Figure 5-4): Between 1990 and 2005, 301 samples from eight A-aquifer and B-aquifer wells were analyzed for aluminum. Aluminum was detected in groundwater at concentrations

that exceeded the B-aquifer RIEC (1,000 µg/L) in two B-aquifer wells (IR01MW02B and IR01MW17B). Both of these B-aquifer wells located within the Landfill Area, and both samples were collected in 1992. Neither well is a Parcel E-2 perimeter well. Recent groundwater sampling (over the past 9 years) shows that aluminum concentrations at these two wells no longer exceed RIEC. The extent of aluminum in groundwater is adequately delineated by concentrations below RIECs.

Antimony (Table 5-2, Figure 5-5): Between 1990 and 2005, 296 samples from 42 A-aquifer and B-aquifer wells were analyzed for antimony. Antimony was detected in all but three of these wells (IR01MW58A, IR04MW31A, and IR12MW11A). Antimony concentrations exceeded the RIEC (43.26 µg/L) in seven A-aquifer wells and the RIEC (6 µg/L) in six B-aquifer wells. Three of the A-aquifer wells (IR01MWI-7, IR01MWI-3, and IR01MW43A) and two of the B-aquifer wells (IR01MW47B and IR01MW53B) are Parcel E-2 perimeter monitoring wells. None of these perimeter wells has exhibited antimony in groundwater at concentrations exceeding the RIEC in more than one sample. Recent groundwater sampling (March 2005) shows that antimony concentrations in groundwater from these perimeter wells no longer exceed the RIEC. Detections exceeding the RIECs in all wells are inconsistent and do not persist over time. The extent of antimony in groundwater is adequately delineated by concentrations below RIECs.

Arsenic (Table 5-2, Figure 5-6): Between 1990 and 2005, 301 samples from 42 A-aquifer and B-aquifer wells were analyzed for arsenic. Arsenic was detected in all but one well at the site (IR01MW367A). Arsenic was detected at concentrations that exceeded the A-aquifer RIEC (36 µg/L) in seven A-aquifer wells and exceeded the B-aquifer RIEC (10 µg/L) in three B-aquifer wells. Two of the A-aquifer wells (IR01MW31A and IR01MW36A) and one of the B-aquifer wells (IR01MW403B) are Parcel E-2 perimeter wells. Wells IR04MW31A and IR01MW403B had isolated, single concentrations exceeding the RIECs. Concentrations exceeding the RIEC at IR04MW36A; however, have occurred consistently since late 1991. This persistent contamination is confined to that well, and does not appear in any of the surrounding wells. Concentrations of arsenic in this well fluctuate slightly, but are generally approximately 4 times the RIEC. An examination of sampling data from wells outside the eastern edge of Parcel E-2 shows no arsenic detections in wells located offsite (immediately downgradient). Wells downgradient of IR04MW36A include IR04MW09A (sampled between 1990 and 1992), IR04MW40A (sampled between 1991 and 2002), and IR04MW37A (sampled between 1990 and 2005). No samples from these wells contained arsenic concentrations exceeding the RIEC. The extent of arsenic in groundwater is adequately delineated by concentrations below RIECs.

Barium (Table 5-2, Figure 5-7): Between 1990 and 2005, 302 samples from 42 Parcel E-2 A-aquifer and B-aquifer monitoring wells were analyzed for barium. Barium was detected in all 42 Parcel E-2 monitoring wells. Barium was detected at concentrations that exceeded the RIEC (1,000 µg/L) in 10 A-aquifer wells. Barium concentrations exceeding RIECs were detected in five A-aquifer Parcel E-2 perimeter wells (IR01MW58A, IR01MW63A, IR01MW48A, IR01MWI-3, and IR04MW36A). Shoreline well IR01MW48 had persistent detections exceeding the RIEC in 1992 (over three consecutive

sampling events); but not since then (over 7 sampling events). Shoreline well IR01MWI-3 had persistent detections exceeding the RIEC between August 2002 and December 2004 (over three consecutive sampling events). A sample collected in March 2005 from this well did not exceed the RIEC.

The presence of barium in groundwater is most prominent in the Panhandle Area and along the Landfill Area shoreline. Cross-gradient data and upgradient data from non-Navy property (adjacent to the Panhandle Area) allows for adequate delineation of the extent of barium along the western edge of the Panhandle Area. Wells located to the west of the Panhandle Area (on non-Navy property) show no detections exceeding RIECs, suggesting that the elevated concentrations (exceeding RIECs) in Panhandle Area groundwater are limited in extent.

A single detected concentration in IR04MW36A exceeded the RIEC once in December 2004, but never before that time (in seven sampling events between 1991 and 2004), and not after that time (in March 2005), indicating that the elevated detection may be anomalous.

The extent of barium in groundwater is not adequately delineated by concentrations below the RIEC at shoreline well IR01MWI-3, where concentrations of barium exceeding the RIEC may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the area of IR01MWI-3, and thus the elevated concentrations of barium detected in this well will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Beryllium (Table 5-2, Figure 5-8): Between 1990 and 2005, 291 samples from 42 A-aquifer and B-aquifer wells were analyzed for beryllium. Beryllium was detected in 10 A-aquifer wells and 2 B-aquifer wells. However, detected concentrations that exceed RIECs are limited to the A-aquifer. Four A-aquifer wells have had concentrations that exceed the RIEC (2.65 µg/L). Throughout their sampling history, detections exceeding the RIEC only occurred once in each of the four wells, and three of the four exceedances were only slightly above the RIEC (less than 1.1 times the RIEC). Two of the wells with detections exceeding the RIEC are Parcel E-2 perimeter wells (IR01MW63A and IR01MWI-7). There have been no concentrations exceeding the RIEC in these wells since January 1992. The extent of beryllium in groundwater is adequately delineated by concentrations below RIECs.

Cadmium (Table 5-2, Figure 5-9): Between 1990 and 2005, 296 samples from 42 A-aquifer and B-aquifer wells were analyzed for cadmium. Cadmium was detected in 17 A-aquifer wells and 3 B-aquifer wells. Concentrations detected have exceeded the RIEC (5.08 µg/L) in six A-aquifer wells and the RIEC (1.1 µg/L) in three B-aquifer wells. The A-aquifer wells had inconsistent detections that exceed the RIEC. B-aquifer wells also show infrequent and inconsistent detections that exceed the RIEC. Only a single B-aquifer Parcel E-2 perimeter well (IR01MW53B) showed a detection that exceeded the RIEC. The concentration of that detection was 7 times the RIEC, and occurred in 1992. The extent of cadmium in groundwater is adequately delineated by concentrations below RIECs.

Chromium (Total) (Table 5-2, Figure 5-10): Between 1990 and 2005, 299 samples from 42 A-aquifer and B-aquifer wells were analyzed for total chromium. Total chromium was detected in all but the

following nine wells at the site: IR01MW403B, IR01MW58A, IR12MW11A, IR04MW31A, IR01MW42A, IR04MW13A, IR04MW36A, IR01MW09B, and IR01MW12A. Concentrations exceeded the A-aquifer RIEC (180 µg/L) in nine A-aquifer wells and exceeded the B-aquifer RIEC (50 µg/L) in one B-aquifer well. Two of these were Parcel E-2 perimeter A-aquifer wells (IR01MW43A and IR01MW44A). The detection that exceeded the RIEC in IR01MW44A occurred in June 2004, and has not recurred since (over the past three sampling events). The detections in IR01MW43A exceeded the A-aquifer RIEC over the past two sampling events. The extent of chromium in groundwater is adequately delineated by concentrations below RIECs, except in well IR01MW43A, where groundwater with elevated total chromium may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the area of IR01MW43A, and thus the elevated concentrations of total chromium detected in this well will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Chromium VI (Table 5-2, Figure 5-11): Between 1990 and 2005, 162 samples from 33 wells were analyzed for chromium VI. Chromium VI was only detected at a single well, the B-aquifer well IR01MW02B. This single detection was 12 times the RIEC (11 µg/L) in January 1992. Since that time, chromium VI has not been detected in this or any other well. The extent of chromium VI in groundwater is adequately delineated by concentrations below RIECs.

Cobalt (Table 5-2, Figure 5-12): Between 1990 and 2005, 290 samples from 41 A-aquifer and B-aquifer wells were analyzed for cobalt. Cobalt was detected in 26 wells at the site; only one of which is a B-aquifer well. Cobalt exceeded the A-aquifer RIEC (20.8 µg/L) in eight A-aquifer wells and exceeded the B-aquifer RIEC (3 µg/L) in one B-aquifer well. One of these wells was an A-aquifer Parcel E-2 perimeter well (IR04MW35A) and one was a B-aquifer Parcel E-2 perimeter well (IR01MW53B). These Parcel E-2 perimeter well detections exceeding RIEC concentrations occurred in 1991 and 1992, respectively, and have not recurred since that time. The concentrations of cobalt exceeding RIECs in Parcel E2 wells are inconsistent, non-recurring, single detections. The extent of cobalt in groundwater is adequately delineated by concentrations below the RIEC.

Copper (Table 5-2, Figure 5-13): Between 1990 and 2005, 300 samples from 42 A-aquifer and B-aquifer wells were analyzed for copper. Copper was detected in all but three wells at the site (IR01MWI-8, IR01MW10A, and IR01MW12A). Concentrations exceeding the A-aquifer RIEC (28.04 µg/L) occurred in 11 A-aquifer wells and exceeding the B-aquifer RIEC (3.1 µg/L) occurred in 5 B-aquifer wells.

Copper concentrations exceeding the RIEC occurred in two A-aquifer Parcel E-2 perimeter wells IR01MW48A and IR01MW44A. These were single detections that occurred in July 1992 and June 2004 at IR04MW48A and IR01MW44A, respectively. Neither well has exhibited any other detections exceeding the RIEC (over nine and three sampling events, respectively).

Copper concentrations exceeded the RIEC in two B-aquifer Parcel E-2 perimeter wells (IR01MW53B and IR01MW09B) a total of three times. These occurred inconsistently between 1992 and 2004, and have not

recurred since (over two and ten sampling events, respectively). The extent of copper in groundwater is adequately delineated by concentrations below the RIEC.

Lead (Table 5-2, Figure 5-14): Between 1990 and 2005, 301 samples from 42 A-aquifer and B-aquifer wells were analyzed for lead. Lead was detected in all but four monitoring wells at Parcel E-2 (IR01MW58A, IR01MWLF4B, IR04MW31A, and IR01MW35A). Concentrations exceeded the A-aquifer RIEC (14.44 µg/L) in 15 A-aquifer wells and exceeded the B-aquifer RIEC (2.5 µg/L) in 5 B-aquifer wells. Detections exceeding RIECs are inconsistent and non-persistent; and are widely distributed across the site.

Lead concentrations exceeded the RIEC in A-aquifer Parcel E-2 perimeter wells IR01MW31A, IR01MW48A, IR01MW43A, and IR01MW44A. In IR01MW31A and IR01MW48A, the detected concentration exceeding the RIEC occurred in 1992, were approximately 2 to 4 times the RIEC, and did not recur (over eight and nine sampling events, respectively). Wells IR01MW43A and IR01MW44A showed more recent detections exceeding the RIEC (three in 2004), which also did not recur (in one and three sampling events, respectively). Concentrations exceeding the RIEC in these wells were up to two times the RIEC in IR01MW43A, and almost 10 times the RIEC in IR01MW44A, which is the maximum concentration detected in A-aquifer Parcel E-2 perimeter wells. .

Lead concentrations exceeded the RIEC in B-aquifer Parcel E-2 perimeter wells IR01MW403B and IR01MW53B a total of three times. Concentrations were no more than 3 times the RIEC.

The extent of lead in groundwater is adequately delineated by concentrations below RIECs, except in IR01MW43A, where two detections exceeded the RIEC over the past three sampling events. At this location, elevated lead concentrations in groundwater may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the area of IR01MW43A, and thus the elevated concentrations of lead detected in this well will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Manganese (Table 5-2, Figure 5-15): Between 1990 and 2005, 290 samples from 36 A-aquifer and B-aquifer wells were analyzed for manganese. Manganese was detected in all A-aquifer and B-aquifer wells sampled. Only a single detected concentration exceeded the A-aquifer RIEC (8,140 µg/L). This occurred in July 1992 in well IR01MWI-2. No detections exceeding the RIEC have recurred in this well. The extent of manganese in groundwater is adequately delineated by concentrations below RIECs.

Mercury (Table 5-2, Figure 5-16): Between 1990 and 2005, 297 samples from 42 A-aquifer and B-aquifer wells were analyzed for mercury. Mercury was detected in more than half the monitoring wells at Parcel E-2, and some concentrations exceeded RIECs in both A-aquifer and B-aquifer wells. A total of nine A-aquifer wells have concentrations of mercury that exceed the RIEC (0.6 µg/L), and only one B-aquifer well has showed a concentration that exceeded the RIEC (0.012 µg/L). Most of the wells (seven of nine) only had single, non-recurring detections exceeding the RIECs that occurred in 1992. One A-aquifer well (IR01MW366A), located within the estimated extent of landfill waste, shows persistent

detections exceeding the RIEC (between 3 and 542 times the RIEC). Only one Parcel E-2 perimeter well (IR01MW44A) screened in the A-aquifer has had a detected mercury concentration exceeding the RIEC. This detection occurred in June 2004 and was 12 times the RIEC. Since then, neither this, nor any other Parcel E-2 perimeter well has had a detection exceeding the RIEC (over three or more sampling events). The extent of mercury in groundwater is adequately delineated by concentrations below the RIECs.

Nickel (Table 5-2, Figure 5-17): Between 1990 and 2005, 305 samples from 42 wells were analyzed for nickel. Nickel was detected in all but four wells at the site (IR01MW58A, IR01MW63A, IR01MW26B, and IR01MWLF4B). Concentrations exceeding RIECs occurred in nine A-aquifer wells and three B-aquifer wells.

Nickel concentrations exceeded the RIEC (36.48 µg/L) in A-aquifer Parcel E-2 perimeter wells IR01MWI-3 and IR01MW35A. Each well had a single detection exceeding the RIEC in 1996 and 1991, respectively. These were 8.6 and 4 times the RIEC, and they never recurred (in five sampling events). Nickel concentrations exceeded the RIEC (8.2 µg/L) in B-aquifer Parcel E-2 perimeter well IR01MW53B. This well has had two detected concentrations that exceed the RIEC that occurred in 2002 and 2004, where concentrations detected were 8.3 and 1.1 times the RIEC. The sampling round in March 2005 shows that concentrations in this well are declining to levels below the RIEC. The extent of nickel in groundwater is adequately delineated by concentrations below RIECs.

Selenium (Table 5-2, Figure 5-18): Between 1990 and 2005, 281 samples from 42 A-aquifer and B-aquifer wells were analyzed for selenium. Selenium was detected in 11 wells sampled at Parcel E-2. Only two wells, one in the A-aquifer and one in the B-aquifer, have shown concentrations that exceed RIECs, all of which have been detected in recent years (between 2002 and 2005). One of the wells (IR01MWI-8) is a Parcel E-2 perimeter well in the A-aquifer, and has had selenium concentrations up to 1.6 times the RIEC (14.5 µg/L). The second well (IR01MW26B) that had a concentration exceeding the B-aquifer RIEC (5 µg/L) is located within the estimated extent of landfill waste. Concentrations of selenium in samples from well IR01MW26B have not exceeded the RIEC in the two most recent sampling events. The extent of selenium in groundwater is adequately delineated by concentrations below the RIEC, except in well IR01MWI-8, where slightly elevated selenium concentrations in groundwater (exceeding the RIEC) may be migrating to the Bay.

Silver (Table 5-2, Figure 5-19): Between 1990 and 2005, 293 samples from 42 A-aquifer and B-aquifer wells were analyzed for silver. Silver was detected in 11 A-aquifer wells at Parcel E-2. Concentrations exceeding the RIEC (7.43 µg/L) were detected three wells, one of which is a Parcel E-2 perimeter well (IR01MW31A). All the detections exceeding the RIEC are single, inconsistent detections that range from 1.02 to 1.16 times the evaluation criteria (7.43 µg/L). The most recent detection exceeding the RIEC was in 2002 in Parcel E-2 perimeter well IR01MW31A. Concentrations of silver in samples from four or more sampling events since 2002 do not exceed the RIEC. The extent of silver in groundwater is adequately delineated by concentrations below RIECs.

Vanadium (Table 5-2, Figure 5-20): Between 1990 and 2005, 176 samples from 37 A-aquifer and B-aquifer monitoring wells were analyzed for vanadium. Vanadium has been detected in all but three of these wells. Concentrations exceeding RIECs have been detected in eight A-aquifer wells and two B-aquifer wells. Two of the wells with concentrations exceeding the RIEC are Parcel E-2 perimeter wells (IR01MW31A and IR01MW58A). Concentrations exceeding the RIEC in all 10 wells are inconsistent, and mainly occurred in 1992. In the two Parcel E-2 perimeter wells, the detections exceeding the RIEC (26.62 µg/L) were no more 1.2 times the RIEC, and have not recurred since August 1992. The two B-aquifer wells (IR01MW02B and IR01MW17B) showing detections that exceed the B-aquifer RIEC (15 µg/L) are located within the Landfill Area, and are not Parcel E-2 perimeter monitoring wells. The extent of vanadium in groundwater is adequately delineated by concentrations below RIECs.

Zinc (Table 5-2, Figure 5-21): Between 1990 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for zinc. Zinc has been detected in all but 10 wells at Parcel E-2. Of these wells zinc was detected in A-aquifer wells at concentrations exceeding the RIEC (81 µg/L). Most of these wells (10 of 13) have not shown concentrations exceeding RIECs since 1996, and three or more sampling events have shown concentrations of zinc below the RIECs. Zinc was detected more recently (between 2002 and 2005) in Parcel E-2 perimeter wells: IR01MW43A and IR01MW44A. The detections are inconsistent in IR01MW43A, yet recent (one detection exceeded the RIEC in November 2004). The detections in IR01MW44A are consistent (three concentrations exceeding the RIEC out of the past five sampling events). The extent of zinc in groundwater is adequately delineated by concentrations below the RIEC, except in wells IR01MW43A and IR01MW44A where elevated zinc concentrations in groundwater (exceeding the RIEC) may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the areas of IR01MW43A and IR01MW44A, and thus the elevated concentrations of lead detected in these wells will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

5.7.2.3. PCBs and Pesticides

Maps were created for the following pesticides and PCBs (as they have been detected at concentrations that exceed the RIECs for this chemical group): 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, total PCBs, dieldrin, heptachlor, gamma-chlordane, endosulfan I, endosulfan II, endrin, gamma-bhc (lindane), and heptachlor epoxide. Results from the mapping of pesticide and PCB concentrations revealed the following:

4,4'-DDD (Table 5-3, Figure 5-22): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for 4,4'-DDD; 4,4'-DDD was detected in a single well at Parcel E-2. The well (IR01MW38A) is screened in the A-aquifer within the landfill waste. The three detections in this well, measured during late 2004/early 2005, exceed the RIEC (0.001 µg/L) by a factor between 12 and 28. No Parcel E-2 perimeter wells showed concentrations that exceeded RIECs. The extent of 4,4'-DDD in groundwater is adequately delineated by concentrations below RIECs.

4,4'-DDE (Table 5-3, Figure 5-23): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for 4,4'-DDE; 4,4'-DDE was detected in two wells at Parcel E-2, both located within the estimated extent of landfill waste. One well (IR01MW38A) is screened in the A-aquifer, and the other (IR01MW26B) is screened in the B-aquifer. The three detections in the A-aquifer well, which occurred in 2004/2005, exceed the RIEC (0.001 µg/L). The single detection in the B-aquifer well occurred in late 2004, and exceeded the RIEC (0.001 µg/L). Neither well is a Parcel E-2 perimeter well, and no surrounding wells have ever had detectable 4,4'-DDE concentrations. The extent of 4,4'-DDE in groundwater is adequately delineated by concentrations below RIECs.

4,4'-DDT (Table 5-3, Figure 5-24): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for 4,4'-DDT; 4,4'-DDT was detected in six A-aquifer wells within the Landfill and Adjacent Areas (IR01MW03A, IR01MW31A, IR01MW18A, IR01MWI-3, IR01MW44A, and IR01MW366A). All the detections in these wells exceed the RIEC (0.001 µg/L). Overall, the detections exceeding the RIEC are not consistent. Of the six wells exhibiting detections exceeding the RIEC, three are Parcel E-2 perimeter wells (IR01MW31A, IR01MWI-3, and IR01MW44A). The two Parcel E-2 perimeter wells showing the highest concentrations are located within the PCB Hot Spot removal area. These wells have had concentrations that exceed the RIEC by a factor of up to 30, but these elevated concentrations (exceeding the RIEC) did not occur after 2002. The third Parcel E-2 perimeter well (IR01MW31A) is located along the eastern boundary of Parcel E-2, and has not shown concentrations that exceed the RIEC since 2002 (in six sampling events). The extent of 4,4'-DDT in groundwater is adequately delineated by concentrations below RIECs.

Alpha-chlordane (Table 5-3, Figure 5-25): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for alpha-chlordane. Alpha-chlordane was detected in two A-aquifer wells; one within the estimated extent of landfill waste (IR01MW366A), and one along the eastern side of the shoreline, in the PCB Hot Spot removal area (IR01MW44A). Alpha-chlordane concentrations in both wells exceed the RIEC (0.004 µg/L). The well located within the estimated extent of landfill waste had a single, non-recurring concentration that exceeded the RIEC in 1996. The shoreline well is the only Parcel E-2 perimeter well that contained a concentration exceeding the RIEC. The two detected concentrations exceeding the RIEC in this well were 2.5 times the RIEC, and they occurred prior to 2002. Since then, samples from this well have not exceeded the RIEC (in four sampling events). The extent of alpha-chlordane in groundwater is adequately delineated by concentrations below RIECs.

Total PCBs (Table 5-3, Figure 5-26): Between 1990 and 2005, 285 samples from 42 A-aquifer and B-aquifer wells were collected for PCBs. These data were used to calculate Total PCB concentrations, which were detected in 14 A-aquifer wells at Parcel E-2. Of these 14 wells, 6 are Parcel E-2 perimeter wells (IR01MW31A, IR01MWI-6, IR01MW58A, IR01MWI-3, IR01MW43A, and IR01MW44A). The detections exceeding the RIEC (0.014 µg/L) are consistent in two of the Parcel E-2 perimeter wells (IR01MW43A and IR01MW44A), which show recurring detections that exceed the RIEC between 1991 and 2005. It is not surprising that these two wells demonstrate elevated concentrations of PCB, as they

are located within the PCB Hot Spot removal area. The detections exceeding the RIEC at the Parcel E-2 perimeter wells IR01MW31A, IR01MW58A, and IR01MWI-3 are non-persistent and/or inconsistent (have not been detected over the past four to nine sampling events). In perimeter well IR01MWI-3, concentrations exceeding the RIEC were persistent until 2001, at which point PCBs were no longer detected in this well (over four sampling events). Lastly, in perimeter well IR01MWI-6, the final sample collected in August 1992 exceeded the RIEC. Because no samples have been collected since then, it is unclear if elevated PCB concentrations persist in this well. The extent of PCBs in groundwater is adequately delineated by concentrations below RIECs, except in wells IR01MW43A and IR01MW44A, where elevated concentrations of PCBs in groundwater (exceeding the RIEC) may migrate to the Bay, and well IR01MWI-6 where crossgradient groundwater movement may allow for PCB migration offsite. It should be noted that the PCB Hot Spot removal action includes soil removal in the areas of IR01MW43A and IR01MW44A, and thus the elevated concentrations of total PCBs detected in these wells will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Dieldrin (Table 5-3, Figure 5-27): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for dieldrin. Dieldrin was detected in two A-aquifer wells (IR01MWI-3 and IR01MW44A). Both wells are Parcel E-2 perimeter monitoring wells located in the PCB Hot Spot removal area. The detections exceeding the RIEC in these wells are inconsistent and limited to three samples collected in 2001-2002. All three detections exceeded the RIEC (0.0019 µg/L) by a factor of approximately 10. No dieldrin was detected in any wells sampled since late 2002 (between September 2002 and March 2005). The extent of dieldrin in groundwater is adequately delineated by concentrations below RIECs.

Endosulfan I (Table 5-3, Figure 5-28): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for endosulfan I. Endosulfan I was only detected once at Parcel E-2. The detection appeared in an A-aquifer well (IR01MW366A) located in the eastern portion of the estimated extent of landfill waste. The single detection, measured in 1996, exceeded the RIEC (0.0087 µg/L) by a factor of 3.4. No endosulfan I was detected in Parcel E-2 perimeter wells since the single detection in 1996. The extent of endosulfan I in groundwater is adequately delineated by concentrations below RIECs.

Endosulfan II (Table 5-3, Figure 5-29): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for endosulfan II. Endosulfan II was detected in three A-aquifer wells at the site (IR01MWI-3, IR01MW43A, and IR01MW44A). All of the detections exceed the RIEC (0.0087 µg/L). All three of these wells are Parcel E-2 perimeter wells located along the southeastern shoreline of Parcel E-2, within the PCB Hot Spot removal area. The inconsistent detections exceeding the RIEC occurred in 1996 and 2002, and they are between 1.8 and 9.2 times the RIEC. Detections never occurred in IR01MW43A and IR01MW44A after 1996 (in at least seven sampling events). In addition,

detections have not occurred in IR01MW43A and IR01MW44A since 2002 (in three sampling events). The extent of endosulfan II in groundwater is adequately delineated by concentrations below RIECs.

Endrin (Table 5-3, Figure 5-30): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for endrin. Endrin was detected a single time in each of three A-aquifer wells at Parcel E-2 (IR01MW03A, IR01MWI-3, and IR01MW05A). All detections exceed the RIEC (0.0023 µg/L). IR01MW03A and IR01MW05A are located within the estimated extent of landfill waste, at the northern edge of the parcel, where, based on the prevailing groundwater flow direction, there is little to no risk of contaminant migration off site. One of the three detections exceeded the RIEC wells is a Parcel E-2 perimeter well (IR01MWI-3). This well is located in the southeastern portion of the Parcel E-2 shoreline, in the PCB Hot Spot removal area. The detection occurred in March 2001, but detectable concentrations have not recurred in this well since then (over four sampling events). The extent of endrin in groundwater is adequately delineated by concentrations below RIECs.

Gamma-BHC (lindane) (Table 5-3, Figure 5-31): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for gamma-BHC (lindane). Gamma-BHC (lindane) was detected in two A-aquifer wells (IR01MWI-3 and IR01MW05A). IR01MW05A is located within the estimated extent of landfill waste, at the northern edge of the parcel, where, based on the prevailing groundwater flow direction, there is little to no risk of contaminant migration off site. IR01MWI-3 is a Parcel E-2 perimeter well located along the eastern shoreline of Parcel E-2, in the PCB Hot Spot removal area. The single detection in this well that exceeds the RIEC (0.016 µg/L) occurred in 1996, and has not recurred since then (over five sampling events). The extent of gamma-BHC (lindane) in groundwater is adequately delineated by concentrations below RIECs.

Gamma-chlordane (Table 5-3, Figure 5-32): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for gamma-chlordane. Gamma-chlordane was detected in three A-aquifer wells located in the PCB Hot Spot removal area (IR01MWI-3, IR01MW43A, and IR01MW44A). These three wells are Parcel E-2 perimeter wells, and all detections exceed the RIEC (0.004 µg/L). No other wells have shown detections of gamma-chlordane at Parcel E-2. The sample concentrations exceeding the RIEC that were detected in the three Parcel E-2 perimeter wells range from 2.4 to 25 times the RIEC, and they occurred inconsistently between 1996 and 2004. No detections have recurred in these wells in recent sampling events (at least three events). The extent of gamma-chlordane in groundwater is adequately delineated by concentrations below RIECs.

Heptachlor (Table 5-3, Figure 5-33): Between 1990 and 2005, 279 samples from 42 A-aquifer and B-aquifer wells were analyzed for heptachlor. Heptachlor was detected in five A-aquifer wells at the site (IR01MWI-3, IR01MW43A, IR01MW44A, IR01MWI-2, and IR01MW05A). All of the detections in these wells exceed the RIEC (0.0036 µg/L). Three of the five wells are Parcel E-2 perimeter wells (IR01MWI-3, IR01MW43A, and IR01MW44A). They are located along the south-eastern shoreline of Parcel E-2, within the PCB Hot Spot removal area. The detections exceeding the RIEC in these wells

occurred between 1996 and 2002, and they were between 2 and 23 times the RIEC. None of the wells have had concentrations exceeding the RIEC since 2002 (between September 2002 and March 2005). The extent of heptachlor in groundwater is adequately delineated by concentrations below RIECs.

Heptachlor Epoxide (Table 5-3, Figure 5-34): Between 1990 and 2005, 236 samples from 41 A-aquifer and B-aquifer wells were analyzed for heptachlor epoxide. Heptachlor epoxide was detected in two A-aquifer wells (IR01MW44A and IR01MW05A). All three detections (one in IR01MW05A and two in IR01MW44A) exceeded the RIEC (0.0036 µg/L). IR01MW05A is located within the estimated extent of landfill waste, at the northern edge of the parcel, where, based on the prevailing groundwater flow direction, there is little to no risk of contaminant migration off site. The second well showing detected concentrations exceeding the RIEC, IR01MW44A, is a Parcel E-2 perimeter well located along the eastern shoreline of Parcel E-2, at the southern edge of the PCB Hot Spot removal area. The detections exceeding the RIEC in this well occurred inconsistently in March 2001 and September 2004. This well has not had concentrations that exceed the RIEC since September 2004 (over two sampling events). The extent of heptachlor epoxide in groundwater is adequately delineated by concentrations below RIECs.

5.7.2.4. SVOCs

SVOCs, more specifically PAHs, are typically present in groundwater at low levels. PAHs are generally biodegradable in soil systems (U.S. Army Environmental Center, 2002). Many of the RIECs for SVOCs are very low; thus, a large number of SVOC were detected in Parcel E-2 aquifers. Many SVOCs detected in A-aquifer and B-aquifer wells were only detected a single time during the nearly 15-year sampling history of the site. Based on the infrequency of these detections, these analytes are unlikely to be groundwater contaminants of concern; however, because they were detected at concentrations exceeding RIECs, they were included in the focused evaluation. Maps were created for the following SVOCs as they have been detected at concentrations that exceed their respective RIECs: anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(g,h,i)pyrylene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)-pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. Results from the mapping of SVOC concentrations revealed the following:

Acenaphthene (Table 5-4, Figure 5-35): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for acenaphthene. Acenaphthene was detected in three A-aquifer wells (IR01MW05A, IR01MW05A and IR01MWI-5), and one B-aquifer well (IR01MW02B). All five wells showing detections are located in the Landfill Area, and none of the wells are Parcel E-2 perimeter monitoring wells. Only a single well (IR01MW18A) has concentrations exceeding the A-aquifer RIEC (23 µg/L). All detections exceeding the RIEC occurred in 1992, and have not recurred since (over six sampling events between 1992 and 2002). The extent of acenaphthene in groundwater is adequately delineated by concentrations below RIECs.

Anthracene (Table 5-4, Figure 5-36): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for anthracene. Anthracene was detected in two A-aquifer wells (IR01MW26A and IR01MWI-5) at concentrations exceeding the RIEC (0.73 µg/L). All detections exceeding the RIEC occurred in 1992, and have not recurred since (over six sampling events for IR01MWI-5 and nine sampling events for IR01MW62A). Neither well is a Parcel E-2 perimeter monitoring well. The extent of anthracene in groundwater is adequately delineated by concentrations below RIECs.

Benzo(a)anthracene (Table 5-4, Figure 5-37): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for benzo(a)anthracene. Benzo(a)anthracene was detected in six A-aquifer wells and one B-aquifer well. All measured detections in the A- and B-aquifers exceeded the RIEC for both aquifers (0.027 µg/L). The detections exceeding the RIECs were not persistent in all wells, and most were single detections that did not recur in those wells. Of the seven wells showing detections exceeding the RIECs, three A-aquifer wells (IR01MWI-3, IR01MW43A, and IR01MW11A) and 1 B-aquifer well (IR01MW53B) are Parcel E-2 perimeter wells.

The A-aquifer Parcel E-2 perimeter wells at the southern limit of the landfill (IR01MWI-3 and IR01MW43A) have historically demonstrated the highest concentrations of benzo(a)anthracene at the site (up to 322 times the RIEC). The concentrations of benzo(a)anthracene in IR01MWI-3 declined after 1992, and have not been detectable since then (over five sampling events). In IR01MW43A, the detections exceeding the RIEC are more recent (November 2004 and March 2005). A sample collected in October 2002 from IR01MW11A contained a benzo(a)anthracene at a concentration exceeding the RIEC. No samples have been collected since that time, from this well, but samples collected in adjacent wells IR01MW7A and IR01MW12A show no detections in 2002, and IR01MW10A shows no detection from 2002 to 2005 (over five sampling events), indicating that benzo(a)anthracene detections are not widespread.

The B-aquifer Parcel E-2 perimeter well had a single detection exceeding the RIEC in 2002, but this has not recurred since then (over four sampling events).

The extent of benzo(a)anthracene in groundwater is adequately delineated by concentrations below RIECs, except in IR01MW43A, where elevated benzo(a)anthracene concentrations in groundwater (exceeding the RIEC) may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the area of IR01MW43A, and thus the elevated concentrations of benzo(a)anthracene detected in this well will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Benzo(b)fluoranthene (Table 5-4, Figure 5-38): Between 1991 and 2005, 303 samples from 42 A-aquifer and B-aquifer wells were analyzed for benzo(b)fluoranthene. Benzo(b)fluoranthene was detected in three A-aquifer wells and two B-aquifer wells. All detections in the A- and B-aquifers exceeded the A- and B-aquifer RIEC (0.029 µg/L). The detections exceeding the RIECs were not

persistent in all wells, and most were single detections that did not recur. Of the five wells showing detections exceeding the RIEC, one A-aquifer well (IR01MWI-3) and two B-aquifer wells (IR01MW53B and IR01MW47B) are Parcel E-2 perimeter wells. In IR01MWI-3, detections exceeding the RIEC were consistent between 1992 and 2002. Since August 2002, there have not been any detections that exceed the RIEC in this well (over three sampling events). The B-aquifer Parcel E-2 perimeter wells showed single detections exceeding the RIEC in 2002 that have not recurred since then (over four or more sampling events). The extent of benzo(b)fluoranthene in groundwater is adequately delineated by concentrations below RIECs.

Benzo(k)fluoranthene (Table 5-4, Figure 5-39): Between 1991 and 2005, 303 samples from 42 A-aquifer and B-aquifer wells were analyzed for benzo(k)fluoranthene. Benzo(k)fluoranthene was detected in one A-aquifer well (IR01MWI-3) and one B-aquifer well (IR01MW53B). Each well had a single detection in 2002, and those detections exceeded the A-aquifer RIEC (0.4 µg/L) and B-aquifer RIEC (0.029 µg/L), respectively. Both wells are Parcel E-2 perimeter wells located along the Parcel E-2 shoreline. Neither well had persistent benzo(k)fluoranthene detections, nor were there any detections since 2002 (over three or more sampling events). The extent of benzo(k)fluoranthene in groundwater is adequately delineated by concentrations below RIECs.

Benzo(a)pyrene (Table 5-4, Figure 5-40): Between 1991 and 2005, 303 samples from 42 A-aquifer and B-aquifer wells were analyzed for benzo(a)pyrene between. Benzo(a)pyrene was detected in three A-aquifer wells (IR01MW62A, IR01MWI-9, and IR01MWI-3) and one B-aquifer well (IR01MW53B). All the detections in those wells exceed the A-aquifer and B-aquifer RIEC (0.014 µg/L). One of the A-aquifer wells (IR01MWI-3) and the B-aquifer well (IR01MW53B) are Parcel E-2 perimeter wells. The three detected concentrations exceeding the RIEC in the A-aquifer Parcel E-2 perimeter well occurred inconsistently between 1992 and 2002, and have not recurred since then (over three sampling events). The single detection exceeding the RIEC in the B-aquifer Parcel E-2 perimeter well occurred in 2002. No other detections have ever been measured in that (over four sampling events), or any other B-aquifer well at Parcel E-2. The extent of benzo(a)pyrene in groundwater is adequately delineated by concentrations below RIECs.

Benzo(g,h,i)pyrylene (Table 5-4, Figure 5-41): Between 1991 and 2005, 303 samples from 42 A-aquifer and B-aquifer wells were analyzed for benzo(g,h,i)pyrylene. Benzo(g,h,i)pyrylene was detected in two A-aquifer wells at Parcel E-2 (IR01MWI-3 and IR01MW43A), which are both Parcel E-2 perimeter wells. The detection recorded in each well exceeded the RIEC (0.1 µg/L), but they were inconsistent in both wells, and they did not recur after 2002 (over three or more sampling events). The extent of benzo(g,h,i)pyrylene in groundwater is adequately delineated by concentrations below RIECs.

Bis(2-ethylhexyl)phthalate (Table 5-4, Figure 5-42): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate was detected in five wells located within the extent of waste in the Landfill Area. Four of the wells are

A-aquifer wells (IR01MW38A, IR01MWI-5, IR01MW366A, and IR01MW43A), and one is a B-aquifer well (IR01MW17B). IR01MW43A is the only Parcel E-2 perimeter well that has shown detections. A single detection in the B-aquifer well (IR01MW17B) in 1992 exceeded the RIEC (4 µg/L); however, this did not recur between 1992 and 2001 (over two sampling events). No detections have ever been measured in any Parcel E-2 perimeter wells. The extent of bis(2-ethylhexyl)phthalate in groundwater is adequately delineated by concentrations below RIECs.

Chrysene (Table 5-4, Figure 5-43): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for chrysene. Chrysene was detected in seven A-aquifer wells and one B-aquifer well. Most of the wells only show single detections throughout their sampling history. Of these eight wells, four are Parcel E-2 perimeter monitoring wells located along the shoreline. Detections exceeding the A-aquifer RIEC (0.35 µg/L) occurred in 1992 in IR01MWI-3, IR01MW44A, but have not recurred since then (over four or more sampling events). Detections exceeding the RIEC (0.35 µg/L) were, however, more recent and more consistent in A-aquifer well IR01MWI43A between July 2002 and March 2005. The single B-aquifer detection exceeded the RIEC (0.29 µg/L) in 2002, but not since then (over four sampling events). The extent of chrysene in groundwater is adequately delineated by concentrations below RIECs, except in IR01MW43A, where elevated chrysene concentrations in groundwater (exceeding the RIEC) may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the area of IR01MW43A, and thus the elevated concentrations of chrysene detected in this well will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Dibenz(a,h)anthracene (Table 5-4, Figure 5-44): Between 1991 and 2005, 303 samples from 42 A-aquifer and B-aquifer wells were analyzed for dibenz(a,h)anthracene. Dibenz(a,h)anthracene was detected a single time in a single A-aquifer well (IR01MWI-3) at Parcel E-2. This well is a Parcel E-2 perimeter well located along the southern edge of the Landfill Area, along the shoreline. The single detection occurred in late 2002, and exceeded the RIEC (0.25 µg/L). No other detections exceeding the RIEC have ever been measured in this well since then (over three sampling events). The extent of dibenz(a,h)anthracene in groundwater is adequately delineated by concentrations below RIECs.

Fluoranthene (Table 5-4, Figure 5-45): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for fluoranthene. Fluoranthene was detected in seven wells at Parcel E-2, six A-aquifer wells and one B-aquifer well. Of the seven wells, only two A-aquifer wells (IR01MWI-5 and IR01MWI-3) had detections that exceed the RIEC (8 µg/L). Well IR01MWI-5 is located in the heart of the estimated extent of landfill waste, and IR01MWI-3 is a Parcel E-2 perimeter well located along the southern edge of the Landfill Area, along the shoreline. Each well had single detections exceeding the RIEC, both measured in August 1992. No other detections exceeding the RIEC have been measured since that time in either well (over five sampling events). The extent of fluoranthene in groundwater is adequately delineated by concentrations below RIECs.

Fluorene (Table 5-4, Figure 5-65): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for fluorene. Fluorene was detected in nine A-aquifer wells and one B-aquifer well. Of the wells with measured detections, two are Parcel E-2 perimeter wells (IR01MWI-3 and IR01MW43A) screened in the A-aquifer. Neither of the Parcel E-2 perimeter wells had detections that exceeded the A-aquifer RIEC (3.9 µg/L). Four wells located within the Landfill Area (IR01MW02B, IR01MW05A, IR01MW18A, and IR01MWI-5) had detections that exceed the A-aquifer and B-aquifer RIEC (3.9 µg/L); however, due to the locations of these wells and the prevalent direction of groundwater flow at the site, there is little to no risk of contaminant migration off site. The extent of fluorene in groundwater is adequately delineated by concentrations below RIECs.

Indeno(1,2,3-cd)pyrene (Table 5-4, Figure 5-46): Between 1991 and 2005, 303 samples from 42 A-aquifer and B-aquifer wells were analyzed for Indeno(1,2,3-cd)pyrene. Indeno(1,2,3-cd)pyrene was detected in two A-aquifer wells at Parcel E-2 (IR01MWI-3 and IR01MW43A), both Parcel E-2 perimeter wells. The detections measured in each well exceeded the RIEC (0.029 µg/L). In both wells, the detections were not persistent, and have not recurred since 2002 (over three or more sampling events). The extent of indeno(1,2,3-cd)pyrene in groundwater is adequately delineated by concentrations below RIECs.

2-methylnaphthalene (Table 5-4, Figure 5-47): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for 2-methylnaphthalene. This analyte was detected in numerous wells at Parcel E-2, including eight A-aquifer wells and two B-aquifer wells. Of the ten wells that have had detections in the past, eight show detections exceeding the RIEC (2.1 µg/L) for the A- and B-aquifers. Of the wells with measured detections, two are A-aquifer Parcel E-2 perimeter wells (IR01MW58A and IR01MW43A). None of the wells at the site show any detections exceeding the RIECs after 1992 (over five or more sampling events in the two Parcel E-2 perimeter wells). The extent of 2-methylnaphthalene in groundwater is adequately delineated by concentrations below RIECs.

Naphthalene (Table 5-4, Figure 5-48): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for naphthalene between. Naphthalene was detected in 13 A-aquifer wells and 4 B-aquifer wells spread across Parcel E-2. Of the 17 wells showing past detections, only 4 have had detections that exceed the A-aquifer (24 µg/L) or B-aquifer (17 µg/L) RIECs, only 1 of which is a Parcel E-2 perimeter well (IR01MW58A). Three A-aquifer wells (IR01MW58A, IR01MW18A, and IR01MW03A) all showed detections that exceeded the RIEC prior to 1992, with none since then (over four or more sampling events). One B-aquifer well (IR01MW02B) had two consecutive detections exceeding the RIEC in 1992; however, there have been no recurrences in this well (over eight sampling events), or anywhere in the B-aquifer. The extent of naphthalene in groundwater is adequately delineated by concentrations below RIECs.

Phenanthrene (Table 5-4, Figure 5-49): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for phenanthrene. Phenanthrene was detected in nine A-aquifer wells and

one B-aquifer well at Parcel E-2. Of the ten wells, three A-aquifer and one B-aquifer wells have had detections that exceed RIECs. More specifically, the three A-aquifer wells (IR01MW62A, IR01MW18A, and IR01MWI-5) have had concentrations that exceed the A-aquifer RIEC (4.6 µg/L) prior to 1992. No sample concentrations exceeding the RIEC in any A-aquifer wells have been detected since then (over five or more sampling events). Similarly, the B-aquifer well also only had detections exceeding the RIEC (4.6 µg/L) prior to 1992, and none since then (over eight sampling events). None of the wells showing detections exceeding RIECs are Parcel E-2 perimeter wells. The extent of phenanthrene in groundwater is adequately delineated by concentrations below RIECs.

Pyrene (Table 5-4, Figure 5-50): Between 1991 and 2005, 305 samples from 42 A-aquifer and B-aquifer wells were analyzed for pyrene. Pyrene was detected in six A-aquifer wells and one B-aquifer well. All of these wells had concentrations that exceeded the A-aquifer and B-aquifer RIEC (2 µg/L). Of the seven wells showing detected concentrations exceeding the RIEC, only two are Parcel E-2 perimeter wells (IR01MWI-3 and IR01MW43A). None of these wells show concentrations exceeding the RIECs after 1992 (over three or more sampling events). The extent of pyrene in groundwater is adequately delineated by concentrations below RIECs.

5.7.2.5. VOCs

Similar to SVOCs, many VOCs detected in A-aquifer and B-aquifer wells were only detected a single time during the entire sampling history of the site. Based on the infrequency of these detections, these analytes are unlikely to be groundwater COPCs; however, because they have been detected at some point, they were included in the focused evaluation to confirm that the single detections did not represent localized areas of contamination. Maps were created for the following VOCs, as they have been detected at concentrations that exceed the RIECs that apply to his chemical group: Maps were created for the following VOCs as they have been detected at concentrations that exceed their respective RIECs: benzene, carbon tetrachloride, 1,4-DCB, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, 1,1,2,2-tetrachloroethane, PCE, 1,1,1-TCA, TCE, vinyl chloride, and xylenes. Results from the mapping of VOC concentrations revealed the following:

Benzene (Table 5-5, Figure 5-51): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for benzene. Benzene has been detected in more than half of the wells across Parcel E-2. More specifically, it has been detected in 17 A-aquifer wells and 5 B-aquifer wells. All but three of the wells with measured detections have had concentrations that exceed the A-aquifer and B-aquifer RIEC (1 µg/L) at some point in the past. The most persistent benzene concentrations exceeding RIECs occur in seven A-aquifer wells located mainly within the Landfill Area (IR01MW16A, IR01MW53B, IR01MW18A, IR01MWI-5, IR01MWI-3, IR01MW43A, and IR01MW367A). The area surrounding these wells constitutes what has been identified as a benzene plume, or plumes, as described in the Phase III GDGI (TfEMI, 2004c). A total of 11 Parcel E-2 perimeter wells had chemical

concentrations that exceed the A-aquifer and B-aquifer RIEC (1 µg/L), including seven A-aquifer wells and four B-aquifer Parcel E-2 perimeter wells.

Of the seven A-aquifer wells showing detections exceeding the RIEC, four are located along the western and eastern edges of the parcel (IR01MW31A, IR01MW58A, IR01MW31A, and IR04MW36A) and three are located along the shoreline (IR01MW48A, IR01MWI-3, and IR01MW43A). The wells along the western property boundary have not had concentrations that exceed the RIEC since 1992 (over seven or more sampling events, depending on the well). The three shoreline wells show persistent and recent concentrations that exceed the RIEC. The wells located along the eastern parcel boundary have only had single concentrations that exceed the RIEC, but these detections were more recent (2002 and 2004). An examination of sampling data from wells outside the eastern edge of Parcel E-2 shows that the detections in IR04MW36A and IR04MW31A have not appeared in wells located offsite (immediately downgradient). There appears to be an area of elevated benzene concentrations associated with a former disposal trench to the south of IR04MW31A, at Parcel E. This contamination will be evaluated further as part of the Parcel E RI nature and extent evaluation.

Four B-aquifer wells are Parcel E-2 perimeter wells with concentrations exceeding the RIEC. One of the four wells is located along the western boundary of the parcel (IR01MW403B), two are located along the shoreline (IR01MW53B and IR01MW47B), and one is located along the eastern parcel boundary (IR01MW09B). Benzene in the western boundary wells exceeds the RIEC as recently as July 2004, but not since (over two sampling events). Groundwater flow direction in this area tends to be in an easterly direction, minimizing the potential for off-site contamination (to the west). The eastern boundary well had concentrations that exceeded the RIEC in 2002, but not since then (over seven sampling events). The shoreline wells, although collocated beside wells in the A-aquifer that show persistent benzene contamination (concentrations exceeding the RIEC), have only exceeded the RIEC a single time (each in 2002), and not since that time (over five or more sampling events).

The extent of benzene in groundwater is only adequately delineated in the A-aquifer by concentrations below RIECs along the western and eastern edges of the parcel. Along the southern edge, consistently elevated benzene concentrations in A-aquifer groundwater (exceeding the RIEC) may be migrating to the Bay (wells IR01MW48A, IR01MWI-3, and IR01MW43A). Along the eastern edge, elevated benzene concentrations, measured recently in A-aquifer groundwater (exceeding the RIEC), do not appear to be migrating off site, based on data from Parcel E wells. It should be noted that the PCB Hot Spot removal action includes soil removal in the areas of IR01MWI-3 and IR01MW43A, and thus the elevated concentrations of lead detected in these wells will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

Carbon Tetrachloride (Table 5-5, Figure 5-52): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for carbon tetrachloride. Carbon tetrachloride was detected once in a single B-aquifer well (IR01MW47B). The detection exceeded the RIEC (0.5 µg/L), and never recurred after 1992 (over 9 sampling events). Carbon tetrachloride has never been detected in any other A- or

B-aquifer well. The extent of carbon tetrachloride in groundwater is adequately delineated by concentrations below RIECs.

1,4-Dichlorobenzene (Tables 5-4 and 5-5, Figure 5-53): Between 1991 and 2005, 259 samples from 42 A-aquifer and B-aquifer wells were analyzed for 1,4-DCB. 1,4-DCB has been detected in nine wells at the site, all of which are screened in the A-aquifer. Detections are mainly in Landfill Area wells. Of the nine wells with measured detections, 4 wells (IR01MWI-3, IR01MW43A, IR01MWI-5 and IR01MW03A) have had concentrations that exceed the RIEC (5 µg/L). Two of these wells (IR01MWI-3 and IR01MW43A) are Parcel E-2 perimeter wells. IR01MWI-3 had four samples exceed the RIEC between 1992 and 2002 (over seven sampling events), with none since then (over three sampling events). IR01MW43A shows a similar pattern of detections exceeding the RIEC (seven detections exceeding the RIEC over 11 sampling events); however IR01MW43A shows more recent detections exceeding the RIEC (November 2004). The extent of 1,4-DCB in groundwater is adequately delineated by concentrations below RIECs, except in IR01MW43A, where elevated concentrations in groundwater (exceeding the RIEC) may be migrating to the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the area of IR01MW43A, and thus the elevated concentrations of 1,4-dichlorobenzene detected in this well will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

1,1-Dichloroethane (Table 5-5, Figure 5-54): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for 1,1-DCA. 1,1-DCA has been detected in six A-aquifer wells at Parcel E-2. Of the six wells showing detections, only two wells (IR01MW43A and IR04MW13A) have had detections that exceed the RIEC (5 µg/L). Both wells are Parcel E-2 perimeter wells; one located along the eastern edge of Parcel E-2, and the other along the shoreline. Well IR01MW43A has had two detections, both of which occurred in or prior to 1996, with no detections since then (over seven sampling events). Well IR04MW13A shows persistent concentrations exceeding the RIEC of 1,1-DCA since 1991 (between 1991 and 2005). An examination of sampling data from wells downgradient from IR04MW13A (IR12MW14A and IR12MW21A) shows that 1,1-DCA does not exceed the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A. There appears to be an area of elevated concentrations associated with a former disposal trench to the south of IR04MW13A, at Parcel E. This contamination will be evaluated further as part of the Parcel E RI nature and extent evaluation. The extent of 1,1-DCA in groundwater is adequately delineated by concentrations below RIECs.

1,1-Dichloroethene (Table 5-5, Figure 5-55): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for 1,1-DCE. 1,1-DCE has been consistently detected in samples collected from a single A-aquifer well (IR04MW13A) at Parcel E-2. The well is a Parcel E-2 perimeter wells located along the eastern edge of Parcel E-2. Well IR04MW13A shows persistent detections of 1,1-DCE that exceed the RIEC (6 µg/L) since 1991 (between 1991 and 2005). An examination of sampling data from wells downgradient from IR04MW13A (IR12MW14A and IR12MW21A) shows that

1,1-DCE does not exceed the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A. The extent of 1,1-DCE in groundwater is adequately delineated by concentrations below RIECs, except in IR01MW13A.

1,2-Dichloroethane (Table 5-5, Figure 5-56): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for 1,2-DCA; 1,2-DCA has been detected in three A-aquifer and 2 B-aquifer wells at Parcel E-2. Of the five wells showing detections, only two wells (IR01MW403B and IR04MW13A) have ever had detections that exceed the A-aquifer and B-aquifer RIEC (0.5 µg/L). Both wells are Parcel E-2 perimeter wells, one located along the northwestern edge of Parcel E-2, and the other along the eastern edge. Well IR01MW403B has had three consecutive detections that exceed the RIEC, all of which occurred recently (2004); however, the direction of groundwater flow in the vicinity of this well is to the east, thus minimizing any risk of contaminant migration off site (to the west). Well IR04MW13A shows persistent concentrations exceeding the RIEC of 1,2-DCA since June 1992 (between 1992 and 2005). An examination of sampling data from wells downgradient from IR04MW13A (IR12MW14A and IR12MW21A) shows that 1,2-DCA does not exceed the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A. There appears to be an area of elevated concentrations associated with a former disposal trench to the south of IR04MW13A, at Parcel E. This contamination will be evaluated further as part of the Parcel E RI nature and extent evaluation. The extent of 1,2-DCA in groundwater is adequately delineated by concentrations below RIECs.

Cis-1,2-Dichloroethene (Table 5-5, Figure 5-57): Between 1991 and 2005, 196 samples from 42 A-aquifer and B-aquifer wells were analyzed for cis-1,2-DCE. Cis-1,2-DCE has been detected in 13 A-aquifer wells and 4 B-aquifer wells at Parcel E-2. Detections are mainly present in wells located in the Landfill and East Adjacent Areas. Only one well screened in the A-aquifer (IR04MW13A) had detections that exceeded the RIEC (6 µg/L). The detections exceeding the RIEC have occurred consistently since 2001 (between 2001 and 2005). IR04MW13A is a Parcel E-2 perimeter well located along the eastern boundary of Parcel E-2. An examination of sampling data from a well downgradient from IR04MW13A (IR12MW14A) shows that 1,1-DCE does not exceed the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A. The extent of cis-1,2-DCE in groundwater is adequately delineated by concentrations below RIECs.

1,1,2,2-Tetrachloroethane (Table 5-5, Figure 5-58): Between 1991 and 2005, 327 samples from 42 A-aquifer and B-aquifer wells were analyzed for 1,1,2,2-tetrachloroethane. 1,1,2,2-Tetrachloroethane has only been detected once in a single A-aquifer well (IR04MW13A) at Parcel E-2. IR04MW13A is a Parcel E-2 perimeter well located along the eastern boundary of Parcel E-2. The single detection did exceed the RIEC (1 µg/L) in 1992, but has not recurred since that time (over seven sampling events). The extent of 1,1,2,2-tetrachloroethane in groundwater is adequately delineated by concentrations below RIECs.

Tetrachloroethene (Table 5-5, Figure 5-59): Between 1991 and 2005, 327 samples from 42 A-aquifer and B-aquifer wells were analyzed for PCE. PCE has been detected in eight A-aquifer wells and one

B-aquifer well at Parcel E-2. Detections are mainly present in wells located in the Landfill and East Adjacent Areas. All but one of the wells with detections are Parcel E-2 perimeter wells, mainly located along the shoreline and the eastern parcel boundary. Three Parcel E-2 perimeter wells screened in the A-aquifer (IR01MW31A, IR04MW13A and IR04MW35A) have had detections that exceed the RIEC (5 µg/L). Two of the wells (IR01MW31A and IR04MW35A) had single detections exceeding the RIEC in 1992 that were each less than 1.2 times the RIEC, with no detections since then (over 11 and 4 sampling events, respectively). The third well (IRMW13A) has exhibited persistent detections exceeding the RIEC since 1991 (between 1991 and 2005). An examination of sampling data from wells downgradient from IR04MW13A (IR12MW14A and IR12MW21A) shows that PCE has not exceeded the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A, except once in well IR12MW21A (in June 2002). No detections in IR12MW21A have exceeded the RIEC before or since June 2002 (over 11 sampling events between 1991 and 2005). The extent of PCE in groundwater is adequately delineated by concentrations below RIECs.

1,1,1-Trichloroethane (Table 5-5, Figure 5-60): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for 1,1,1-TCA; 1,1,1-TCA has only been detected in a single A-aquifer well (IR04MW13A) at Parcel E-2. IR04MW13A is a Parcel E-2 perimeter well located along the eastern boundary of Parcel E-2. The detections in this well have been persistent since 1991, but have been steadily declining over time. Peak concentration in this well occurred prior to 1992, and detections prior to 2001 exceeded the RIEC (62 µg/L). Currently detected concentrations (measured between 2001 and 2005) are consistently below the RIEC. The extent of 1,1,1-TCA in groundwater is adequately delineated by concentrations below RIECs.

Trichloroethene (Table 5-5, Figure 5-61): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for TCE. TCE has been detected in nine A-aquifer wells and five B-aquifer wells at Parcel E-2. Detections are mainly present in wells located in the Landfill and East Adjacent Areas. Two A-aquifer wells (IR01MW48A and IR04MW13A) and one B-aquifer well (IR01MW26B) have had detections that exceed the RIEC (5 µg/L). Both A-aquifer wells are Parcel E-2 perimeter wells; one well (IR01MW48A) had a single detection in July 2002 exceeding the RIEC that has not recurred (over five sampling events), and one well (IR04MW13A) had persistent detections exceeding the RIEC (between 1991 and 2005). An examination of sampling data from wells downgradient from IR04MW13A (IR12MW14A and IR12MW21A) shows that TCE does not exceed the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A.

The B-aquifer well (IR01MW26B), which is not a Parcel E-2 perimeter well, has only exceeded the RIEC once, in 2002, and not since then (over five sampling events). The extent of TCE in groundwater is adequately delineated by concentrations below RIECs.

Vinyl Chloride (Table 5-5, Figure 5-62): Between 1991 and 2005, 328 samples from 42 A-aquifer and B-aquifer wells were analyzed for vinyl chloride. Vinyl chloride has been detected in three A-aquifer wells (IR01MW16A, IR01MW367A, and IR04MW13A) at Parcel E-2. Two of the wells, located in the

East Adjacent Area, had detections that exceeded the RIEC for the A-aquifer (0.5 µg/L). IR04MW13A is the only Parcel E-2 perimeter well that has ever had vinyl chloride detections that exceed the RIEC. Since early 2001, this well has had persistent detections that exceed the RIEC (between 2001 and 2005). An examination of sampling data from wells downgradient from IR04MW13A (IR12MW14A and IR12MW21A) shows that vinyl chloride does not exceed the RIEC beyond the parcel boundary, immediately downgradient of well IR04MW13A. The extent of vinyl chloride in groundwater is adequately delineated by concentrations below RIECs.

Xylene (Total) (Table 5-5, Figure 5-63): Between 1991 and 2005, 270 samples from 41 A-aquifer and B-aquifer wells were analyzed for total xylene. Xylenes have been detected in 17 A-aquifer wells and 2 B-aquifer wells across Parcel E-2. Detections in samples collected in 1992 in a single A-aquifer well (IR01MW43A) exceeded the RIEC (100 µg/L). No detections exceeding RIECs were measured in this Parcel E-2 perimeter well after 1992. The extent of total xylene in groundwater is adequately delineated by concentrations below RIECs.

5.7.2.6. Petroleum Hydrocarbons

TPH (Total) (Table 5-6, Figure 5-64): Between 1991 and 2005, 234 samples from 41 A-aquifer and B-aquifer wells were analyzed for total petroleum hydrocarbons. The sum of TPH fractions were used to evaluate total TPH concentrations in groundwater. Total TPH has been detected in all but seven wells at the site, scattered across the Landfill Area and the Adjacent Areas. The detection data were compared to RIECs assigned as a function of well distance from the Parcel E-2 shoreline (TtEMI, 2004b). The evaluation concentration increases as the distance from the shoreline increases, as shown in Figure 5-64. Total TPH concentrations exceeded their distance-dependent RIECs in two A-aquifer wells. Both wells (IR01MWI-3 and IR01MW43A) are Parcel E-2 perimeter wells located along the shoreline. Well IR01MWI-3 demonstrates inconsistent detections throughout its sampling history, and recent detections in December 2004 and March 2005 exceeded the RIECs for a well between 0 and 50 feet from the shoreline (1,400 µg/L). Well IR01MW43A shows more persistent and increasing total TPH concentrations exceeding the RIEC for a well between 50 and 100 feet from the shoreline (2,100 µg/L). The extent of total TPH in groundwater is adequately delineated by concentrations below RIECs, except along the shoreline at IR01MWI-3 and IR01MW-43A, where elevated concentrations in groundwater (exceeding the RIECs) may be migrating toward the Bay. It should be noted that the PCB Hot Spot removal action includes soil removal in the areas of IR01MWI-3 and IR01MW43A, and thus the elevated concentrations of total TPH detected in these wells will likely be reduced in the future. Post removal action groundwater sampling is required to confirm this presumption.

5.8. SUMMARY OF FINDINGS

To accurately determine the nature and extent of groundwater contamination in Parcel E-2, all of the groundwater data collected to date (from early 1990 to April 2005) were included in the analysis. Concentrations of metals in groundwater were compared to ambient concentrations (HGALs) to eliminate

those analytes not introduced by the landfill or its surrounding source areas. The data were then evaluated by comparing detected analytes to evaluation criteria (RIECs) to establish whether compounds are likely to be present at levels that may negatively impact human health or the environment. To identify the subset of detected compounds on which to focus the evaluation, the data were compared to the selected RIECs for each aquifer. The RIECs are composed of regulatory groundwater and drinking water limits and/or standards and aquatic criteria, as well as background levels (in the case of metals only). To identify and select the criteria that apply to each aquifer at Parcel E-2, a beneficial use evaluation was conducted, followed by a criteria selection process based on the results of that evaluation.

Further evaluation was performed for analytes found to exceed the selected RIECs. Data maps were created to depict the spatial and temporal distribution and magnitude of the detections and the samples that exceed the RIEC for each analyte, in each aquifer.

The information presented above was used to determine if the problem statements defined for Parcel E-2 groundwater have been answered, and if the DQOs have been met. The following subsection summarizes the results of the nature and extent evaluation, and addresses the resolution of DQOs and the responses to the problem statements guiding the data collection at Parcel E-2.

5.8.1. Summary of Lateral and Vertical Extent

As stated in subsection 5.1, the goal of this section is to present an evaluation of all existing groundwater data to support the risk assessment and remedial alternatives portions of the RI/FS process. This nature and extent evaluation is meant to document that an adequate amount of data, of sufficient quality, exists to support the human health and ecological risk assessments, to provide a strong basis for the RAOs, and to support the evaluation of a focused set of remedial alternatives for Parcel E-2.

Below is a summary of the findings and the areas of concern with respect to groundwater contamination at Parcel E-2.

- Ammonia was detected at elevated concentrations throughout the A- and B-aquifers in the Landfill Area. These concentrations are indicative of the decomposition of natural organic matter and organic waste material in the landfill. Elevated concentrations of unionized ammonia (exceeding the RIEC) are present in wells located along the Bay shoreline. Upon contact with Bay water, un-ionized ammonia is oxidized to nitrite, then nitrate. The oxidation of ammonia reduces the dissolved oxygen in the Bay water and may be harmful to aquatic life.
- Persistent arsenic concentrations exceeding the RIEC (36 µg/L) exist in A-aquifer groundwater in the vicinity of IR04MW36A, located on the eastern boundary of the parcel, near the leaking sanitary sewer line. Arsenic concentrations exceeding the RIEC have persisted in this well for nearly 15 years; however, off-site, downgradient well data confirm that the elevated arsenic concentrations in this well are not migrating east/southeast toward Parcel E.
- Persistent barium concentrations exceeding the RIEC (1,000 µg/L) exist in A-aquifer groundwater in the southern portion of the Panhandle Area, and along the Landfill Area shoreline. Because the extent of barium beyond the Parcel E-2 shoreline is unknown, groundwater with barium concentrations exceeding the RIEC is potentially migrating toward the Bay.

Concentrations of barium, as well as other dissolved metals, in groundwater may decrease in the Panhandle Area as a result of the Metal Slag Area removal action.

- In the case of metals in groundwater, ambient concentrations are the predominant reason for the wide variety of detections in the A-aquifer, as opposed to contamination contributed by past site activities conducted at Parcel E-2. Concentrations slightly exceeding ambient levels were treated and delineated as RIEC exceedances in this evaluation, but they may be due to natural variations in background concentrations.
- Concentrations of PCBs consistently exceed the RIEC in A-aquifer wells located near the sheet pile wall, along the shoreline in the Landfill Area. Historical data indicate that PCB concentrations generally decrease over time at the site. In addition, the removal action currently being performed in the PCB Hot Spot Area along the Parcel E-2 shoreline will likely reduce soil source concentrations, and subsequently dissolved concentrations in Parcel E-2 aquifers. The removal action performed at the PCB Hot Spot Area will probably also reduce source concentrations of other chemicals (e.g. SVOCs) detected in within the extents of that area.
- In the northwestern corner of the site, where the A-aquifer is not separated from the B-aquifer by the Bay Mud aquitard, benzene is the only chemical whose concentrations exceeded the RIEC in this area. Benzene was present in the B-aquifer in 2004 at a concentration of 1.3 µg/L in IR01MW403B, slightly exceeding the B-aquifer RIEC of 1 µg/L. Elevated concentrations of benzene have been detected in wells in the A- and B-aquifers within an area extending south and west from the landfill. Although benzene is present in groundwater in a large lateral area, concentrations across the site have been decreasing. Benzene is, and always has been, the most laterally and vertically extensive groundwater contaminant at Parcel E-2.
- Concentrations of the chlorinated solvents PCE, TCE, vinyl chloride, 1,1-DCE, 1,1-DCA, cis-1,2-DCE and 1,2-DCA, exceeding RIECs at the Landfill Area were detected in an area southeast of the landfill in well IR04MW13A. This contamination is not migrating downgradient, toward Parcel E, as confirmed by data from off-site downgradient wells (located at Parcel E). However, to the southeast of IR04MW13A, in the area of a former disposal trench, elevated concentrations (exceeding RIECs) these compounds persist in groundwater (in wells IR12MW13A and/or IR12MW17A). This area of concern will be evaluated in the Parcel E RI.
- Historical total TPH concentrations in groundwater in wells IR01MWI-3, IR01MW43A, and IR01MW44A exceeded TPH criteria in samples collected between (1992 and 1996). Total TPH concentrations in IR01MWI-3 and IR01MW43A continued to exceed their respective RIECs (1,400 µg/L and 2,100 µg/L) through 2005. Total TPH, as well as other chemical concentrations in soil will likely be reduced as a result of the soil removal action being conducted in the collocated PCB Hot Spot Area.

Table 5.14 includes a list of all the wells from which adequate extent delineations for certain analytes could not be estimated, based on the available data. Although these are potential areas of concern, and may not have all been identified as such in the bulleted list above, the information available is adequate for the evaluation of remedial alternatives for Parcel E-2. The data gaps subsection provides more information on how the nature and extent analysis presented in this section will be strengthened by future data (subsection 5.8.3).

5.8.2. Resolution of Data Quality Objectives

A DQO question was presented in the BGMP (TtEMI, 2004e) that directly addresses the nature and extent of contamination in basewide groundwater, including groundwater affected by the landfill at Parcel E-2. The problem statements, decision question, and answer to the decision question are presented below.

5.8.2.1. Problem Statements

The BGMP (TtEMI, 2004e) lists two problem statements for groundwater monitoring at the landfill at Parcel E-2:

1. Historical groundwater data show that chemicals have been detected in groundwater downgradient of the Industrial Landfill. Additional monitoring is necessary to determine trends in chemical concentrations and to help evaluate potential remedial alternatives.
2. 27 CCR provides guidance for groundwater monitoring at landfills. Additional monitoring at the Industrial Landfill is necessary to establish baseline data for chemicals and groundwater parameters that are typical of landfill contaminants.

5.8.2.2. Decision Question

The following decision question was formulated in response to the aforementioned problem statements:

Is the characterization of chemical concentrations and concentration trends, the lateral and vertical distribution of groundwater chemicals, and seasonal fluctuations in concentrations of groundwater chemicals in the Industrial Landfill Area adequate for evaluation of remedial alternatives?

To answer the decision question, many types of information and data were collected, graphically (spatially and temporally) mapped, and analyzed to support the groundwater nature and extent evaluation in this RI/FS. The information and data sources included:

- Quarterly monitoring data from Parcel E-2 wells, collected as part of the BGMP (TtEMI, 2004e), including chemical concentrations, field groundwater quality, and hydrogeologic data.
- Existing chemical concentration data and hydrogeologic data from the GDGI (from 2000 to 2002) and from studies conducted before the GDGI (from 1990 to 1996).
- Geologic and hydrogeologic information derived from past potentiometric and hydrogeologic mapping.
- HGALs, and other pertinent regulatory evaluation criteria.

5.8.2.3. Answer to the Decision Question

The characterization of chemical concentrations and concentration trends and the understanding of lateral and vertical distribution of groundwater chemicals at the Landfill are adequate for evaluation of remedial alternatives. Large amounts of defensible data have been analyzed, and the results of those analyses sufficiently characterize the nature and extent of groundwater contamination at Parcel E-2 for the purpose of remedial alternatives evaluation. The groundwater characterization analyses revealed the following:

- The lateral and vertical extent of almost all analytes tested is adequate to define the overall nature and extent of groundwater contamination at Parcel E-2, for the purposes of performing a risk assessment and remedial alternatives analysis.
- The broad and focused evaluations of the data allowed for a thorough assessment of the lateral and vertical extent of groundwater chemicals at Parcel E-2, and identification of major areas of concern.
- Overall, groundwater at Parcel E-2 contains elevated levels (exceeding RIECs) of compounds from each of the analyte groups evaluated (i.e., anions, metals, pesticides and PCBs, SVOCs, VOCs, and petroleum hydrocarbons). A summary of major areas of concern is provided in [Subsection 5.8.1](#) (Summary of Lateral and Vertical Extent).

5.8.3. Laboratory Reporting Limits Exceeding RIECs

As part of the data evaluation, the laboratory reporting limits associated with all Parcel E-2 groundwater samples were compared to the selected RIECs for the analytes tested. More specifically, the purpose of this comparison was to identify any analytes for which the available data may not have been analyzed at reporting limits below RIECs. Because RIECs are the primary evaluation criteria used in this nature and extent evaluation, it is important to report instances where detecting concentrations at or below the RIEC may not be possible, or may not have been achievable for particular samples. The following subsections identify the major reasons why reporting limits may not be (or may not have been) at or below RIECs. They also identify the analytes, by group, that may have sample results that were analyzed using reporting limits that may have exceeded the selected RIECs. Lastly, an assessment of the usability of the data, for the purpose of evaluating the extent of chemicals, is included.

5.8.3.1. Causes for Elevated Reporting Limits

The data used for this nature and extent evaluation were generated under a number of separate investigations and monitoring programs over a period of nearly 15 years. Over that period of time, many factors have influenced the laboratory reporting limits applied to Parcel E-2 groundwater analyses, including increased accuracy and diversity of analytical methods due to improvements in processes and technologies, and changes in data quality goals and objectives, based on varying anticipated beneficial use scenarios, monitoring goals, and/or remedial objectives. A complete summary of data quality and data validation results is not provided in the form of a quality control summary report (QCSR) because the data were derived from multiple investigations, each having their own QCSR based on different data quality objectives; which may not apply to the evaluation criteria used in this data evaluation (RIECs).

A general evaluation of the data indicates that, for most analytes, the elevated reporting limits do not affect the usability of the data for the purpose of evaluating chemical extent in groundwater, because there are usually multiple analyses for each chemical in each well that have reporting limits less than the RIECs. In some cases, reporting limits are achievable, but not met due to chemical interferences in samples. To allow for proper analysis, samples may have been diluted to alleviate the effects of these interferences. Sample dilution results in an elevation of the reporting limit, possibly greater than RIECs.

Again, if the need for dilution is occasional within each well, the usability of the data, for the purpose of evaluating chemical extent, is probably not diminished.

In other cases, when RIECs are based on non-promulgated, risk-based criteria (e.g., ESLs), and where these criteria are more stringent than the promulgated criteria (e.g., MCLs or HGALs), the specified reporting limit may not be less than the selected RIEC. This is because the RIEC selected is always based on the most stringent (lowest) of all evaluation criteria; however, the data quality objectives selected for the BGMP (TtEMI, 2004e) (the source of the more recent groundwater data) specify reporting limits selection based on promulgated criteria. Monitoring program design and selection of remedial objectives are primarily based on data collection and evaluation based on promulgated criteria, which may not necessarily correspond with evaluations using more stringent, non-promulgated criteria. Therefore, the conservative nature of the RIEC selection process produces situations where reporting limits are higher than evaluation criteria. The effect on data usability, for the purpose of the extent evaluation, is usually directly related to the magnitude of the difference between the reporting limit and the chosen RIEC.

Throughout this evaluation, in cases where most samples (80 to 100 percent) have reporting limits that exceed the RIEC, and estimated detections are reported, the available estimated data were treated as sufficiently accurate for the purpose of evaluating chemical extent.

5.8.3.2. Assessment of Reporting Limits Exceeding RIECs by Chemical Group

Every chemical group included chemicals whose laboratory reporting limits exceeded RIECs. [Table 5-13](#) includes summary statistics related to the frequency that reporting limits exceed RIECs, for each chemical included in the nature and extent evaluation. [Figures 5-1 through 5-65](#) indicate the well locations where, at some point during the sampling history of a well, a reporting limit exceeds the specified RIEC. For those analytes that were not mapped, the data summary statistics, incorporated in the comprehensive data tables in [Appendix J](#), include information regarding reporting limits, as compared to RIECs.

In the subsections related to each analyte group (below), an analysis was performed to provide brief explanations of the probable causes of the elevated reporting limits, and the magnitude of the effects on the chemical extent evaluation. This was based on an evaluation of the frequency values in [Table 5-13](#) (number of samples with reporting limits greater than RIECs divided by the total number of samples analyzed) and the spatial distribution of the occurrences of samples with reporting limits exceeding criteria (represented on [Figures 5-1 through 5-65](#)).

Anions

Reporting limits were found to exceed RIECs for four anions ([Table 5-13](#)). The results of the evaluation are presented below:

- For a list of anions with reporting limits exceeding RIECs in less than 10 percent of all samples, see [Table 5-13](#). For these chemicals, a low number (10 percent or less) of the analyses had reporting limits greater than RIECs, because reporting limits are typically less than RIECs, except in a small number of instances where dilution may have been required to adjust for chemical interferences in

samples. The small number of samples with reporting limits exceeding RIECs does not diminish the usability of the data in the nature and extent evaluation.

- For a list of anions with reporting limits exceeding RIECs in more than 80 percent of all samples, see [Table 5-13](#). As shown in [Figures 5-1 and 5-2](#), most wells are flagged as having reporting limits that exceed RIECs. This is because the lowest achievable laboratory reporting limit for each chemical is greater than its RIECs. In cases where detections were flagged as estimated because the detected concentrations were less than the reporting limit, those estimated values were evaluated like all other data and were included in the data set. Therefore, both estimated and confirmed data were used to evaluate the extent of these chemicals in groundwater. In each case, the lowest achievable reporting limits are being used, and thus, the most stringent evaluation of chemical extent possible was conducted.

Metals

Reporting limits were found to exceed RIECs for 12 metals ([Table 5-13](#)). The results of the evaluation are presented below:

- For a list of metals with reporting limits exceeding RIECs in less than 10 percent of all samples, see [Table 5-13](#). For these chemicals, the occurrence of elevated reporting limits is due, for the most part, to occasional sample dilutions, and does not diminish the usability of the data used in the extent evaluation.
- For a list of metals with reporting limits exceeding RIECs in more than 80 percent of all samples, see [Table 5-13](#). For these chemicals, the RIECs are typically less than achievable laboratory reporting limits. This is because the chosen reporting limits in the B-aquifer are based on promulgated criteria (typically MCLs in the B-aquifer), while the RIECs are based on more stringent, risk-based, non-promulgated criteria (typically ESLs in the B-aquifer). The inclusion of estimated results in the analyses of these data improves the usability of the data for evaluation of chemical extent. Because the actual detection concentrations seem to be typically higher than the reporting limit specified for these metals, and thus higher than the RIEC, the extent evaluation data usability is not diminished.
- For a list of metals with reporting limits exceeding RIECs in 10 to 80 percent of all samples, see [Table 5-13](#). Many of these chemicals either had reporting limits that were greater than the RIECs in the past that have since been reduced due to improvements in lab techniques or revised data quality objectives. Therefore, only a fraction of the data (mostly those data collected prior to the BGMP) is flagged as having reporting limits greater than the RIEC. In other cases, some samples required occasional dilutions to minimize chemical interferences. Generally, the usability of these data for chemical extent evaluation is not diminished because samples exist, in most wells, which have reporting limits less than RIECs.

PCBs and Pesticides

Reporting limits were found to exceed RIECs for 21 chemicals in the PCBs and pesticides group ([Table 5-13](#)). All of these chemicals had analyses with reporting limits exceeding RIECs in more than 80 percent of samples. For these chemicals, the RIECs are typically less than achievable laboratory reporting limits. The RIECs for PCBs and pesticides are based on risk-based, non-promulgated criteria (mainly ESLs), and are typically one or two orders of magnitude less than the lowest achievable

laboratory reporting limit. In each case, the lowest achievable reporting limits are being used, and thus, the most stringent evaluation of chemical extent possible was conducted.

SVOCs and VOCs

Reporting limits were found to exceed RIECs for 40 SVOCs and 25 VOCs (Table 5-13). The results of the evaluation are as follows:

- For a list of SVOCs and VOCs with reporting limits exceeding RIECs in less than 10 percent of samples, see Table 5-13. For these chemicals, the occurrence of elevated reporting limits is mainly due to occasional sample dilutions, and has does not diminish the usability of the data for the purpose of evaluating chemical extent.
- For a list of SVOCs and VOCs with reporting limits exceeding RIECs in more than 80 percent of all samples, see Table 5-13. For SVOCs, the RIECs are typically less than achievable laboratory reporting limits. This is because the RIECs are mostly based on risk-based, non-promulgated criteria, which are lower than the achievable reporting limits. Thus, the most stringent evaluation of SVOC chemical extent possible was conducted. Only a single VOC had more than 80 percent of its sample reporting limits exceeding RIECs (1,4-DCB). This was also due to the fact that achievable laboratory reporting limit is greater than the chosen RIEC. Therefore, as was done for SVOCs, the most stringent evaluation of VOC chemical extent possible was conducted.
- For a list of SVOCs and VOCs with reporting limits exceeding RIECs in 10 to 80 percent of all samples, see Table 5-13. In the case of SVOCs, many of the analytes appear to require occasional to frequent sample dilutions to minimize chemical interferences, thus, only a fraction of the data is flagged as having reporting limits greater than the RIEC. In the case of VOCs, the reporting limits for many chemicals were reduced to values less than the RIEC over time, allowing more detections to be reported with more confidence. Generally, the usability of these data for chemical extent evaluation for SVOCs and VOCs is not diminished because samples exist, in most wells, which have reporting limits less than RIECs.

Petroleum Hydrocarbons

Reporting limits were found to exceed RIECs for 3 groups of petroleum hydrocarbons (Table 5-13). The results of the evaluation are as follows:

- For a list of petroleum hydrocarbons with reporting limits exceeding RIECs in less than 10 percent of samples, see Table 5-13. Although these chemicals are evaluated in the nature and extent evaluation as total TPH, the individual components were evaluated for this assessment. For these chemical groups, the occurrence of elevated reporting limits is mainly due to occasional sample dilutions, and does not diminish the usability of the data for the purpose of evaluating chemical extent.
- A single petroleum hydrocarbon group (total oil and grease) had reporting limits exceeding RIECs in more than 80 percent of all samples (Table 5-13). The elevated number of reporting limits greater than the RIEC is mainly due to sample dilutions due to interferences, which is not uncommon when analyzing for total oil and grease in groundwater. Therefore, the most stringent evaluation of chemical extent possible was conducted for total oil and grease.

5.8.3.3. Summary of Assessment of Reporting Limits Exceeding RIECs

The assessment of reporting limits exceeding RIECs was generalized by evaluating individual chemical groups, using spatial representations of the locations where reporting limits exceed RIECs (Figures 5-1 through 5-65) and frequencies of reporting limit exceedances over RIECs (Table 5-13 and Appendix J). The summaries presented above are meant to bring to light the most predominant reasons why reporting limits for each chemical group might exceed RIECs.

5.8.4. Data Gaps

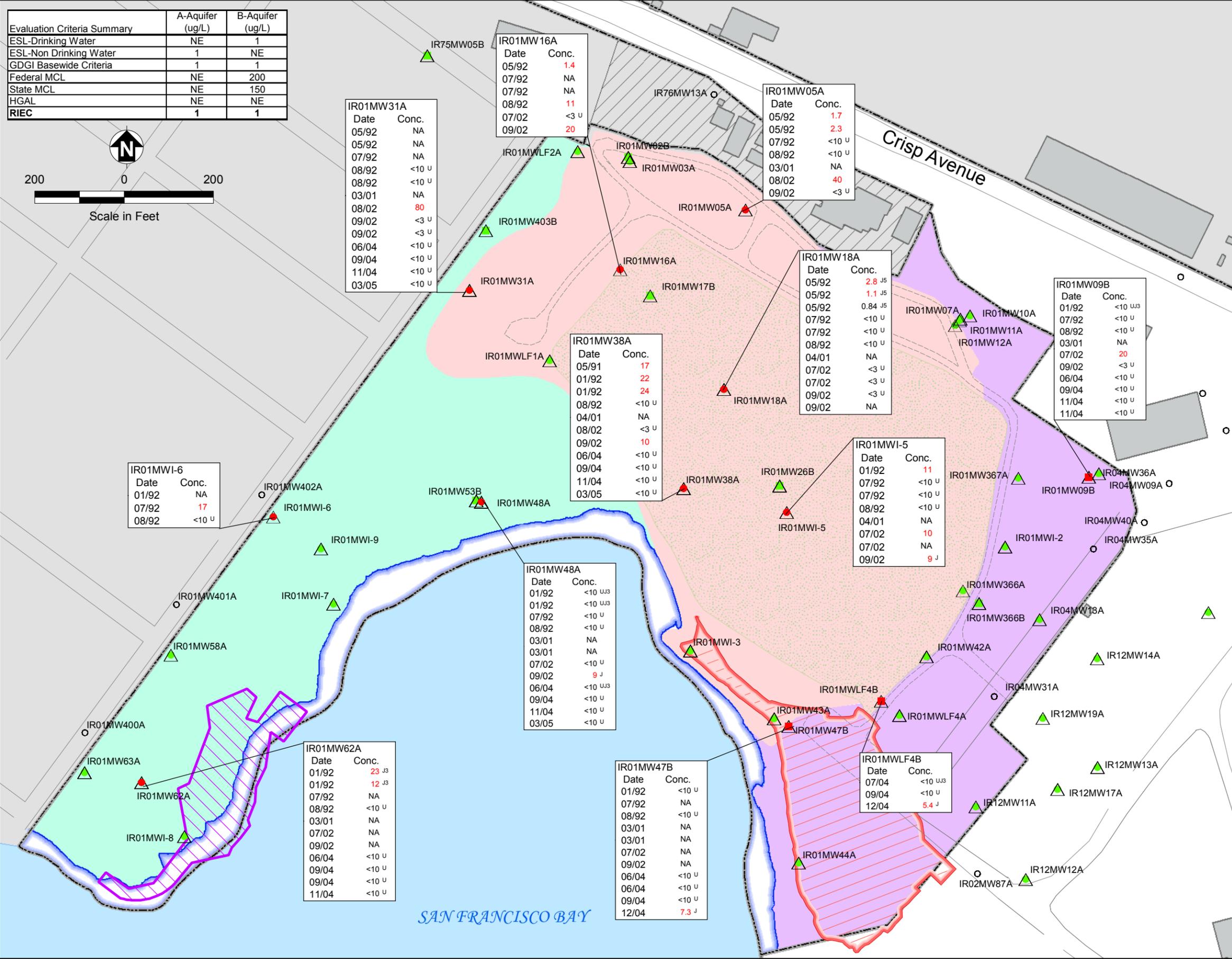
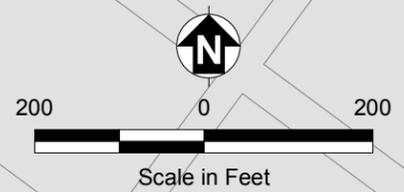
Although the overall nature and extent of groundwater contaminants at Parcel E-2 can be adequately defined by the data evaluated in this analysis, some data gaps are present and should be addressed. The following areas in which further data may help the nature and extent evaluation process were revealed through this analysis:

- Data gaps exist for certain analytes (Table 5-14) along the Parcel E-2 shoreline, where chemical concentrations persistently or recently exceeded RIEC. A method for comparing groundwater data to aquatic criteria, in a manner that accounts for chemical attenuation and the near-shore mixing process, is required to assess the downgradient impact of shoreline groundwater contamination on the Bay.
- Data gaps exist in areas where the potentially beneficial effects on groundwater concentrations by recent soil removal actions or planned construction activities have yet to be evaluated (e.g., the PCB Hot Spot removal action, the Metal Slag Area removal action, and the sanitary sewer line removal). As confirmation sampling data and future groundwater monitoring data become available, these will be incorporated into the nature and extent analysis.
- The possibility exists that the presence of some chemicals may have not been identified as part of this nature and extent evaluation, due to the fact that some sample reporting limits exceed the RIECs selected for this evaluation. After evaluating the data, it appears that generally, this issue does not diminish the usability of the data for the purpose of identifying the extent of the most prevalent, risk-driving chemicals in groundwater. It also has little effect on the HHRA presented later in this document, as appropriate measures are taken during the risk assessment process to conservatively compensate for elevated reporting limits.
- Recent data collected as part of the BGMP (TtEMI, 2004e) do not span more than one full year. As future groundwater monitoring data become available, these will be incorporated into the nature and extent analysis, and allow for analysis of seasonal groundwater fluctuations on chemical concentrations.

The ongoing basewide groundwater monitoring continues to contribute useful characterization data to the Parcel E-2 database. Data collected between the various interim versions of this report will be incorporated into the Draft Final and Final versions of the RI/FS report to reduce the number of data gaps and further strengthen the nature and extent evaluation.

Figures

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	1
ESL-Non Drinking Water	1	NE
GDGI Basewide Criteria	1	1
Federal MCL	NE	200
State MCL	NE	150
HGAL	NE	NE
RIEC	1	1



Well ID	Date	Conc.
IR01MW31A	05/92	NA
IR01MW31A	05/92	NA
IR01MW31A	07/92	NA
IR01MW31A	08/92	<10 U
IR01MW31A	08/92	<10 U
IR01MW31A	08/92	<10 U
IR01MW31A	03/01	NA
IR01MW31A	08/02	80
IR01MW31A	09/02	<3 U
IR01MW31A	09/02	<3 U
IR01MW31A	06/04	<10 U
IR01MW31A	09/04	<10 U
IR01MW31A	11/04	<10 U
IR01MW31A	03/05	<10 U

Well ID	Date	Conc.
IR01MW16A	05/92	1.4
IR01MW16A	07/92	NA
IR01MW16A	07/92	NA
IR01MW16A	08/92	11
IR01MW16A	07/02	<3 U
IR01MW16A	09/02	20

Well ID	Date	Conc.
IR01MW05A	05/92	1.7
IR01MW05A	05/92	2.3
IR01MW05A	07/92	<10 U
IR01MW05A	08/92	<10 U
IR01MW05A	03/01	NA
IR01MW05A	08/02	40
IR01MW05A	09/02	<3 U

Well ID	Date	Conc.
IR01MW18A	05/92	2.8 J5
IR01MW18A	05/92	1.1 J5
IR01MW18A	05/92	0.84 J5
IR01MW18A	07/92	<10 U
IR01MW18A	07/92	<10 U
IR01MW18A	08/92	<10 U
IR01MW18A	04/01	NA
IR01MW18A	07/02	<3 U
IR01MW18A	07/02	<3 U
IR01MW18A	09/02	<3 U
IR01MW18A	09/02	NA

Well ID	Date	Conc.
IR01MW09B	01/92	<10 UJ3
IR01MW09B	07/92	<10 U
IR01MW09B	08/92	<10 U
IR01MW09B	03/01	NA
IR01MW09B	07/02	20
IR01MW09B	09/02	<3 U
IR01MW09B	06/04	<10 U
IR01MW09B	09/04	<10 U
IR01MW09B	11/04	<10 U
IR01MW09B	11/04	<10 U

Well ID	Date	Conc.
IR01MWI-6	01/92	NA
IR01MWI-6	07/92	17
IR01MWI-6	08/92	<10 U

Well ID	Date	Conc.
IR01MW38A	05/91	17
IR01MW38A	01/92	22
IR01MW38A	01/92	24
IR01MW38A	08/92	<10 U
IR01MW38A	04/01	NA
IR01MW38A	08/02	<3 U
IR01MW38A	09/02	10
IR01MW38A	06/04	<10 U
IR01MW38A	09/04	<10 U
IR01MW38A	11/04	<10 U
IR01MW38A	03/05	<10 U

Well ID	Date	Conc.
IR01MWI-5	01/92	11
IR01MWI-5	07/92	<10 U
IR01MWI-5	07/92	<10 U
IR01MWI-5	08/92	<10 U
IR01MWI-5	04/01	NA
IR01MWI-5	07/02	10
IR01MWI-5	07/02	NA
IR01MWI-5	09/02	9 J

Well ID	Date	Conc.
IR01MW48A	01/92	<10 UJ3
IR01MW48A	01/92	<10 UJ3
IR01MW48A	07/92	<10 U
IR01MW48A	08/92	<10 U
IR01MW48A	03/01	NA
IR01MW48A	03/01	NA
IR01MW48A	07/02	<10 U
IR01MW48A	09/02	9 J
IR01MW48A	06/04	<10 UJ3
IR01MW48A	09/04	<10 U
IR01MW48A	11/04	<10 U
IR01MW48A	03/05	<10 U

Well ID	Date	Conc.
IR01MW62A	01/92	23 J3
IR01MW62A	01/92	12 J3
IR01MW62A	07/92	NA
IR01MW62A	08/92	<10 U
IR01MW62A	03/01	NA
IR01MW62A	07/02	NA
IR01MW62A	09/02	NA
IR01MW62A	06/04	<10 U
IR01MW62A	09/04	<10 U
IR01MW62A	09/04	<10 U
IR01MW62A	11/04	<10 U

Well ID	Date	Conc.
IR01MW47B	01/92	<10 U
IR01MW47B	07/92	NA
IR01MW47B	08/92	<10 U
IR01MW47B	03/01	NA
IR01MW47B	03/01	NA
IR01MW47B	07/02	NA
IR01MW47B	09/02	NA
IR01MW47B	06/04	<10 U
IR01MW47B	06/04	<10 U
IR01MW47B	09/04	<10 U
IR01MW47B	12/04	7.3 J

Well ID	Date	Conc.
IR01MWLF4B	07/04	<10 UJ3
IR01MWLF4B	09/04	<10 U
IR01MWLF4B	12/04	5.4 J

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) are expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
IR01MWLF1A	09/04	8.4
IR01MWLF1A	11/04	2.5
IR01MWLF1A	03/05	0.57

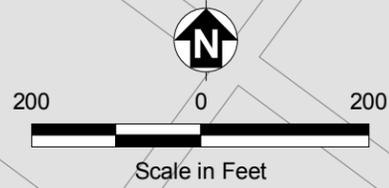
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 ERRG RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-1
CYANIDE
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	NE
ESL-Non Drinking Water	NE	NE
GDGI Basewide Criteria	NE	1,000
Federal MCL	NE	1,000
State MCL	NE	1,000
HGAL	NE	NE
RIEC	NE	1,000



Well ID	Date	Conc.
IR01MW403B	07/04	3300
	09/04	820 J5
	12/04	<100 UJ5

Well ID	Date	Conc.
IR01MW09B	01/92	<500 U
	07/92	<500 U
	08/92	<5000 U
	03/01	<5 U
	07/02	NA
	09/02	<20 U
	06/04	<200 U
	09/04	<200 U
	11/04	<200 UJ5
	11/04	<200 UJ5
	03/05	12600 J5
	03/05	160

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-3

**NITRITE AS NITROGEN
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	NE
ESL-Non Drinking Water	NE	NE
GDGI Basewide Criteria	NE	1,000
Federal MCL	NE	NE
State MCL	NE	1,000
HGAL	NE	NE
RIEC	NE	1,000

IR75MW05B	
Date	Conc.
07/96	<33.2 U ¹
07/96	<36.7 U ¹
09/96	32
11/96	<42.9 U ²
06/04	2630
06/04	1770
09/04	<100 U
12/04	<100 U
03/05	<100 U

IR01MW02B	
Date	Conc.
05/91	<16.3 U
05/91	<16.3 U
01/92	<16 U
08/92	3630
03/01	<41.8 U
07/02	<30 U
09/02	<30 U
06/04	<100 U
08/04	<100 U
11/04	<100 U
03/05	<100 U
03/05	<100 U

IR01MW17B	
Date	Conc.
01/92	<20 U
07/92	<21.6 U
08/92	4040
04/01	<41.8 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Concentration (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

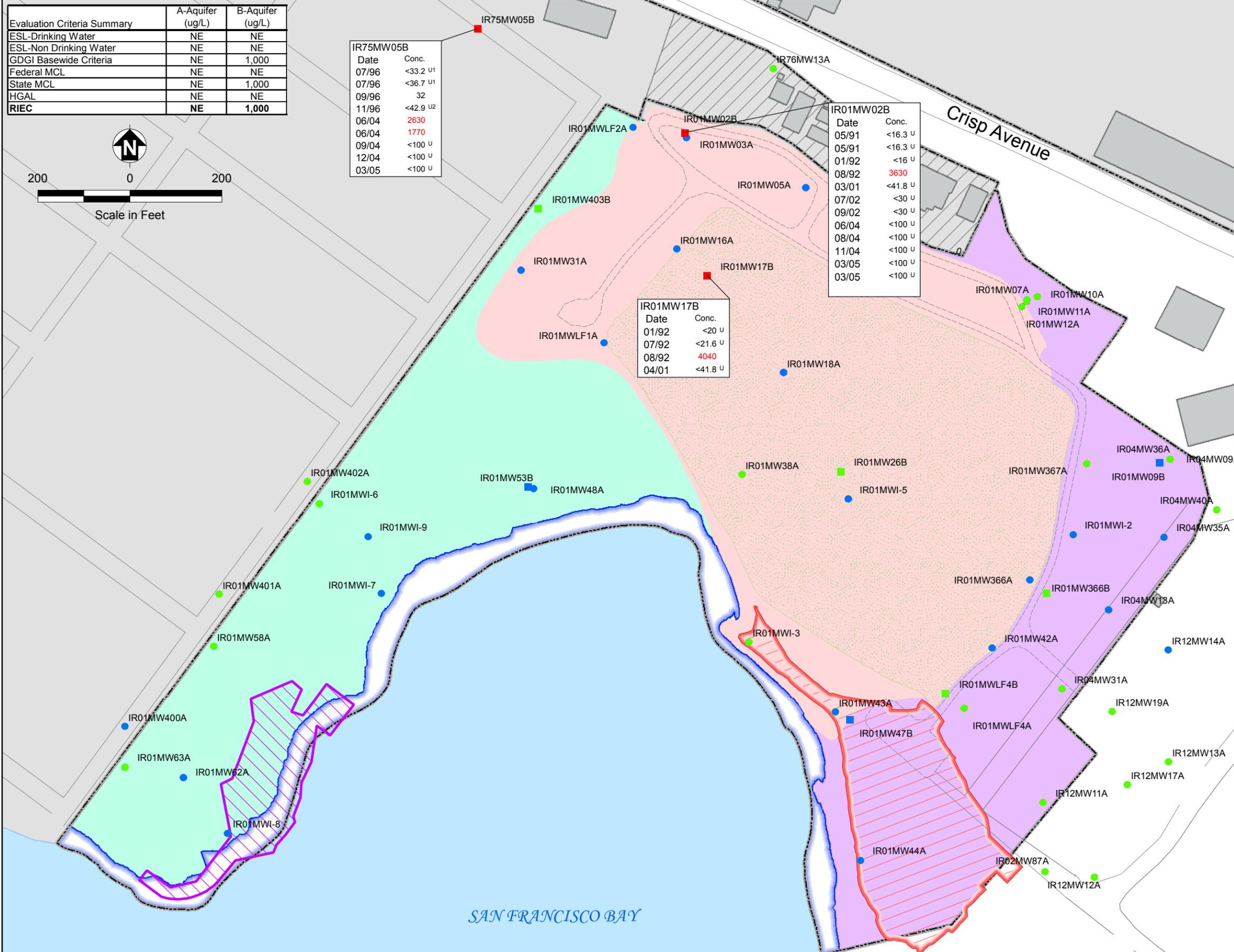
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Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

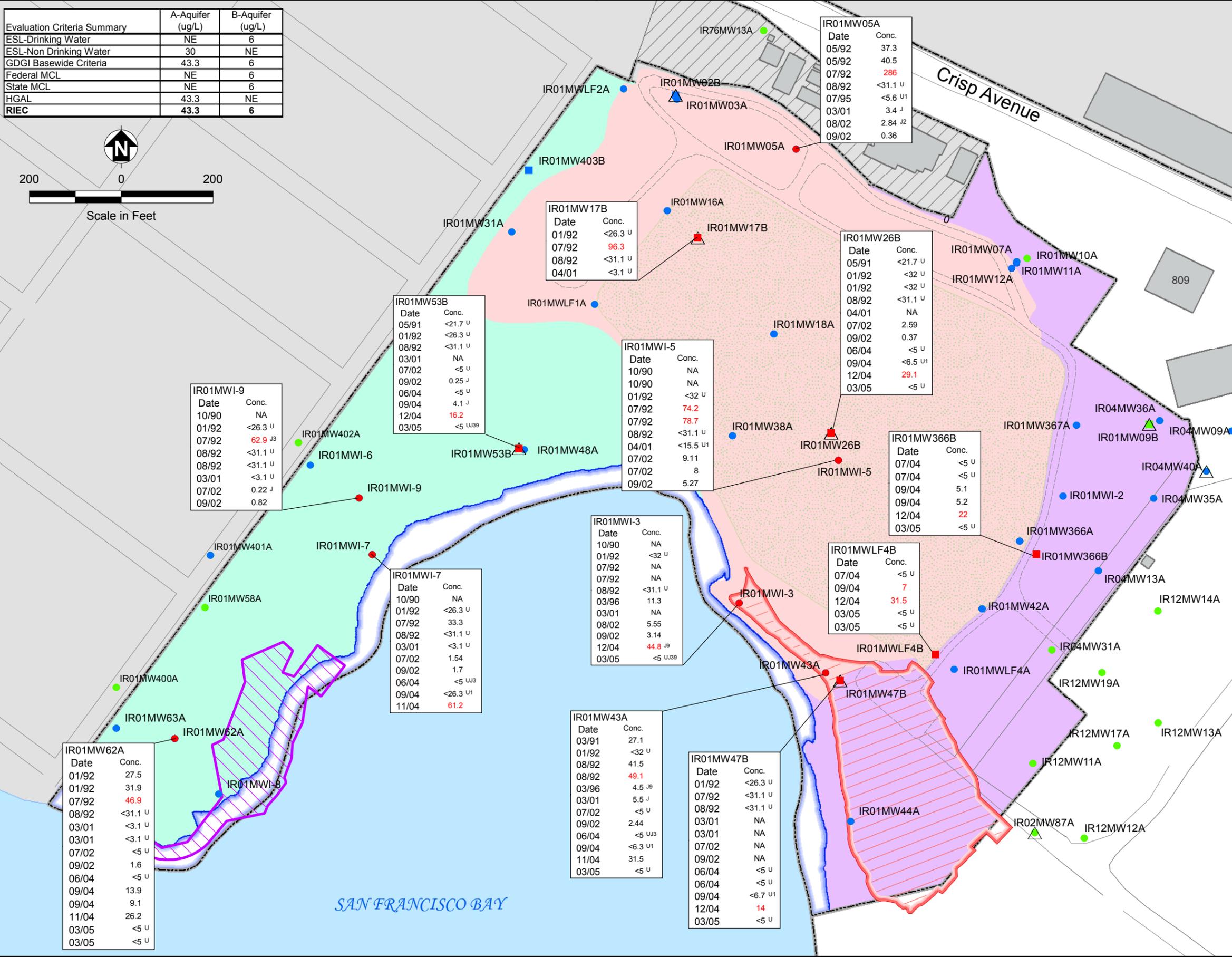
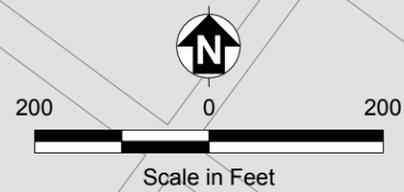
FIGURE 5-4

**ALUMINUM
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	6
ESL-Non Drinking Water	30	NE
GDGI Basewide Criteria	43.3	6
Federal MCL	NE	6
State MCL	NE	6
HGAL	43.3	NE
RIEC	43.3	6



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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**FIGURE 5-5
ANTIMONY
IN GROUNDWATER**
 Remedial Investigation/Feasibility Study for Parcel E-2

IR01MWI-9	Date	Conc.
10/90	NA	
01/92	<26.3 U	
07/92	62.9 J3	
08/92	<31.1 U	
08/92	<31.1 U	
03/01	<3.1 U	
07/02	0.22 J	
09/02	0.82	

IR01MW53B	Date	Conc.
05/91	<21.7 U	
01/92	<26.3 U	
08/92	<31.1 U	
03/01	NA	
07/02	<5 U	
09/02	0.25 J	
06/04	<5 U	
09/04	4.1 J	
12/04	16.2	
03/05	<5 UJ39	

IR01MWI-5	Date	Conc.
10/90	NA	
10/90	NA	
01/92	<32 U	
07/92	74.2	
07/92	78.7	
08/92	<31.1 U	
04/01	<15.5 U1	
07/02	9.11	
07/02	8	
09/02	5.27	

IR01MW26B	Date	Conc.
05/91	<21.7 U	
01/92	<32 U	
01/92	<32 U	
08/92	<31.1 U	
04/01	NA	
07/02	2.59	
09/02	0.37	
06/04	<5 U	
09/04	<6.5 U1	
12/04	29.1	
03/05	<5 U	

IR01MW366B	Date	Conc.
07/04	<5 U	
07/04	<5 U	
09/04	5.1	
09/04	5.2	
12/04	22	
03/05	<5 U	

IR01MWLF4B	Date	Conc.
07/04	<5 U	
09/04	7	
12/04	31.5	
03/05	<5 U	
03/05	<5 U	

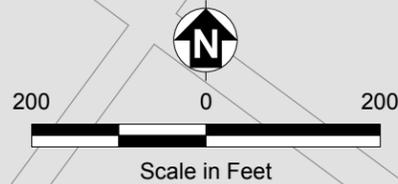
IR01MWI-3	Date	Conc.
10/90	NA	
01/92	<32 U	
07/92	NA	
07/92	NA	
08/92	<31.1 U	
03/96	11.3	
03/01	NA	
08/02	5.55	
09/02	3.14	
12/04	44.8 J9	
03/05	<5 UJ39	

IR01MW43A	Date	Conc.
03/91	27.1	
01/92	<32 U	
08/92	41.5	
08/92	49.1	
03/96	4.5 J9	
03/01	5.5 J	
07/02	<5 U	
09/02	2.44	
06/04	<5 UJ3	
09/04	<6.3 U1	
11/04	31.5	
03/05	<5 U	

IR01MW47B	Date	Conc.
01/92	<26.3 U	
07/92	<31.1 U	
08/92	<31.1 U	
03/01	NA	
03/01	NA	
07/02	NA	
06/04	<5 U	
06/04	<5 U	
09/04	<6.7 U1	
12/04	14	
03/05	<5 U	

IR01MW62A	Date	Conc.
01/92	27.5	
01/92	31.9	
07/92	46.9	
08/92	<31.1 U	
03/01	<3.1 U	
03/01	<3.1 U	
07/02	<5 U	
09/02	1.6	
06/04	<5 U	
09/04	13.9	
09/04	9.1	
11/04	26.2	
03/05	<5 U	
03/05	<5 U	

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	36
ESL-Non Drinking Water	36	NE
GDGI Basewide Criteria	36	50
Federal MCL	NE	10
State MCL	NE	50
HGAL	27.3	NE
RIEC	36	10



IR01MW62A	Date	Conc.
	01/92	2.7
	01/92	1.9
	07/92	69.6 ^{J3}
	08/92	2.8
	03/01	<4.1 U
	03/01	<4.1 U
	07/02	<4.3 U ¹
	09/02	3 ^J
	06/04	<5 U
	09/04	<5 U ^{J9}
	09/04	<5 U ^{J9}
	11/04	8.9
	03/05	<5 U
	03/05	<5 U

IR01MW403B	Date	Conc.
	07/04	27.7
	09/04	2.8 ^J
	12/04	7.8

IR01MW05A	Date	Conc.
	05/92	15.1
	05/92	17.3
	07/92	41.3
	08/92	4.6
	07/95	6.2
	03/01	<4.1 U
	08/02	3.8
	09/02	8 ^J

IR01MW18A	Date	Conc.
	05/92	<3 U ¹
	05/92	<2.8 U ¹
	05/92	<3.3 U ¹
	07/92	21.2
	07/92	5.1
	08/92	2.5
	04/01	NA
	04/01	NA
	07/02	50.4
	07/02	20.5
	09/02	50.8

IR01MWI-2	Date	Conc.
	10/90	NA
	10/90	NA
	01/92	15.5
	07/92	77.8
	08/92	15.5
	03/01	14.3
	08/02	16
	09/02	21.8 ^{J3}

IR01MW366B	Date	Conc.
	07/04	22.7
	07/04	<20.5 U ¹
	09/04	3.2 ^J
	09/04	2.7 ^J
	12/04	16.3
	03/05	<5

IR01MWLF4B	Date	Conc.
	07/04	14.4
	09/04	3.9 ^J
	12/04	<11.2 U ¹
	03/05	<5 U
	03/05	<5 U

IR04MW36A	Date	Conc.
	12/90	NA
	12/90	NA
	11/91	156
	11/91	149
	02/92	159
	02/92	169
	06/92	4.6
	03/01	156
	07/02	20.7
	09/02	149
	06/04	156
	09/04	143
	12/04	40.1
	03/05	138

IR01MWI-9	Date	Conc.
	10/90	NA
	01/92	2.2
	07/92	61.6
	08/92	6.2
	08/92	6.5
	03/01	<4.1 U
	07/02	<2 U
	09/02	4.5

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

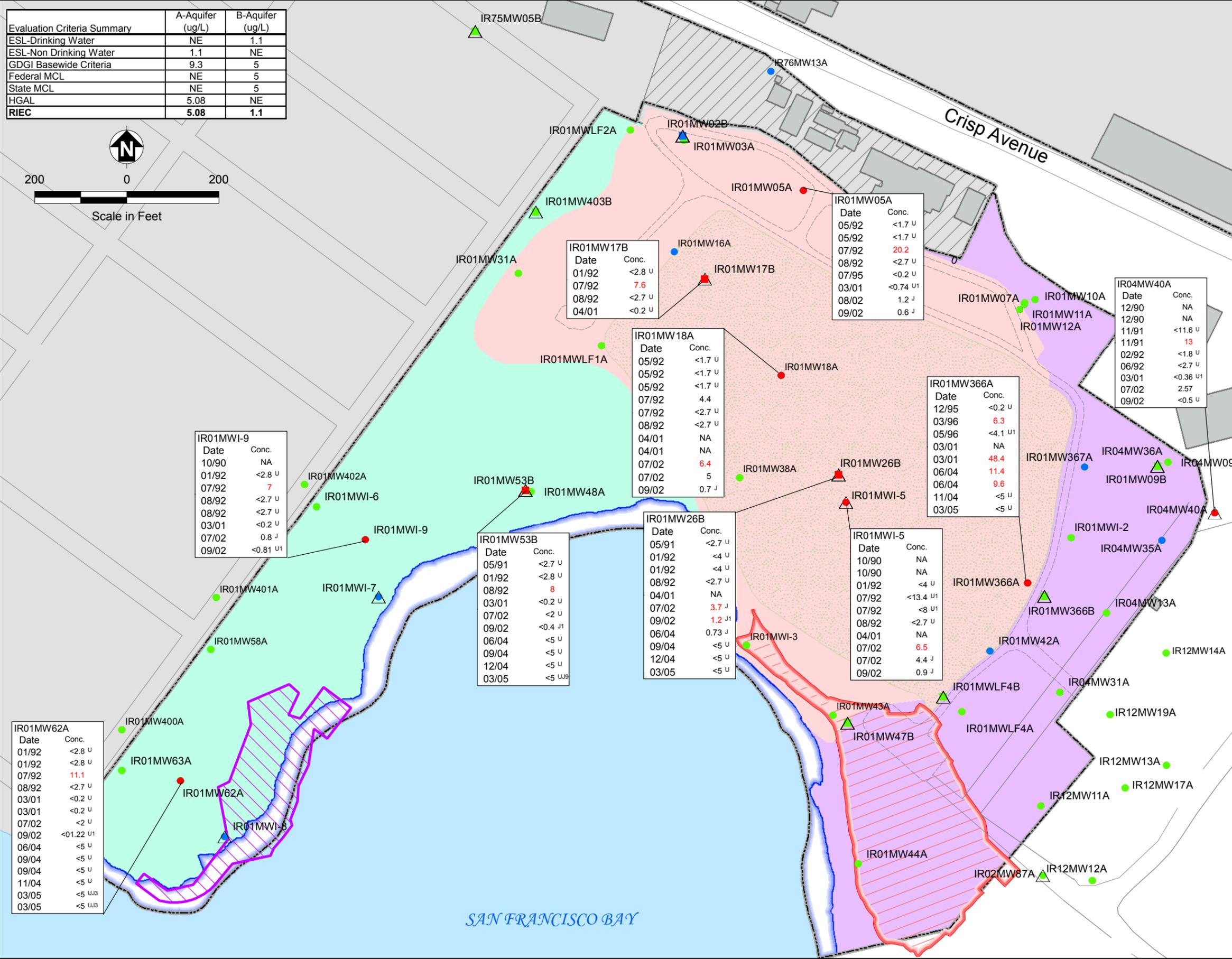
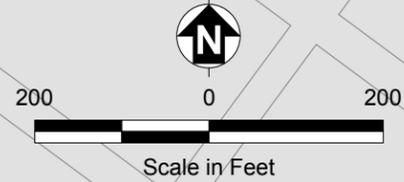
IR01MWLF1A	Date	Conc.
	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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FIGURE 5-6
ARSENIC
IN GROUNDWATER
 Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	1.1
ESL-Non Drinking Water	1.1	NE
GDGI Basewide Criteria	9.3	5
Federal MCL	NE	5
State MCL	NE	5
HGAL	5.08	NE
RIEC	5.08	1.1



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

IR01MWLF1A	← Well ID
Date	Conc.
07/04	2.1
09/04	8.4
11/04	2.5
03/05	0.57

Sample Date (mm/yy) → ← Concentration (ug/L)

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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-9
**CADMIUM
 IN GROUNDWATER**
 Remedial Investigation/Feasibility Study for Parcel E-2

IR01MW62A	Date	Conc.
	01/92	<2.8 U
	01/92	<2.8 U
	07/92	11.1
	08/92	<2.7 U
	03/01	<0.2 U
	03/01	<0.2 U
	07/02	<2 U
	09/02	<0.122 U ¹
	06/04	<5 U
	09/04	<5 U
	09/04	<5 U
	11/04	<5 U
	03/05	<5 U ³
	03/05	<5 U ³

IR01MWI-9	Date	Conc.
	10/90	NA
	01/92	<2.8 U
	07/92	7
	08/92	<2.7 U
	08/92	<2.7 U
	03/01	<0.2 U
	07/02	0.8 J
	09/02	<0.81 U ¹

IR01MW53B	Date	Conc.
	05/91	<2.7 U
	01/92	<2.8 U
	01/92	<2.8 U
	08/92	8
	03/01	<0.2 U
	07/02	<2 U
	09/02	<0.4 J ¹
	06/04	<5 U
	09/04	<5 U
	12/04	<5 U
	03/05	<5 U ³

IR01MW17B	Date	Conc.
	01/92	<2.8 U
	07/92	7.6
	08/92	<2.7 U
	04/01	<0.2 U

IR01MW18A	Date	Conc.
	05/92	<1.7 U
	05/92	<1.7 U
	05/92	<1.7 U
	07/92	4.4
	07/92	<2.7 U
	08/92	<2.7 U
	04/01	NA
	04/01	NA
	07/02	6.4
	07/02	5
	09/02	0.7 J

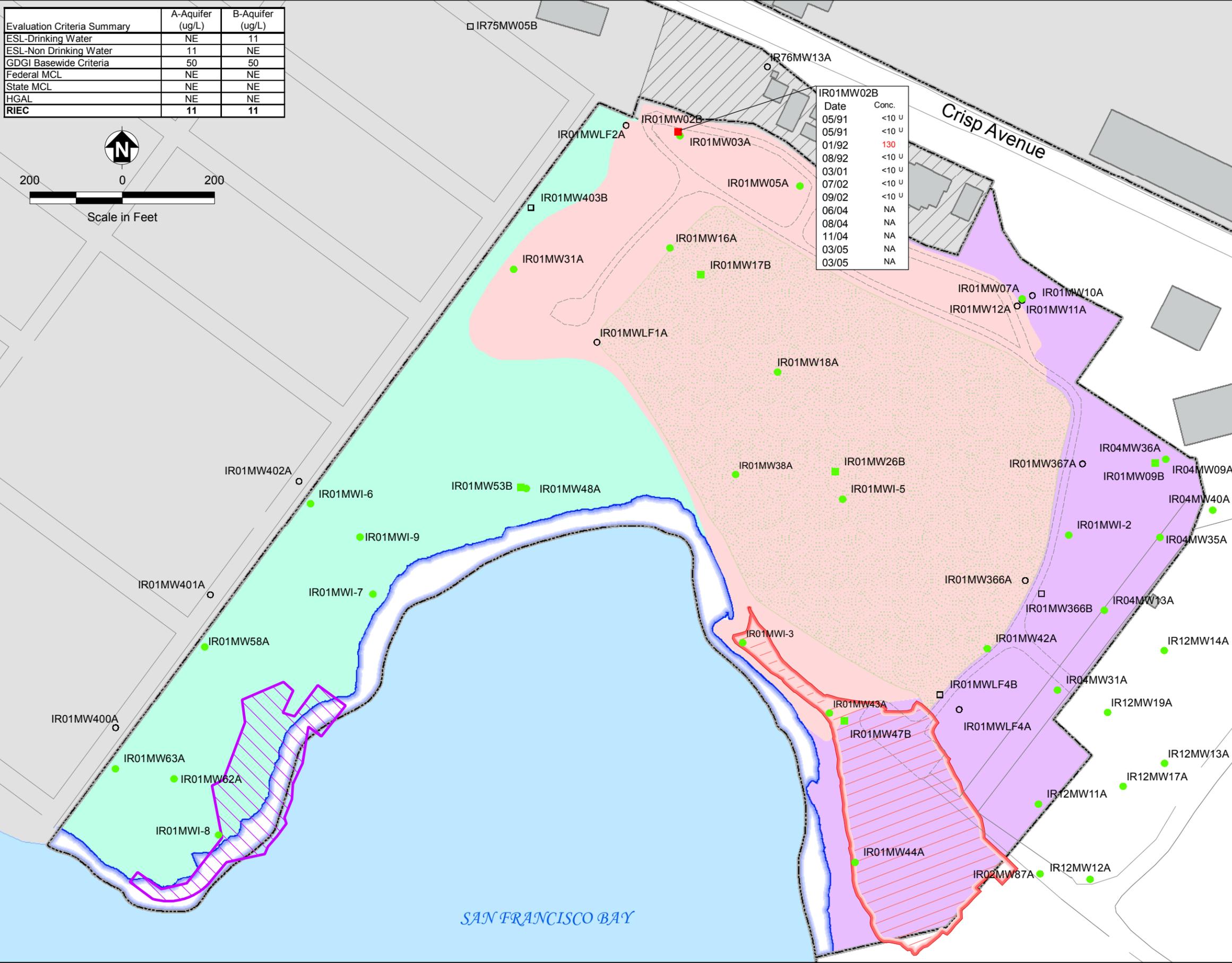
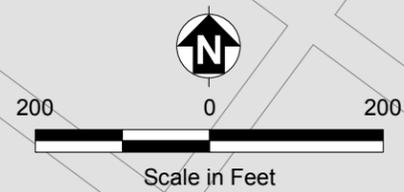
IR01MW26B	Date	Conc.
	05/91	<2.7 U
	01/92	<4 U
	01/92	<4 U
	08/92	<2.7 U
	04/01	NA
	07/02	3.7 J
	09/02	1.2 J ¹
	06/04	0.73 J
	09/04	<5 U
	12/04	<5 U
	03/05	<5 U

IR01MW05A	Date	Conc.
	05/92	<1.7 U
	05/92	<1.7 U
	07/92	20.2
	08/92	<2.7 U
	07/95	<0.2 U
	03/01	<0.74 U ¹
	08/02	1.2 J
	09/02	0.6 J

IR01MW366A	Date	Conc.
	12/95	<0.2 U
	03/96	6.3
	05/96	<4.1 U ¹
	03/01	NA
	03/01	48.4
	06/04	11.4
	06/04	9.6
	11/04	<5 U
	03/05	<5 U

IR04MW40A	Date	Conc.
	12/90	NA
	12/90	NA
	11/91	<11.6 U
	11/91	13
	02/92	<1.8 U
	06/92	<2.7 U
	03/01	<0.36 U ¹
	07/02	2.57
	09/02	<0.5 U

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	11
ESL-Non Drinking Water	11	NE
GDGI Basewide Criteria	50	50
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	11	11



Well ID	Date	Conc.
IR01MW02B	05/91	<10 U
	05/91	<10 U
	01/92	130
	08/92	<10 U
	03/01	<10 U
	07/02	<10 U
	09/02	<10 U
	06/04	NA
	08/04	NA
	11/04	NA
03/05	NA	
03/05	NA	

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

Sample Date (mm/yy) →

← Well ID

← Chemical Concentration (ug/L)

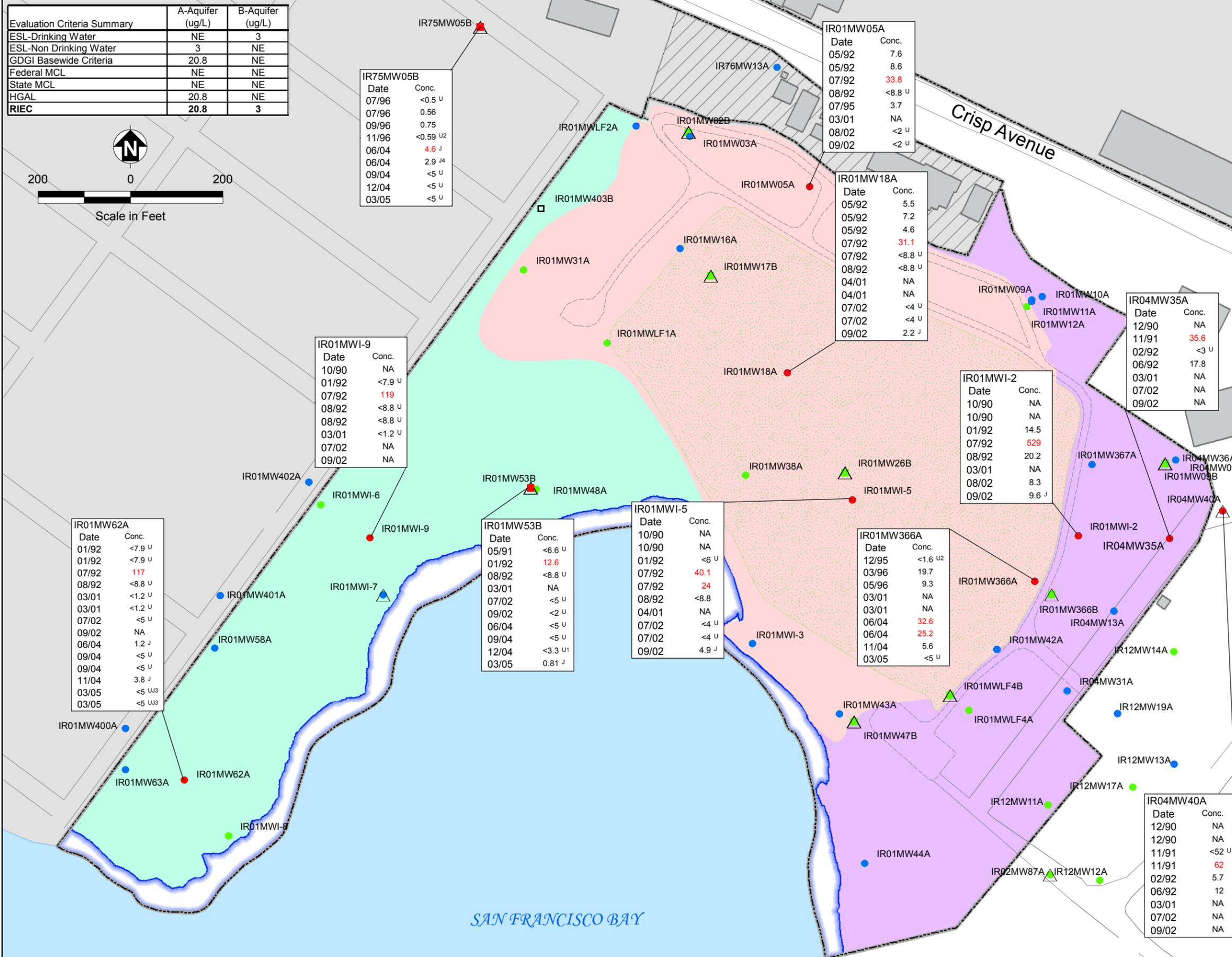
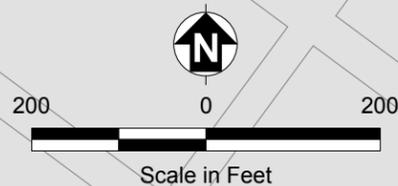
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-11
CHROMIUM VI
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	3
ESL-Non Drinking Water	3	NE
GDGI Basewide Criteria	20.8	NE
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	20.8	NE
RIEC	20.8	3



Date	Conc.
07/96	<0.5 U
07/96	0.56
09/96	0.75
11/96	<0.59 U ²
06/04	4.6 J
06/04	2.9 J ⁴
09/04	<5 U
12/04	<5 U
03/05	<5 U

Date	Conc.
05/92	7.6
05/92	8.6
07/92	33.8
08/92	<8.8 U
07/95	3.7
03/01	NA
08/02	<2 U
09/02	<2 U

Date	Conc.
05/92	5.5
05/92	7.2
05/92	4.6
07/92	31.1
07/92	<8.8 U
08/92	<8.8 U
04/01	NA
04/01	NA
07/02	<4 U
07/02	<4 U
09/02	2.2 J

Date	Conc.
12/90	NA
11/91	35.6
02/92	<3 U
06/92	17.8
03/01	NA
07/02	NA
09/02	NA

Date	Conc.
10/90	NA
10/90	NA
01/92	14.5
07/92	529
08/92	20.2
03/01	NA
08/02	8.3
09/02	9.6 J

Date	Conc.
10/90	NA
10/90	NA
01/92	<6 U
07/92	40.1
08/92	<8.8 U
04/01	NA
07/02	<4 U
07/02	<4 U
09/02	4.9 J

Date	Conc.
12/95	<1.6 U ²
03/96	19.7
05/96	9.3
03/01	NA
03/01	NA
06/04	32.6
06/04	25.2
11/04	5.6
03/05	<5 U

Date	Conc.
01/92	<7.9 U
01/92	<7.9 U
07/92	117
08/92	<8.8 U
03/01	<1.2 U
03/01	<1.2 U
07/02	<5 U
09/02	NA
06/04	1.2 J
09/04	<5 U
09/04	<5 U
11/04	3.8 J
03/05	<5 U ³
03/05	<5 U ³

Date	Conc.
05/91	<6.6 U
01/92	12.6
08/92	<8.8 U
03/01	NA
07/02	<5 U
09/02	<2 U
06/04	<5 U
09/04	<5 U
12/04	<3.3 U ¹
03/05	0.81 J

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
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- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
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 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

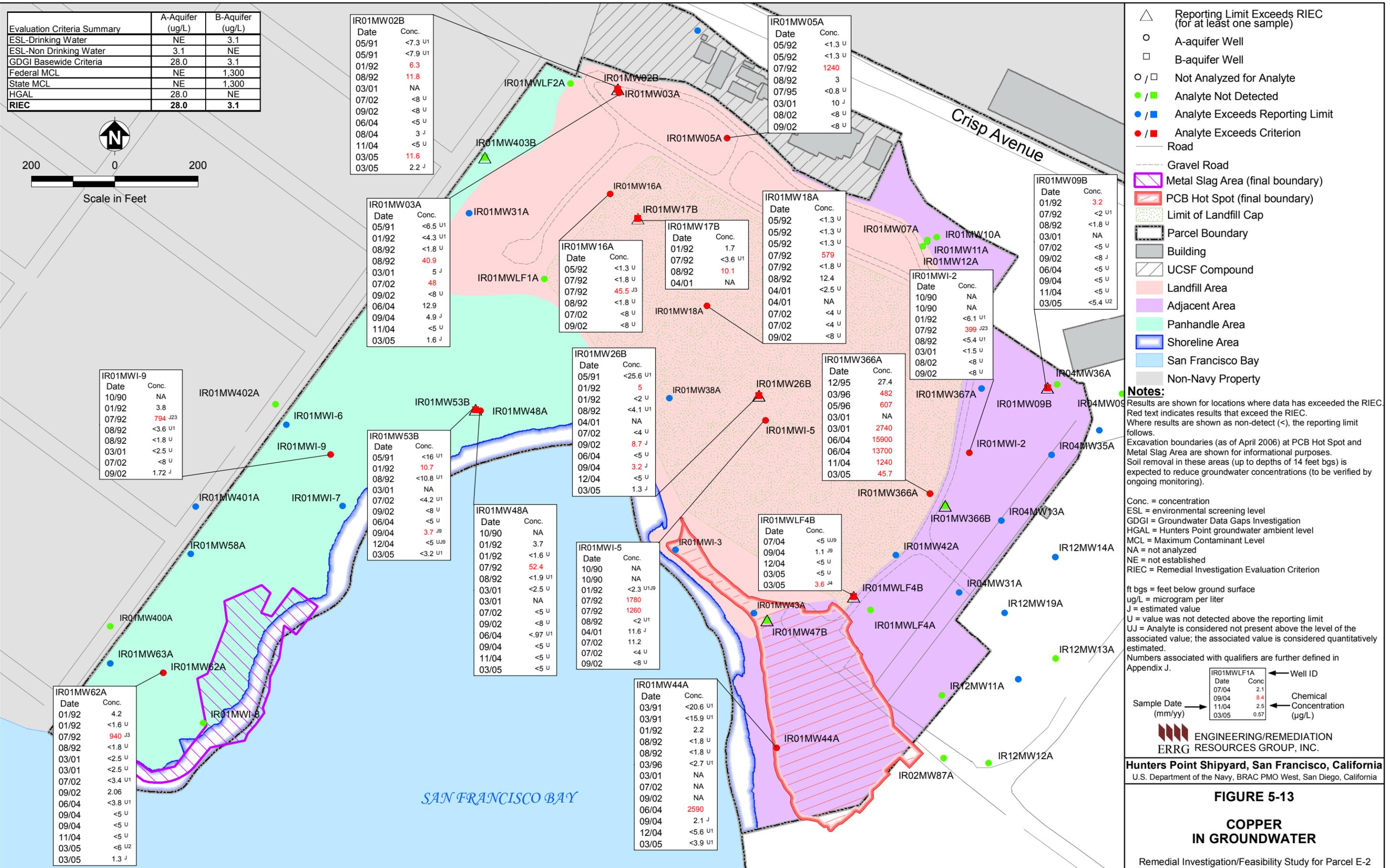
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Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

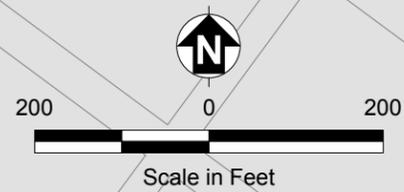
FIGURE 5-12

**COBALT
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	3.1
ESL-Non Drinking Water	3.1	NE
GDGI Basewide Criteria	28.0	3.1
Federal MCL	NE	1,300
State MCL	NE	1,300
HGAL	28.0	NE
RIEC	28.0	3.1



IR01MW02B	Date	Conc.
	05/91	<7.3 U1
	05/91	<7.9 U1
	01/92	6.3
	08/92	11.8
	03/01	NA
	07/02	<8 U
	09/02	<8 U
	06/04	<5 U
	08/04	3 J
	11/04	<5 U
	03/05	11.6
	03/05	2.2 J

IR01MW05A	Date	Conc.
	05/92	<1.3 U
	05/92	<1.3 U
	07/92	1240
	08/92	3
	07/95	<0.8 U
	03/01	10 J
	08/02	<8 U
	09/02	<8 U

IR01MW09B	Date	Conc.
	01/92	3.2
	07/92	<2 U1
	08/92	<1.8 U
	03/01	NA
	07/02	<5 U
	09/02	<8 U
	06/04	<5 U
	09/04	<5 U
	11/04	<5 U
	03/05	<5.4 U2

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Concentration (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.6
03/05	IR01MWLF1A	0.57

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ERRG RESOURCES GROUP, INC.**

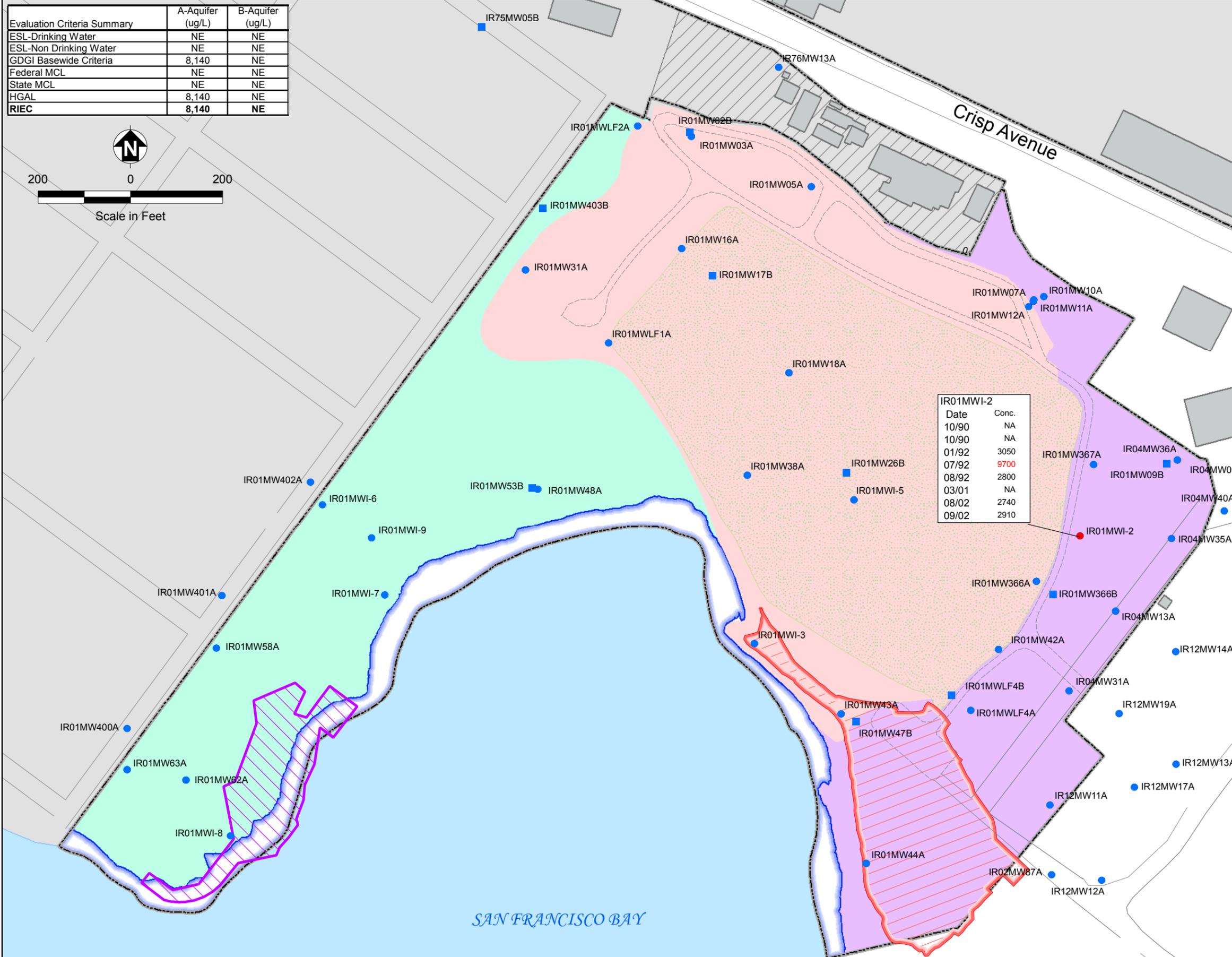
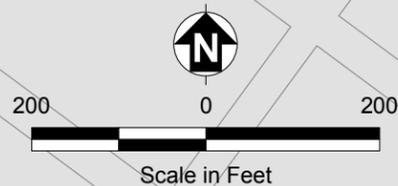
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-13

**COPPER
IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	NE
ESL-Non Drinking Water	NE	NE
GDGI Basewide Criteria	8,140	NE
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	8,140	NE
RIEC	8,140	NE



IR01MWI-2	
Date	Conc.
10/90	NA
10/90	NA
01/92	3050
07/92	9700
08/92	2800
03/01	NA
08/02	2740
09/02	2910

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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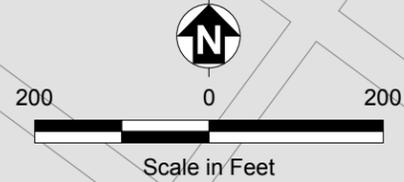
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-15

MANGANESE IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.012
ESL-Non Drinking Water	0.012	NE
GDGI Basewide Criteria	0.34	0.34
Federal MCL	NE	2
State MCL	NE	2
HGAL	0.60	NE
RIEC	0.60	0.012



IR01MW02B	
Date	Conc.
05/91	<0.2 U
05/91	<0.2 U
01/92	<0.2 U
08/92	0.36
03/01	NA
07/02	<0.1 U
09/02	<0.1 U
06/04	<0.2 U
08/04	<0.2 U
11/04	<0.2 U
03/05	<0.2 U
03/05	<0.2 U

IR01MW05A	
Date	Conc.
05/92	0.59 J3
05/92	0.2 J3
07/92	4.6
08/92	<0.2 U
07/95	<0.1 U
03/01	<0.1 U
08/02	<0.1 U
09/02	<0.1 U

IR01MW18A	
Date	Conc.
05/92	0.29 J3
05/92	<0.14 UJ3
05/92	<0.14 UJ3
07/92	2.2
07/92	<0.2 U
08/92	<0.2 U
04/01	<0.1 U
04/01	NA
07/02	<0.12 U1
07/02	<0.11 U1
09/02	0.16 J

IR01MWI-2	
Date	Conc.
10/90	NA
10/90	NA
01/92	<0.2 U
07/92	1.1
08/92	<0.2 U
03/01	<0.1 U
08/02	NA
09/02	<0.1 U

IR01MW366A	
Date	Conc.
12/95	<0.5 U1
03/96	5.3
05/96	1.9
03/01	NA
03/01	8.1
06/04	325
06/04	180
11/04	14.4
03/05	2.2

IR01MWI-5	
Date	Conc.
10/90	NA
10/90	NA
01/92	<0.2 U
07/92	6.5
07/92	4.6
08/92	<0.2 U
04/01	<0.1 U
07/02	<0.1 U
07/02	<0.16 U1
09/02	<0.1 U

IR01MW44A	
Date	Conc.
03/91	<0.2 U
03/91	<0.2 U
01/92	<0.2 U
08/92	<0.2 U
08/92	<0.2 U
03/96	<0.1 U
03/01	NA
07/02	NA
09/02	NA
06/04	7.2
09/04	<0.097 U1
12/04	<0.2 U
03/05	<0.2 U

IR01MW62A	
Date	Conc.
01/92	<0.2 U
01/92	<0.2 U
07/92	4.4
08/92	<0.2 U
03/01	<0.1 U
03/01	<0.1 U
07/02	<0.2 U
09/02	0.11 J2
06/04	<0.097 U1
09/04	<0.2 U
09/04	<0.2 U
11/04	<0.2 U
03/05	<0.2 U
03/05	<0.2 U

IR01MWI-9	
Date	Conc.
10/90	NA
01/92	<0.2 U
07/92	10
08/92	<0.2 U
08/92	<0.2 U
03/01	<0.1 U
07/02	<0.1 U
09/02	<0.1 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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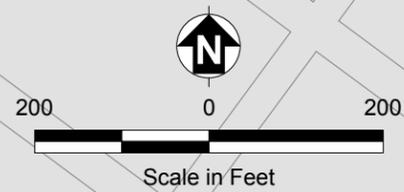
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FIGURE 5-16

**MERCURY
IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	8.2
ESL-Non Drinking Water	8.2	NE
GDGI Basewide Criteria	96.5	82
Federal MCL	NE	NE
State MCL	NE	100
HGAL	96.5	NE
RIEC	96.5	8.2



IR75MW05B	
Date	Conc.
07/96	8.5
07/96	9.1
09/96	11.5
11/96	13.1
06/04	85.5
06/04	57.5
09/04	15.3
12/04	11.3
03/05	13.1

IR01MW02B	
Date	Conc.
05/91	15.3
05/91	<14.5 U
01/92	<17 U
08/92	75.7
03/01	NA
07/02	2 J
09/02	3.1 J
06/04	<5 U
08/04	<5 U
11/04	<5 U
03/05	<5 U ³
03/05	<5 U ³

IR01MW05A	
Date	Conc.
05/92	157
05/92	163
07/92	780
08/92	68.2
07/95	118
03/01	50.1
08/02	28.8
09/02	23.4

IR01MW18A	
Date	Conc.
05/92	113
05/92	103
05/92	110
07/92	762
07/92	54.9
08/92	47.5
04/01	103
04/01	109
07/02	25.7
07/02	35.4
09/02	19.3 J

IR01MW17B	
Date	Conc.
01/92	<28.8 U
07/92	<17.3 U
08/92	31.3
04/01	NA

IR01MWI-2	
Date	Conc.
10/90	NA
10/90	NA
01/92	119 J ³
07/92	6260 J ²
08/92	111
03/01	180
08/02	33.7
09/02	35.6

IR04MW35A	
Date	Conc.
12/90	NA
11/91	147
02/92	11.5
06/92	46.1
03/01	28.9 J
07/02	41.5
09/02	38.9

IR01MWI-9	
Date	Conc.
10/90	NA
01/92	<28.8 U
07/92	1080 J ²
08/92	<17.3 U
08/92	<17.3 U
03/01	13.6 J
07/02	8.2 J
09/02	7.2 J

IR01MW62A	
Date	Conc.
01/92	33.6
01/92	<28.8 U
07/92	740
08/92	<17.3 U
03/01	2.2 J
03/01	2.6 J
07/02	<20 U
09/02	<0.9 U
06/04	<5 U
09/04	<5 U
09/04	6.1
11/04	<5 U
03/05	<5 U ³
03/05	<5 U ³

IR01MW53B	
Date	Conc.
05/91	<14.5 U
01/92	<28.8 U
08/92	<17.3 U
03/01	NA
07/02	<16 U ¹
09/02	68.3
06/04	<5 U
09/04	<5 U
12/04	9.2
03/05	5.5

IR01MWI-5	
Date	Conc.
10/90	NA
10/90	NA
01/92	33.9
07/92	476
07/92	366
08/92	60.4
04/01	139
07/02	94
07/02	71.2
09/02	56.3

IR01MW366A	
Date	Conc.
12/95	19.3
03/96	101
05/96	38
03/01	NA
03/01	129
06/04	222
06/04	164
11/04	12.3
03/05	9.6

IR01MWI-3	
Date	Conc.
10/90	NA
01/92	28.4
07/92	80.7 J ²⁴⁹
07/92	87 J ²
08/92	63
03/96	315
03/01	19.4 J
08/02	11.3 J
09/02	13.9 J
12/04	8
03/05	6.4

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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FIGURE 5-17

**NICKEL
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

SAN FRANCISCO BAY

Crisp Avenue

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	5
ESL-Non Drinking Water	5	NE
GDGI Basewide Criteria	71	50
Federal MCL	NE	50
State MCL	NE	50
HGAL	14.5	NE
RIEC	14.5	5

IR75MW05B	
Date	Conc.
07/96	<3.9 U
07/96	<3.9 U
09/96	<3.9 U
11/96	<3.1 U ¹
06/04	<5 U
06/04	<5 U
09/04	<9.8 U ¹
12/04	<5 U
03/05	7.9

IR01MW26B	
Date	Conc.
05/91	<2.3 U
01/92	<1 U
01/92	<1 U
08/92	<2.9 U
04/01	NA
07/02	<5 U
09/02	<1 U ^{J3}
06/04	<5 U
09/04	10.3
12/04	<5 U ^{J3}
03/05	<5 U

IR01MWI-8	
Date	Conc.
01/92	NA
08/92	<29 U
03/96	<2.3 U ^{J3}
03/01	<4.2 U
07/02	<5 U ^{J13}
09/02	22.8 J ³
03/05	21.3 J

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Concentration (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.6
03/05	IR01MWLF1A	0.57

ENGINEERING/REMEDiation
 ERRG RESOURCES GROUP, INC.

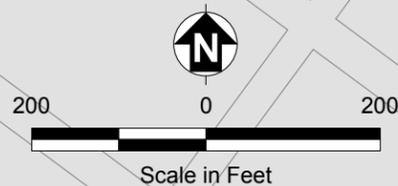
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-18

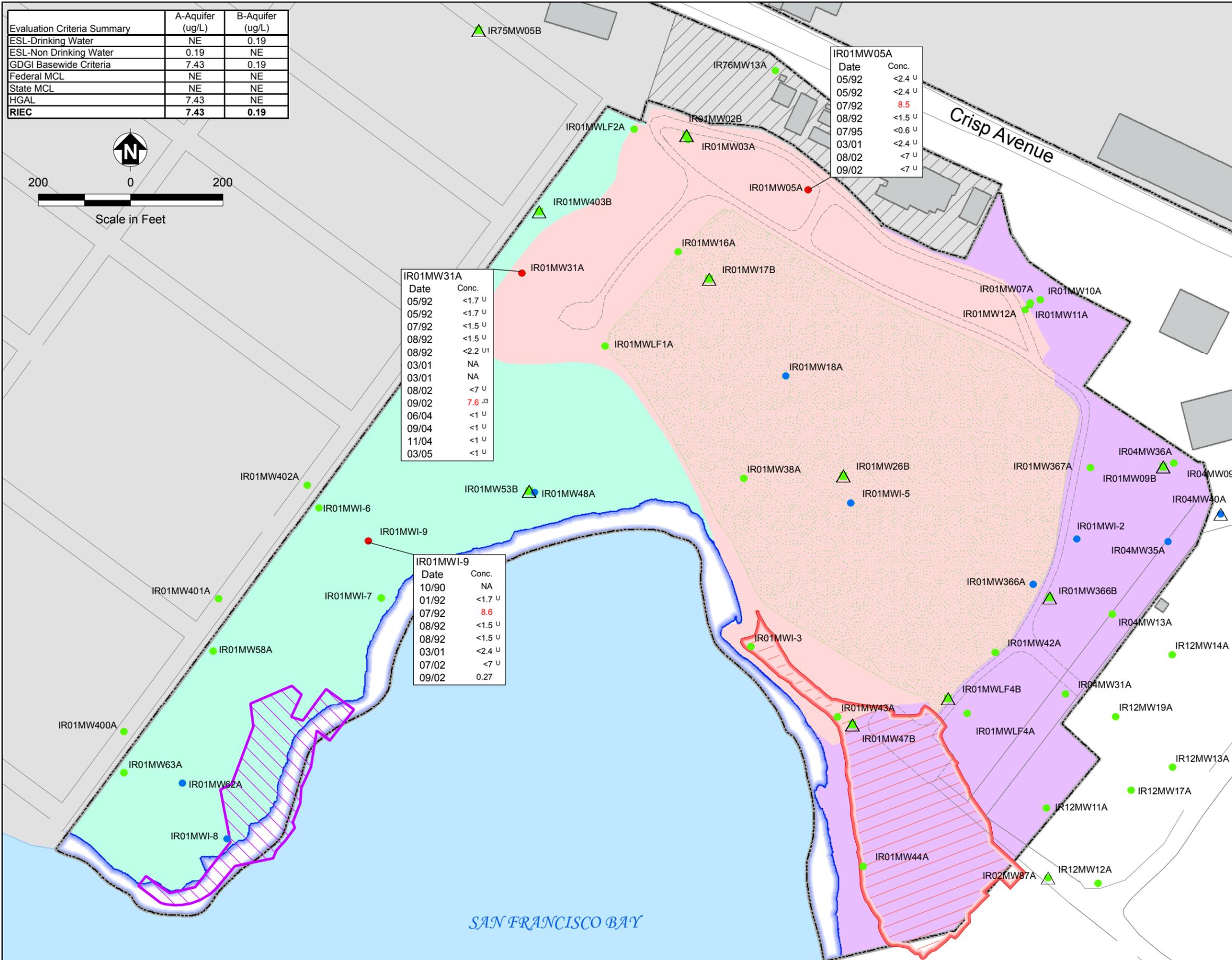
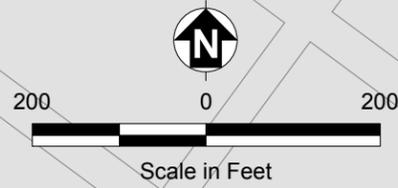
**SELENIUM
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

SAN FRANCISCO BAY



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.19
ESL-Non Drinking Water	0.19	NE
GDGI Basewide Criteria	7.43	0.19
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	7.43	NE
RIEC	7.43	0.19



IR01MW05A	
Date	Conc.
05/92	<2.4 U
05/92	<2.4 U
07/92	8.5
08/92	<1.5 U
07/95	<0.6 U
03/01	<2.4 U
08/02	<7 U
09/02	<7 U

IR01MW31A	
Date	Conc.
05/92	<1.7 U
05/92	<1.7 U
07/92	<1.5 U
08/92	<1.5 U
08/92	<2.2 U ^J
03/01	NA
03/01	NA
08/02	<7 U
09/02	7.6 J ³
06/04	<1 U
09/04	<1 U
11/04	<1 U
03/05	<1 U

IR01MWI-9	
Date	Conc.
10/90	NA
01/92	<1.7 U
07/92	8.6
08/92	<1.5 U
08/92	<1.5 U
03/01	<2.4 U
07/02	<7 U
09/02	0.27

IR01MWLF1A	
Date	Conc.
07/04	2.1
09/04	8.4
11/04	2.5
03/05	0.57

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
 Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion
 ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

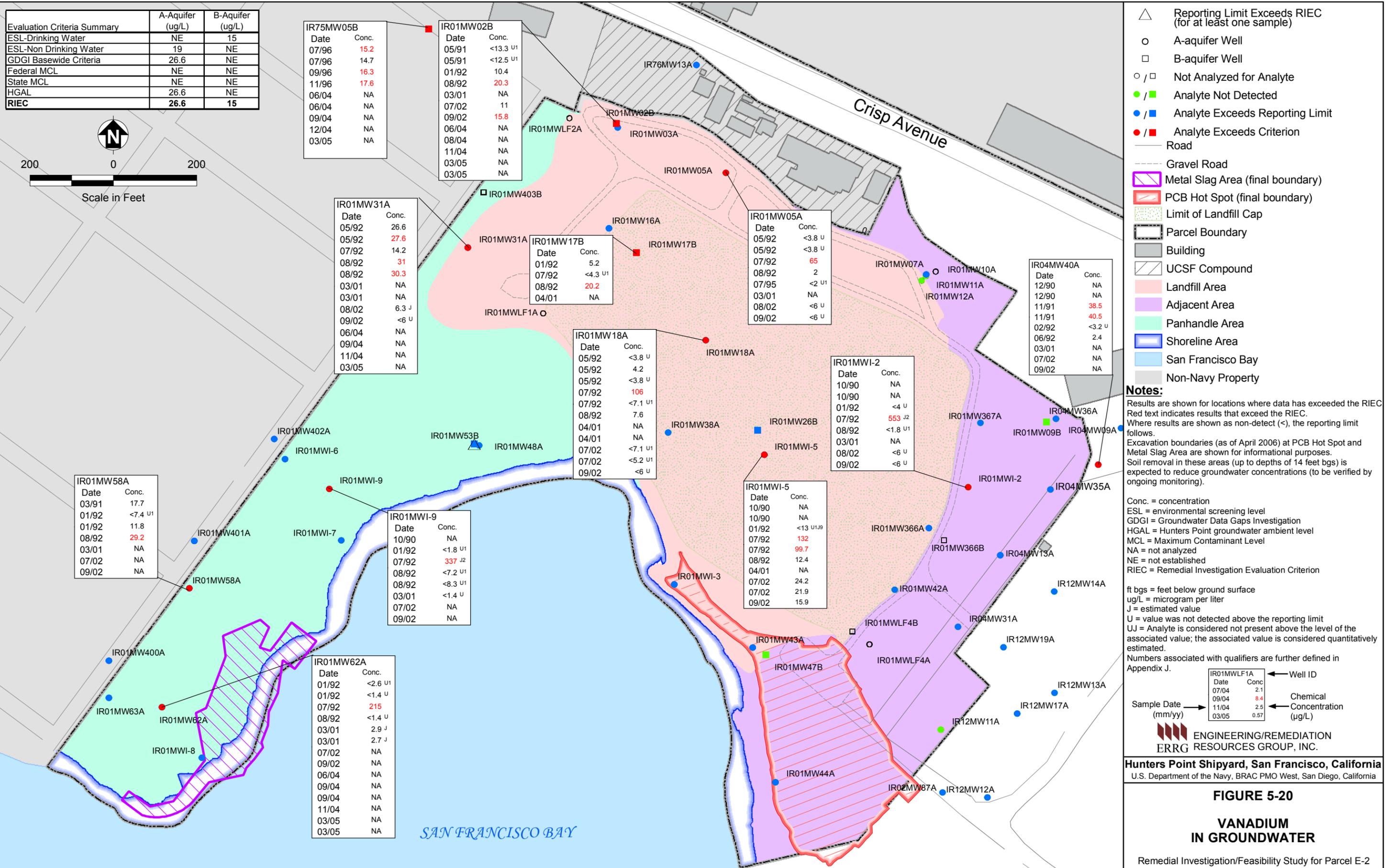
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FIGURE 5-19

**SILVER
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2



IR75MW05B

Date	Conc.
07/96	15.2
07/96	14.7
09/96	16.3
11/96	17.6
06/04	NA
06/04	NA
09/04	NA
12/04	NA
03/05	NA

IR01MW02B

Date	Conc.
05/91	<13.3 U ¹
05/91	<12.5 U ¹
01/92	10.4
08/92	20.3
03/01	NA
07/02	11
09/02	15.8
06/04	NA
08/04	NA
11/04	NA
03/05	NA
03/05	NA

IR01MW31A

Date	Conc.
05/92	26.6
05/92	27.6
07/92	14.2
08/92	31
08/92	30.3
03/01	NA
03/01	NA
08/02	6.3 J
09/02	<6 U
06/04	NA
09/04	NA
11/04	NA
03/05	NA

IR01MW17B

Date	Conc.
01/92	5.2
07/92	<4.3 U ¹
08/92	20.2
04/01	NA

IR01MW05A

Date	Conc.
05/92	<3.8 U
05/92	<3.8 U
07/92	65
08/92	2
07/95	<2 U ¹
03/01	NA
08/02	<6 U
09/02	<6 U

IR01MW18A

Date	Conc.
05/92	<3.8 U
05/92	4.2
05/92	<3.8 U
07/92	106
07/92	<7.1 U ¹
08/92	7.6
04/01	NA
04/01	NA
07/02	<7.1 U ¹
07/02	<5.2 U ¹
09/02	<6 U

IR01MWI-2

Date	Conc.
10/90	NA
10/90	NA
01/92	<4 U
07/92	553 J ²
08/92	<1.8 U ¹
03/01	NA
08/02	<6 U
09/02	<6 U

IR01MWI-5

Date	Conc.
10/90	NA
10/90	NA
01/92	<13 U ^{1,39}
07/92	132
07/92	99.7
08/92	12.4
04/01	NA
07/02	24.2
07/02	21.9
09/02	15.9

IR04MW40A

Date	Conc.
12/90	NA
12/90	NA
11/91	38.5
11/91	40.5
02/92	<3.2 U
06/92	2.4
03/01	NA
07/02	NA
09/02	NA

IR01MW58A

Date	Conc.
03/91	17.7
01/92	<7.4 U ¹
01/92	11.8
08/92	29.2
03/01	NA
07/02	NA
09/02	NA

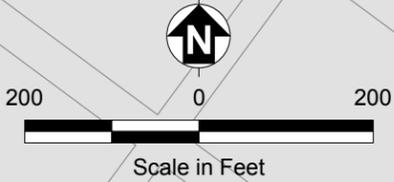
IR01MWI-9

Date	Conc.
10/90	NA
01/92	<1.8 U ¹
07/92	337 J ²
08/92	<7.2 U ¹
08/92	<8.3 U ¹
03/01	<1.4 U
07/02	NA
09/02	NA

IR01MW62A

Date	Conc.
01/92	<2.6 U ¹
01/92	<1.4 U
07/92	215
08/92	<1.4 U
03/01	2.9 J
03/01	2.7 J
07/02	NA
09/02	NA
06/04	NA
09/04	NA
09/04	NA
11/04	NA
03/05	NA
03/05	NA

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	81
ESL-Non Drinking Water	81	NE
GDGI Basewide Criteria	81	81
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	75.7	NE
RIEC	81	81



IR01MW03A	
Date	Conc.
05/91	16.6
01/92	<30.8 U1
08/92	<16.5 U
08/92	152
03/01	16.5 J
07/02	97
09/02	<8 U1
06/04	<50 UJ3
09/04	<50 U
11/04	<50 U
03/05	<50 UJ3

IR01MW05A	
Date	Conc.
05/92	114
05/92	108
07/92	3920
08/92	128
07/95	71.7 J4
03/01	45.5
08/02	9.6 J
09/02	<5.5 U2

IR01MW16A	
Date	Conc.
05/92	22.9
07/92	<16.5 U
07/92	255
08/92	<16.5 U
07/02	<3.7 U2
09/02	<2.3 U2

IR01MW18A	
Date	Conc.
05/92	28.5
05/92	20.3
05/92	27.2
07/92	1060
07/92	<16.5 U
08/92	52.6
04/01	<4.8 U
04/01	NA
07/02	<2 U
07/02	2.7 J
09/02	<3.3 U1

IR01MW367A	
Date	Conc.
11/95	111
03/96	<14.7 U1
05/96	<7.3 U1
03/01	5.8 J
07/02	<6.5 U2
09/02	<2.2 U1

IR01MWI-2	
Date	Conc.
10/90	NA
10/90	NA
01/92	<4.7 U1
07/92	632 J2
08/92	<16.5 U
03/01	9.3 J
08/02	<2 U
09/02	9.6 J

IR01MW366A	
Date	Conc.
12/95	<34.2 U2
03/96	682
05/96	537
03/01	NA
03/01	6840
06/04	3870
06/04	2740
11/04	243
03/05	<50 U

IR01MWI-5	
Date	Conc.
10/90	NA
10/90	NA
01/92	<11.2 U1J9
07/92	3540
07/92	2510
08/92	<16.5 U
04/01	5.1 J
07/02	28.8
07/02	12.8
09/02	<7.3 U1

IR01MW48A	
Date	Conc.
10/90	NA
01/92	<3.8 U1
01/92	<2.6 U1
07/92	164
08/92	<16.5 U
03/01	<4.8 U
03/01	NA
07/02	<10 U
06/04	<50 U
09/04	<50 U
11/04	<50 U
03/05	<50 U

IR01MWI-9	
Date	Conc.
10/90	NA
01/92	<2.6 U1
07/92	2560 J2
08/92	<16.5 U
08/92	<16.5 U
03/01	<4.8 U
07/02	<2.6 U2
09/02	<3.3 U2

IR01MWI-3	
Date	Conc.
10/90	NA
01/92	19
07/92	<16.5 U
07/92	<16.5 U
08/92	<16.5 U
03/96	323
03/01	<4.8 U
08/02	12.2
09/02	13.9
12/04	<50 U
03/05	<50 U

IR01MW43A	
Date	Conc.
03/91	66.3
01/92	36.1
08/92	<16.5 U
08/92	18.7
03/96	<8.4 U1J9
03/01	NA
07/02	NA
09/02	2.7 J
06/04	<50 UJ3
09/04	<50 U
11/04	136
03/05	<50 U

IR01MW44A	
Date	Conc.
03/91	235
03/91	226
01/92	<8.4 U1
08/92	22.8
08/92	20.5
03/96	<19 U1
03/01	34.4
07/02	44.5
09/02	136
06/04	1980
09/04	<50 U
12/04	143
03/05	<50 U

IR01MW62A	
Date	Conc.
01/92	<1.9 U
01/92	<3 U1
07/92	5050
08/92	<16.5 U
03/01	<4.8 U
03/01	<4.8 U
07/02	<10 U
09/02	<2 U
06/04	<50 UJ3
09/04	<50 U
09/04	<50 U
11/04	<50 U
03/05	<50 UJ3
03/05	<50 UJ3

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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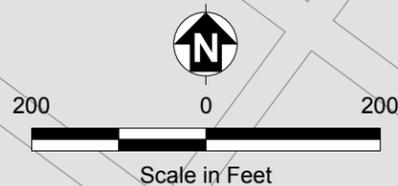
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FIGURE 5-21

ZINC
 IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.001
ESL-Non Drinking Water	0.001	NE
GDGI Basewide Criteria	0.36	0.36
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.001	0.001



IR01MW402A	
Date	Conc.
06/96	0.06 J
09/96	<0.1 U
09/96	<0.1 U
11/96	<0.1 U
04/01	NA
04/01	NA
07/02	NA
09/02	NA

IR01MW38A	
Date	Conc.
05/91	<0.5 U
01/92	<0.1 U
01/92	<0.1 U
08/92	<1 U
08/02	<0.47 U
09/02	<0.094 U
06/04	0.022 J
09/04	<0.05 U
11/04	0.016 J
03/05	0.0064 J

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Date	Conc.	Chemical Concentration (ug/L)
	IR01MWLF1A	07/04	2.1	
		09/04	8.4	
		11/04	2.6	
		03/05	0.57	

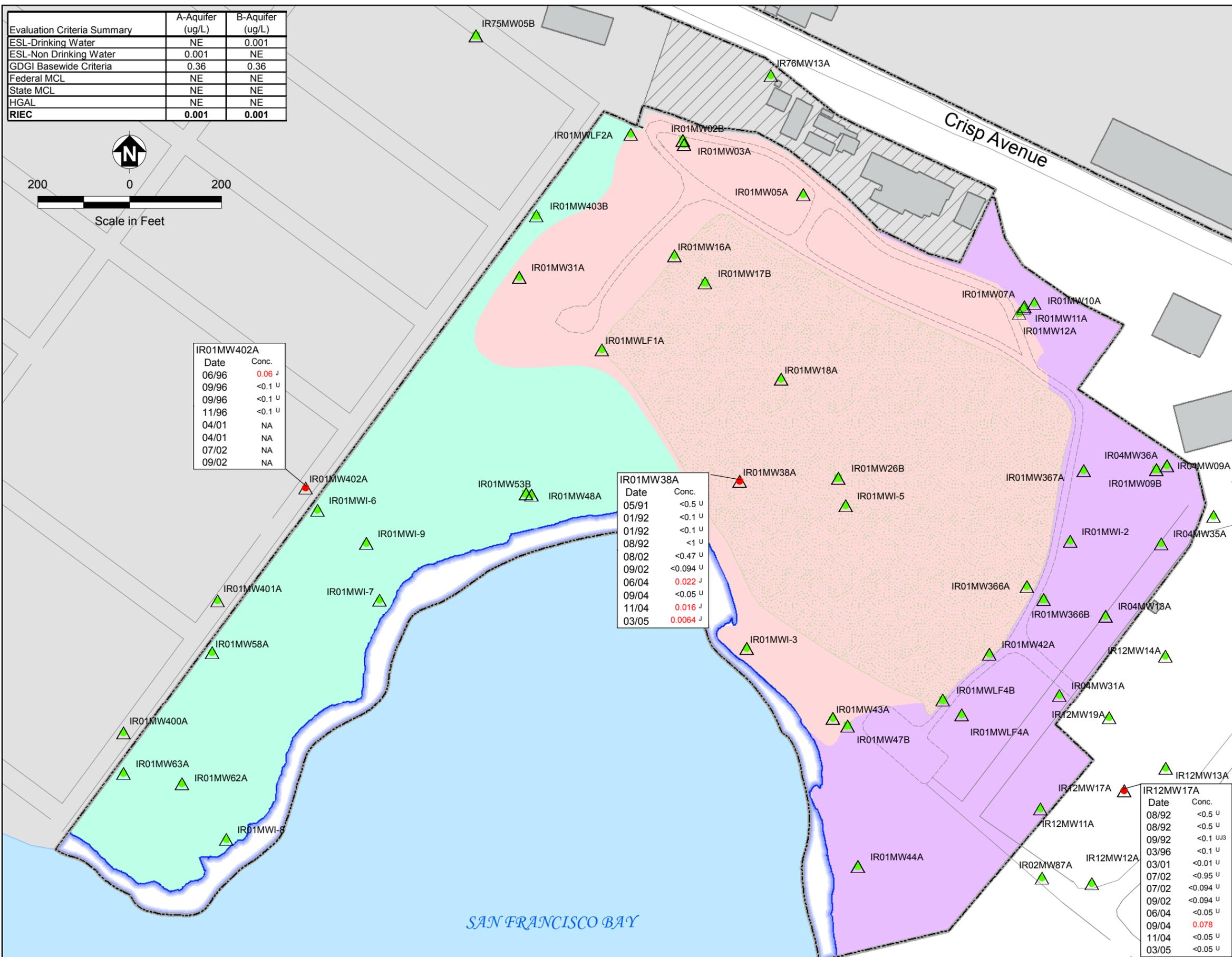
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

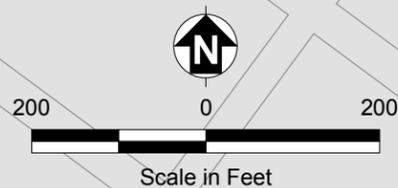
FIGURE 5-22

**4,4'-DDD
IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.001
ESL-Non Drinking Water	0.001	NE
GDGI Basewide Criteria	0.001	0.001
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.001	0.001



IR01MW03A	
Date	Conc.
05/91	<0.5 U
01/92	<0.1 U
08/92	<0.1 U
08/92	<0.1 U
03/01	<0.01 U
07/02	0.011 J
09/02	<0.019 U
06/04	0.0071 J
09/04	<0.05 U
11/04	<0.05 U
03/05	0.01 J

IR01MW31A	
Date	Conc.
05/92	<0.1 U
05/92	<0.5 U
07/92	<0.5 U
08/92	NA
08/92	NA
03/01	<0.01 J
08/02	0.013 J
09/02	<0.038 U
09/02	<0.19 U
06/04	<0.05 U
09/04	<0.05 U
11/04	<0.05 U
03/05	<0.05 UJ7

IR01MW18A	
Date	Conc.
05/92	<0.1 U
05/92	<0.1 U
05/92	<0.1 U
07/92	<0.5 U
07/92	<0.5 U
08/92	<0.5 U
04/01	<0.01 U
07/02	0.028
07/02	0.035
09/02	<0.019 U
09/02	NA

IR01MW366A	
Date	Conc.
12/95	<0.1 U
03/96	<0.1 U
05/96	<0.1 U
06/04	NA
06/04	0.053
11/04	<0.05 U
03/05	<0.05 U

IR01MWI-3	
Date	Conc.
01/92	<1 U
01/92	NA
07/92	<3 U
07/92	<0.5 U
08/92	<1 U
03/96	<0.1 U
03/01	0.02
08/02	0.025
09/02	<0.019 U
12/04	<0.05 U
03/05	<0.05 U

IR01MW44A	
Date	Conc.
03/91	<1 U
03/91	<1 U
01/92	<1 U
01/92	NA
08/92	<2 U
08/92	<2 U
03/96	<0.1 U
03/01	0.03 J9
07/02	<0.019 U
09/02	<0.019 U
06/04	<0.05 U
09/04	<0.15 U
12/04	<0.1 U
03/05	<0.1 U

IR12MW17A	
Date	Conc.
08/92	<0.5 U
08/92	<0.5 U
09/92	<0.1 UJ3
03/96	<0.1 U
03/01	0.008 J
07/02	<0.19 U
07/02	<0.019 U
09/02	<0.019 U
06/04	<0.05 U
09/04	<0.05 U
11/04	<0.05 U
03/05	<0.05 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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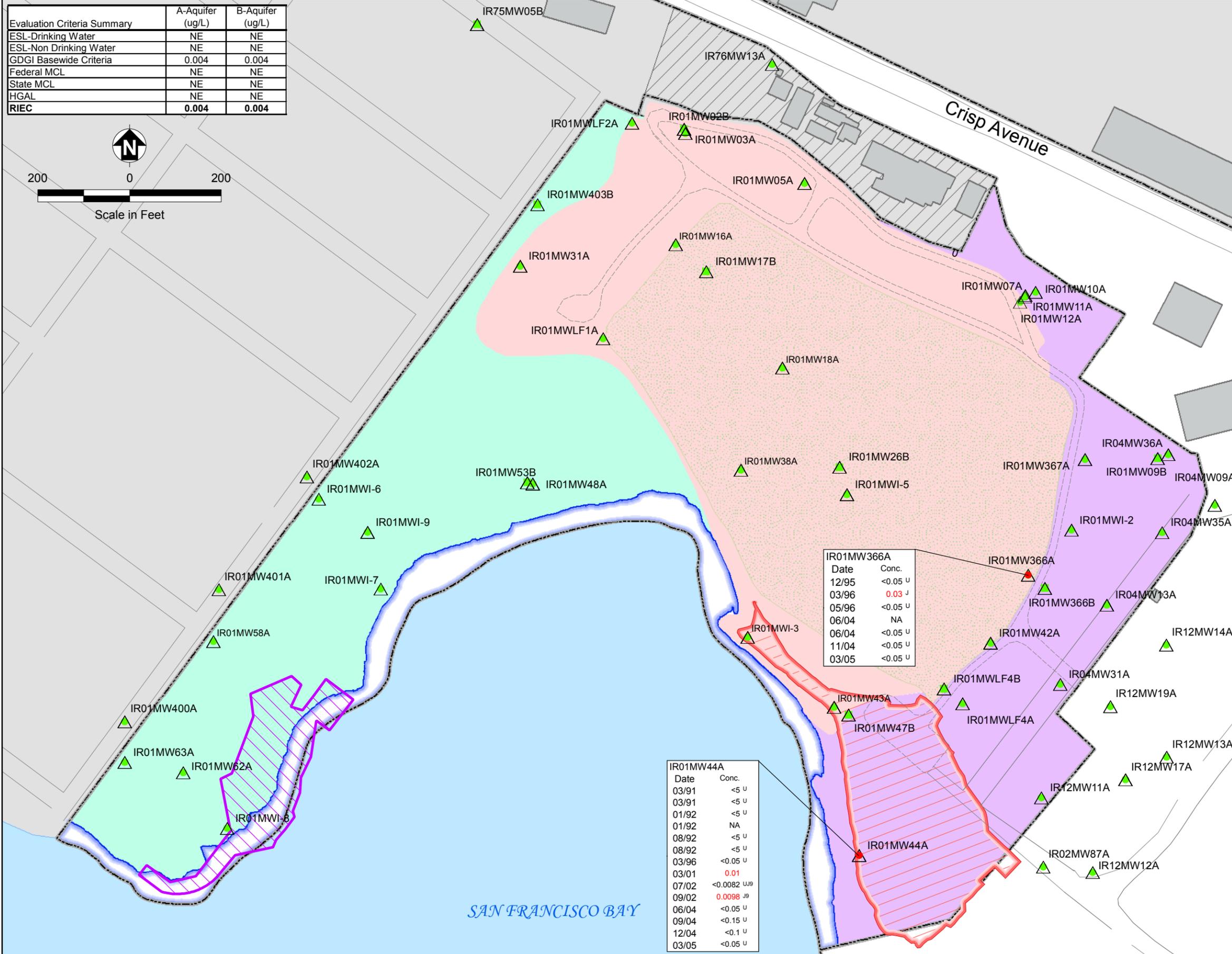
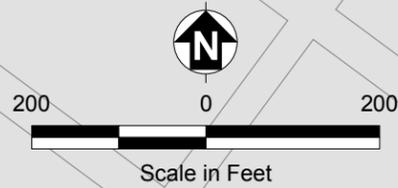
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FIGURE 5-24

4,4'-DDT
 IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	NE
ESL-Non Drinking Water	NE	NE
GDGI Basewide Criteria	0.004	0.004
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.004	0.004



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
 Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion
 ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

IR01MW366A	Date	Conc.
	12/95	<0.05 U
	03/96	0.03 J
	05/96	<0.05 U
	06/04	NA
	06/04	<0.05 U
	11/04	<0.05 U
	03/05	<0.05 U

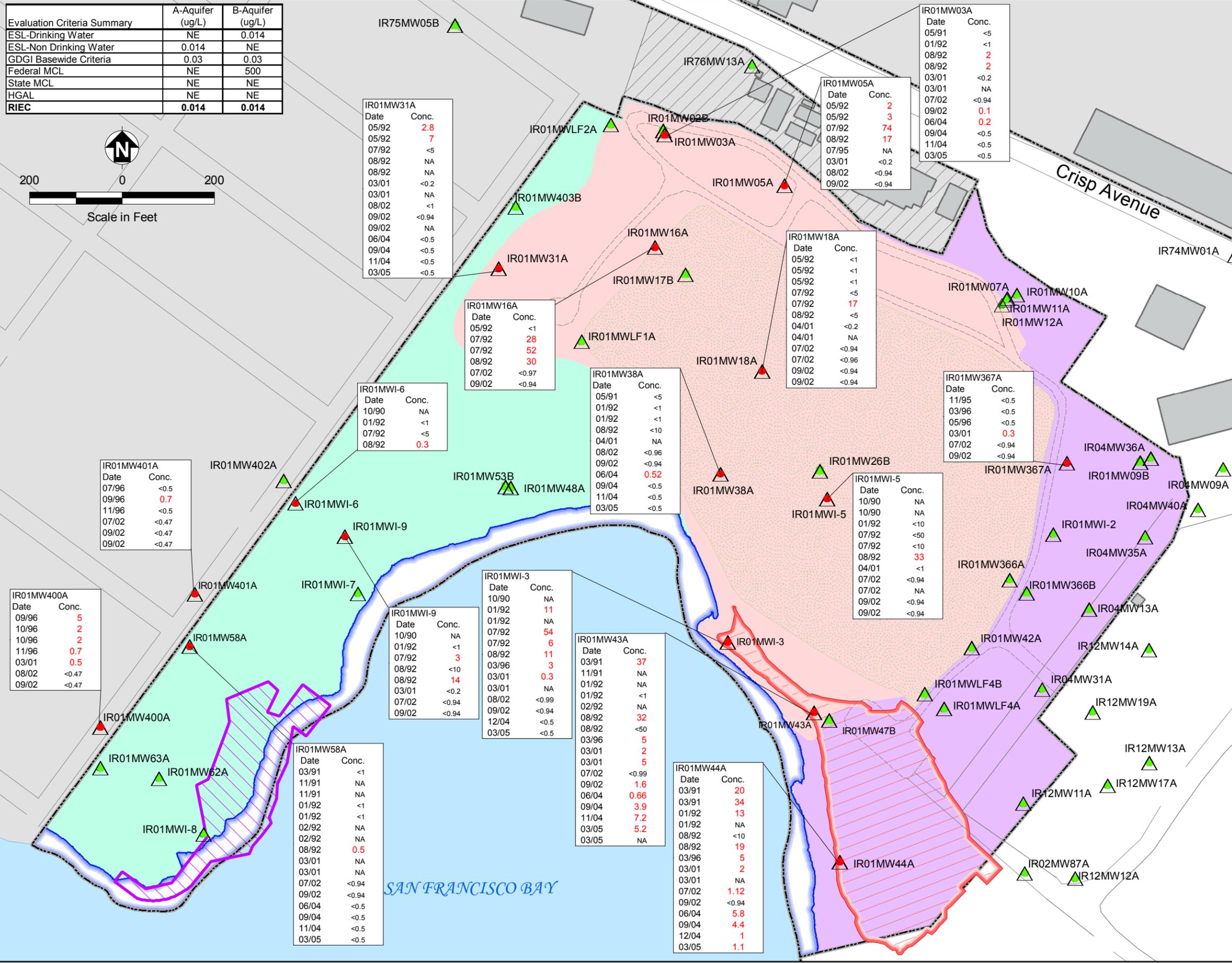
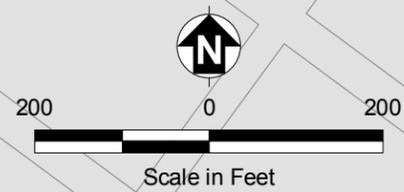
IR01MW44A	Date	Conc.
	03/91	<5 U
	03/91	<5 U
	01/92	<5 U
	01/92	NA
	08/92	<5 U
	08/92	<5 U
	03/96	<0.05 U
	03/01	0.01
	07/02	<0.0082 U ⁹
	09/02	0.0098 J ⁹
	06/04	<0.05 U
	09/04	<0.15 U
	12/04	<0.1 U
	03/05	<0.05 U

IR01MWLF1A	Date	Conc.
	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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 Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-25
ALPHA CHLORDANE
IN GROUNDWATER
 Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.014
ESL-Non Drinking Water	0.014	NE
GDGI Basewide Criteria	0.03	0.03
Federal MCL	NE	500
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.014	0.014



Legend:

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

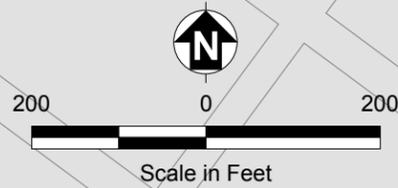
Well ID	Date (mm/yy)	Conc. (ug/L)
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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FIGURE 5-26
TOTAL PCBs
IN GROUNDWATER
 Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.0019
ESL-Non Drinking Water	0.0019	NE
GDGI Basewide Criteria	0.0019	0.0019
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.0019	0.0019



- Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds Criterion
- Road
- Gravel Road
- Metal Slag Area (final boundary)
- PCB Hot Spot (final boundary)
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
 Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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FIGURE 5-27

**DIELDRIN
 IN GROUNDWATER**

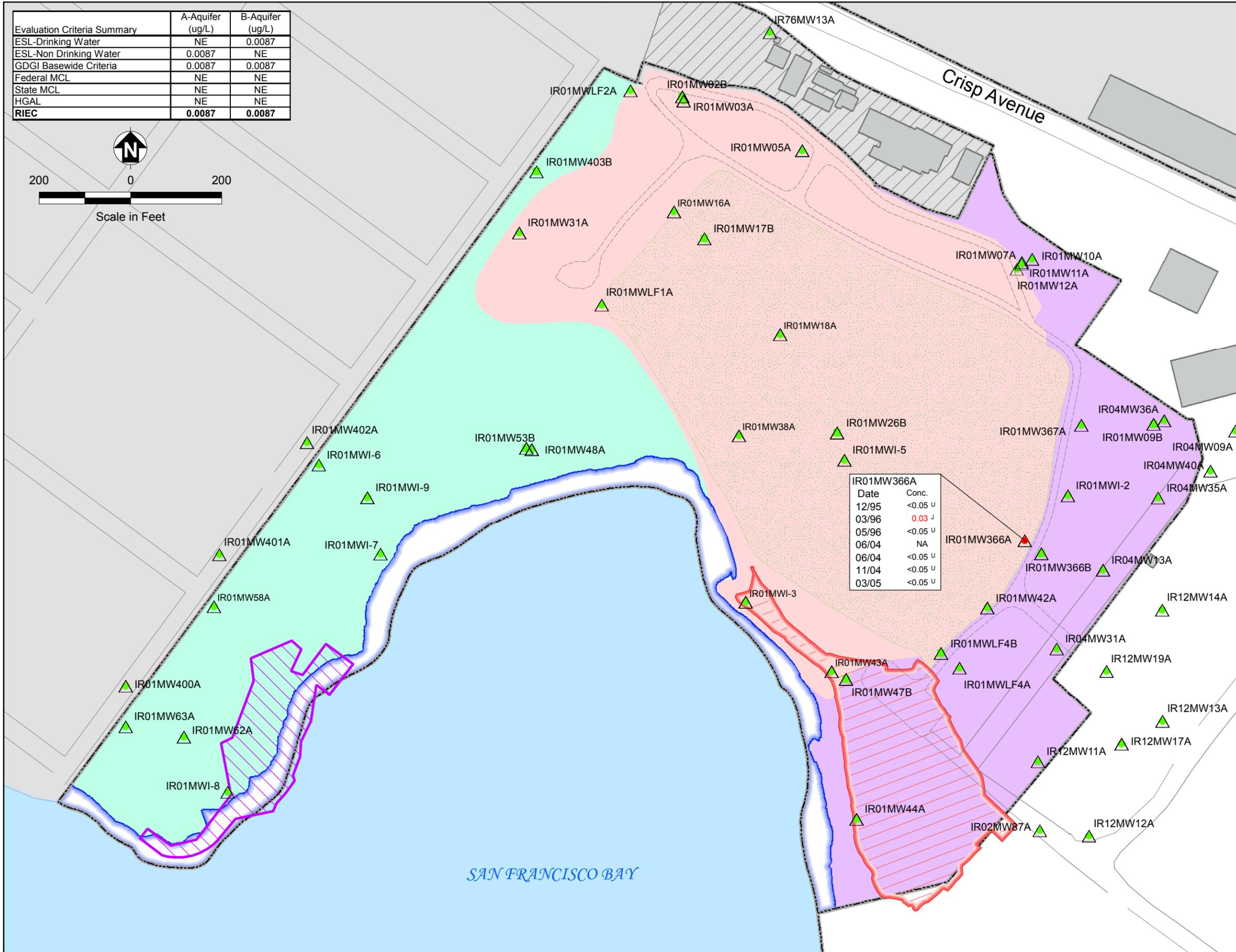
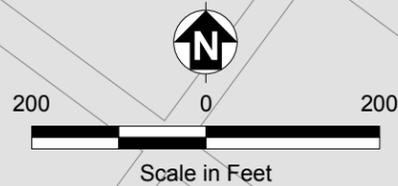
Remedial Investigation/Feasibility Study for Parcel E-2

Well ID	Date	Conc.
IR01MWI-3	01/92	<1 U
	01/92	NA
	07/92	<3 U
	07/92	<0.5 U
	08/92	<1 U
	03/96	<0.1 U
	03/01	0.02
	08/02	<0.02 U
	09/02	0.015 J
	12/04	<0.05 U

Well ID	Date	Conc.
IR01MW44A	03/91	<1 U
	03/91	<1 U
	01/92	<1 U
	01/92	NA
	08/92	<1 U
	08/92	<1 U
	03/96	<0.1 U
	03/01	0.02 J9
	07/02	<0.019 U
	09/02	<0.019 U
	06/04	<0.2 U
	09/04	<0.15 U
	12/04	<0.1 U
	03/05	<0.1 U

SAN FRANCISCO BAY

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.0087
ESL-Non Drinking Water	0.0087	NE
GDGI Basewide Criteria	0.0087	0.0087
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.0087	0.0087



Date	Conc.
12/95	<0.05 U
03/96	0.03 J
05/96	<0.05 U
06/04	NA
06/04	<0.05 U
11/04	<0.05 U
03/05	<0.05 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
 Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion
 ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date (mm/yy)	Conc. (ug/L)
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

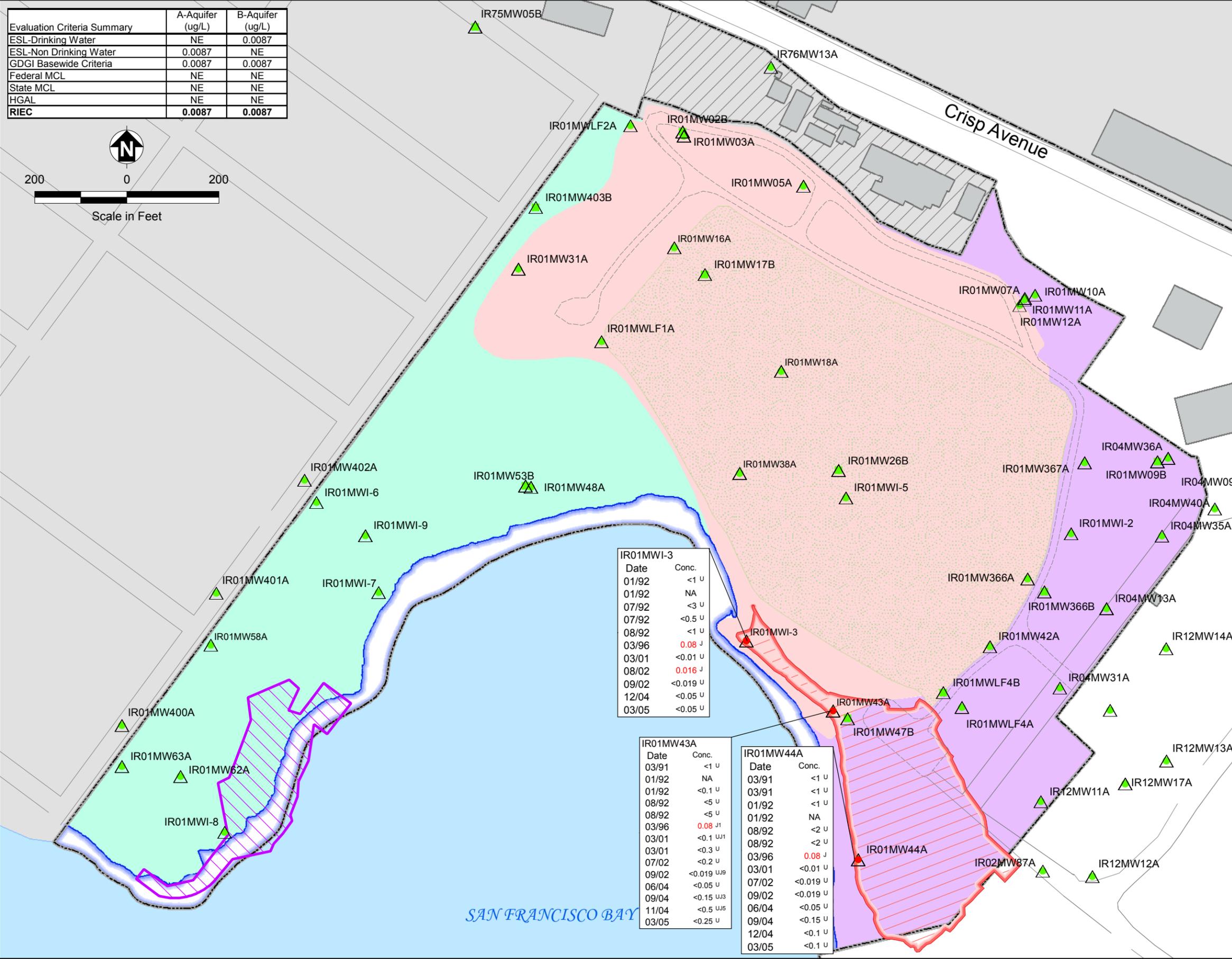
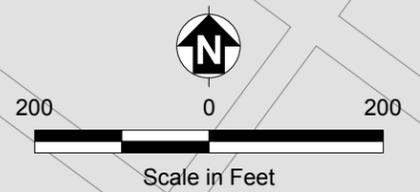
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Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-28
ENDOSULFAN I
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.0087
ESL-Non Drinking Water	0.0087	NE
GDGI Basewide Criteria	0.0087	0.0087
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.0087	0.0087



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

IR01MWI-3		
Date	Conc.	
01/92	<1 U	
01/92	NA	
07/92	<3 U	
07/92	<0.5 U	
08/92	<1 U	
03/96	0.08 J	
03/01	<0.01 U	
08/02	0.016 J	
09/02	<0.019 U	
12/04	<0.05 U	
03/05	<0.05 U	

IR01MW43A		
Date	Conc.	
03/91	<1 U	
01/92	NA	
01/92	<0.1 U	
08/92	<5 U	
08/92	<5 U	
03/96	0.08 J1	
03/01	<0.1 UJ1	
03/01	<0.3 U	
07/02	<0.2 U	
09/02	<0.019 UJ9	
06/04	<0.05 U	
09/04	<0.15 UJ3	
11/04	<0.5 UJ5	
03/05	<0.25 U	

IR01MW44A		
Date	Conc.	
03/91	<1 U	
03/91	<1 U	
01/92	<1 U	
01/92	NA	
08/92	<2 U	
08/92	<2 U	
03/96	0.08 J	
03/01	<0.01 U	
07/02	<0.019 U	
09/02	<0.019 U	
06/04	<0.05 U	
09/04	<0.15 U	
12/04	<0.1 U	
03/05	<0.1 U	

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

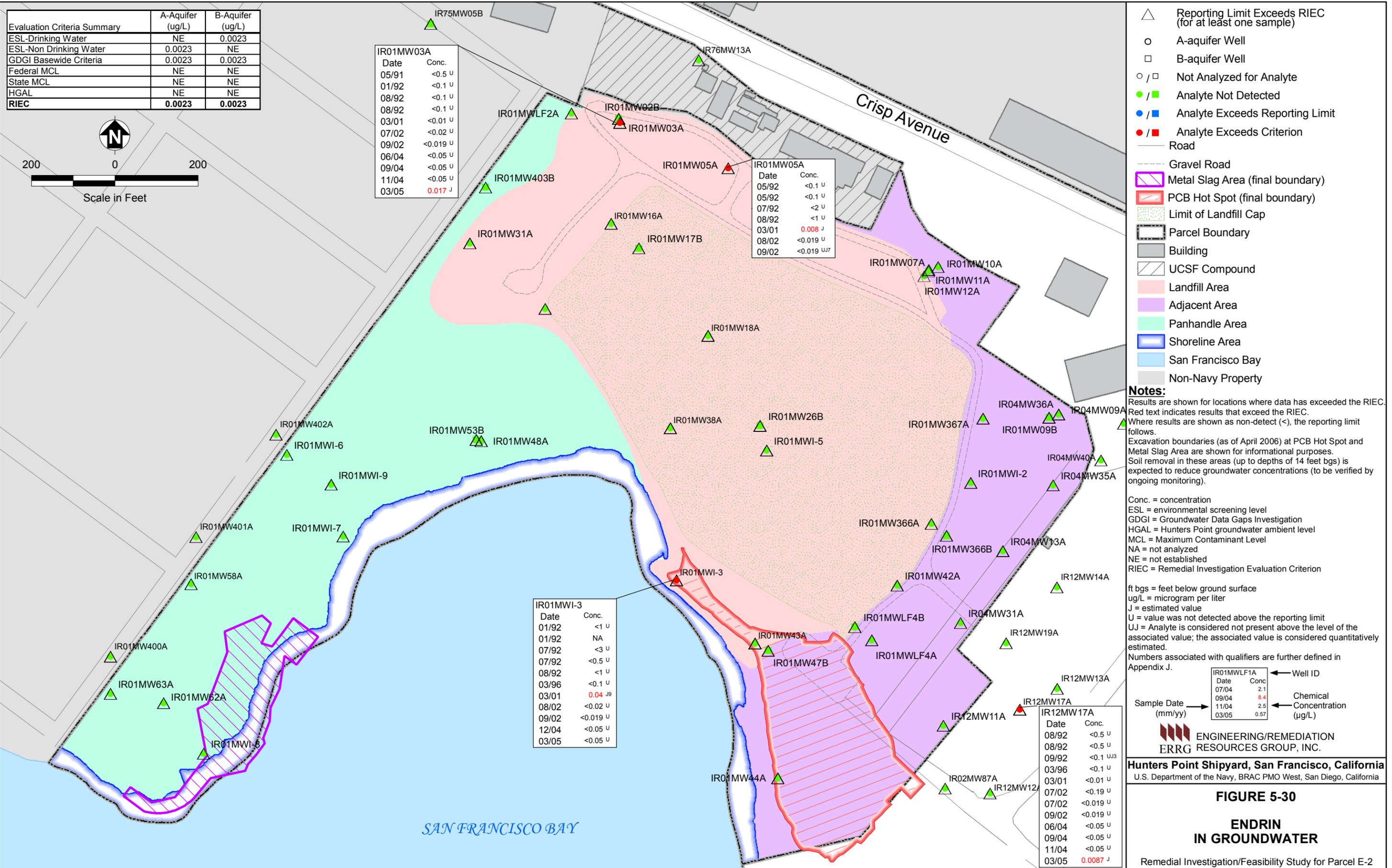
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FIGURE 5-29

ENDOSULFAN II
 IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2



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ERRG RESOURCES GROUP, INC.**

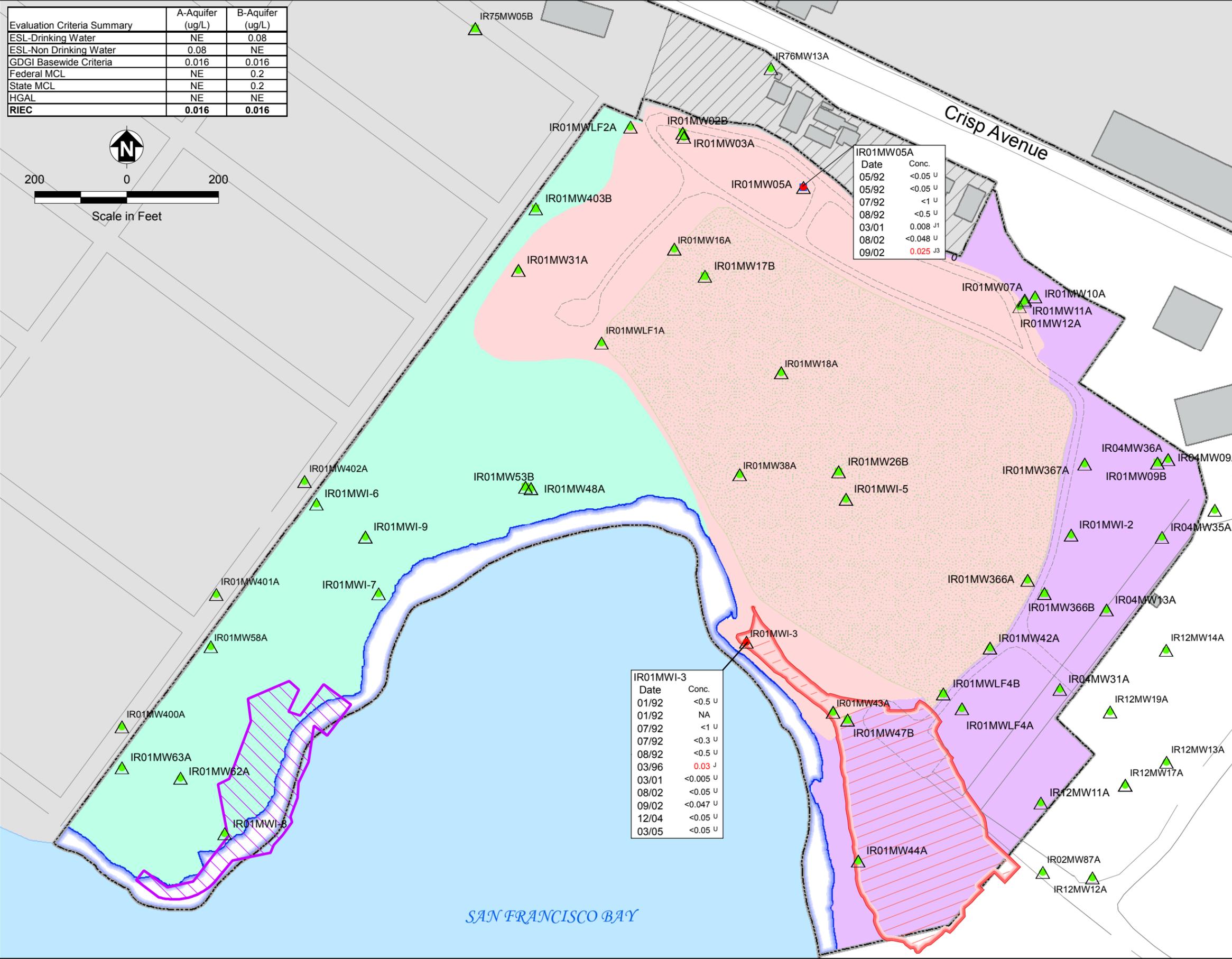
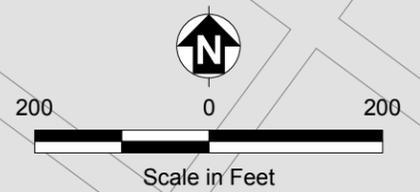
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U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-30

**ENDRIN
IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.08
ESL-Non Drinking Water	0.08	NE
GDGI Basewide Criteria	0.016	0.016
Federal MCL	NE	0.2
State MCL	NE	0.2
HGAL	NE	NE
RIEC	0.016	0.016



IR01MW05A	
Date	Conc.
05/92	<0.05 U
05/92	<0.05 U
07/92	<1 U
08/92	<0.5 U
03/01	0.008 J1
08/02	<0.048 U
09/02	0.025 J3

IR01MWI-3	
Date	Conc.
01/92	<0.5 U
01/92	NA
07/92	<1 U
07/92	<0.3 U
08/92	<0.5 U
03/96	0.03 J
03/01	<0.005 U
08/02	<0.05 U
09/02	<0.047 U
12/04	<0.05 U
03/05	<0.05 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
 Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.6
03/05	IR01MWLF1A	0.57

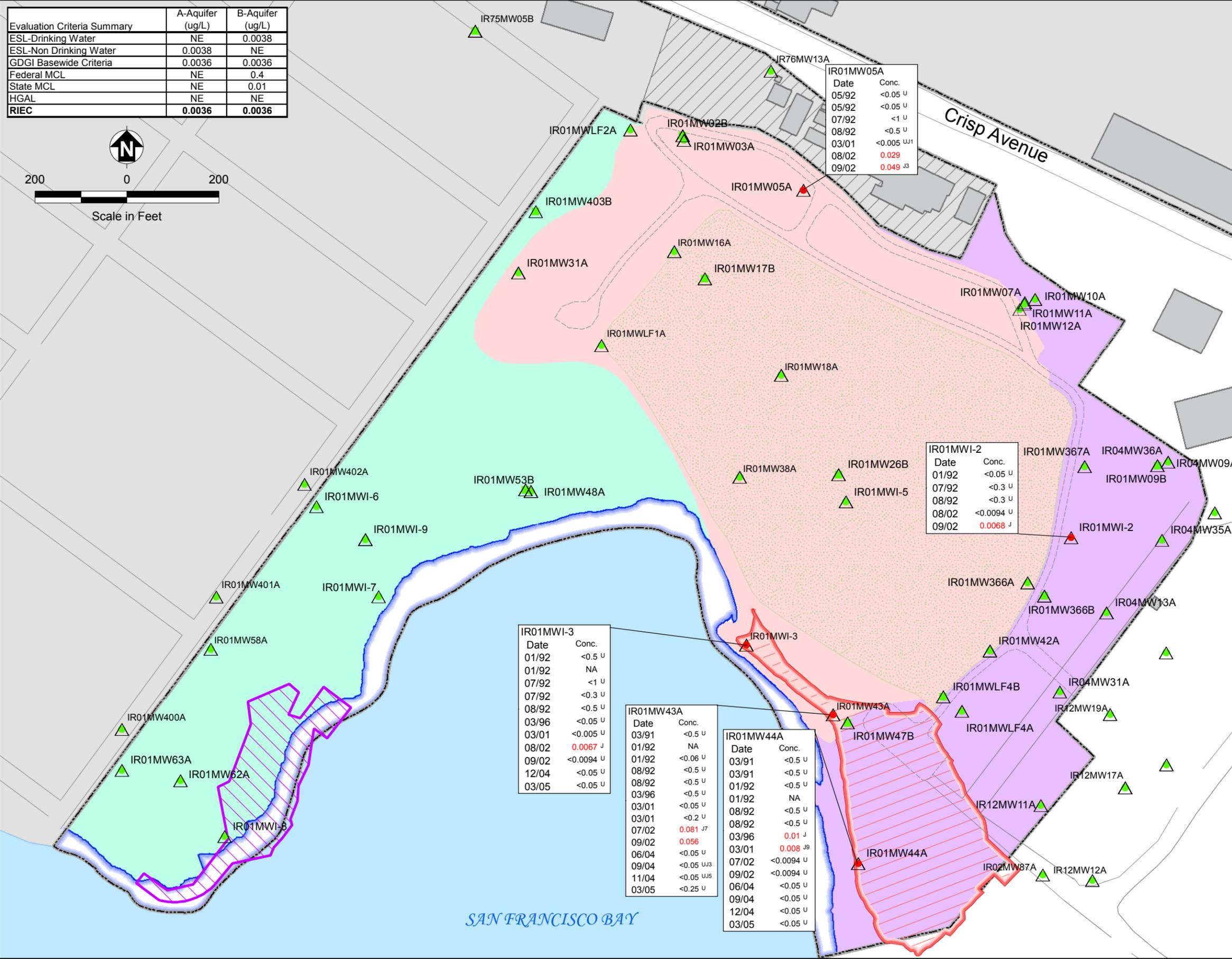
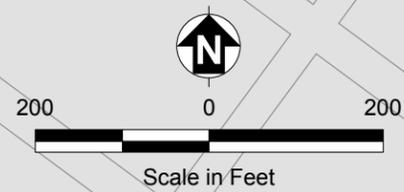
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-31
GAMMA-BHC (LINDANE)
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.0038
ESL-Non Drinking Water	0.0038	NE
GDGI Basewide Criteria	0.0036	0.0036
Federal MCL	NE	0.4
State MCL	NE	0.01
HGAL	NE	NE
RIEC	0.0036	0.0036



Well ID	Date	Conc.
IR01MW05A	05/92	<0.05 U
	05/92	<0.05 U
	07/92	<1 U
	08/92	<0.5 U
	03/01	<0.005 UJ1
	08/02	0.029
	09/02	0.049 J3

Well ID	Date	Conc.
IR01MWI-2	01/92	<0.05 U
	07/92	<0.3 U
	08/92	<0.3 U
	08/02	<0.0094 U
	09/02	0.0068 J

Well ID	Date	Conc.
IR01MWI-3	01/92	<0.5 U
	01/92	NA
	07/92	<1 U
	07/92	<0.3 U
	08/92	<0.5 U
	03/96	<0.05 U
	03/01	<0.005 U
	08/02	0.0067 J
09/02	<0.0094 U	
12/04	<0.05 U	
03/05	<0.05 U	

Well ID	Date	Conc.
IR01MW43A	03/91	<0.5 U
	01/92	NA
	08/92	<0.06 U
	08/92	<0.5 U
	08/92	<0.5 U
	03/96	<0.5 U
	03/01	<0.05 U
	03/01	<0.2 U
	07/02	0.081 J7
	09/02	0.056
	06/04	<0.05 U
	09/04	<0.05 UJ3
	11/04	<0.05 UJ5
	03/05	<0.25 U

Well ID	Date	Conc.
IR01MW44A	03/91	<0.5 U
	03/91	<0.5 U
	01/92	<0.5 U
	01/92	NA
	08/92	<0.5 U
	08/92	<0.5 U
	03/96	0.01 J
	03/01	0.008 J9
	07/02	<0.0094 U
	09/02	<0.0094 U
	06/04	<0.05 U
	09/04	<0.05 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

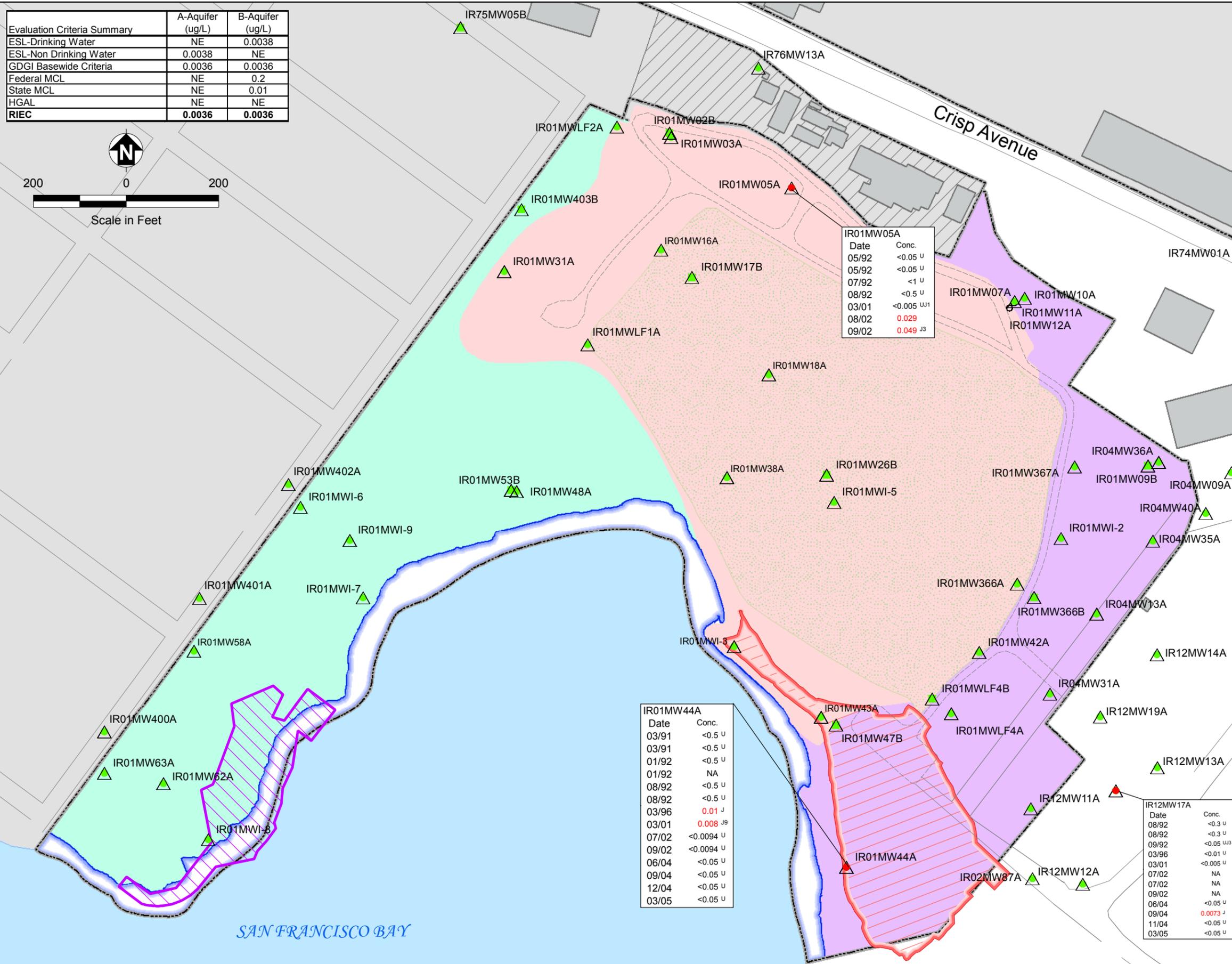
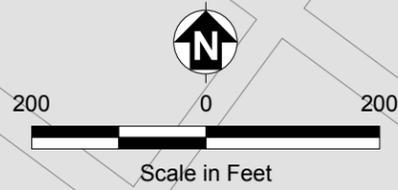
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FIGURE 5-33
HEPTACHLOR
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.0038
ESL-Non Drinking Water	0.0038	NE
GDGI Basewide Criteria	0.0036	0.0036
Federal MCL	NE	0.2
State MCL	NE	0.01
HGAL	NE	NE
RIEC	0.0036	0.0036



IR01MW05A	
Date	Conc.
05/92	<0.05 U
05/92	<0.05 U
07/92	<1 U
08/92	<0.5 U
03/01	<0.005 U ^{J1}
08/02	0.029
09/02	0.049 J ³

IR01MW44A	
Date	Conc.
03/91	<0.5 U
03/91	<0.5 U
01/92	<0.5 U
01/92	NA
08/92	<0.5 U
08/92	<0.5 U
03/96	0.01 J
03/01	0.008 J ⁹
07/02	<0.0094 U
09/02	<0.0094 U
06/04	<0.05 U
09/04	<0.05 U
12/04	<0.05 U
03/05	<0.05 U

IR12MW17A	
Date	Conc.
08/92	<0.3 U
08/92	<0.3 U
09/92	<0.05 U ³
03/96	<0.01 U
03/01	<0.005 U
07/02	NA
07/02	NA
09/02	NA
06/04	<0.05 U
09/04	0.0073 J
11/04	<0.05 U
03/05	<0.05 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
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Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

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Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-34

**HEPTACHLOR EPOXIDE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	20
ESL-Non Drinking Water	23	NE
GDGI Basewide Criteria	710	710
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	23	20

Well ID	Date	Conc.
IR01MW18A	05/92	27
	05/92	29
	05/92	23
	07/92	17
	07/92	12
	08/92	18
	04/01	0.5 J
	07/02	0.68 J
	09/02	0.79 J

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
 Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

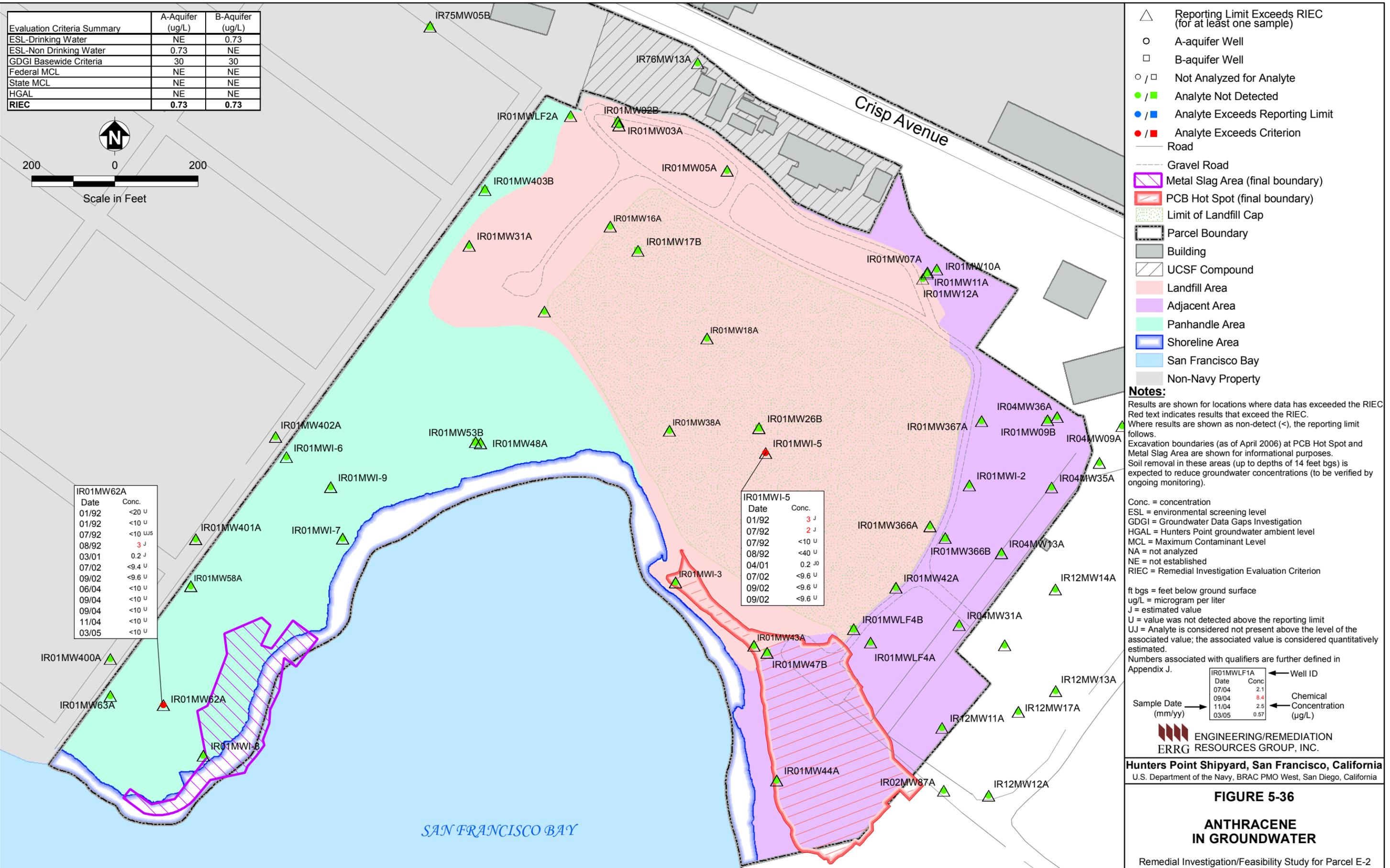
ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-35
ACENAPHTHENE
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.73
ESL-Non Drinking Water	0.73	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.73	0.73

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).
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 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion
 ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

IR01MW62A	
Date	Conc.
01/92	<20 U
01/92	<10 U
07/92	<10 U ^J
08/92	3 J
03/01	0.2 J
07/02	<9.4 U
09/02	<9.6 U
06/04	<10 U
09/04	<10 U
09/04	<10 U
11/04	<10 U
03/05	<10 U

IR01MWI-5	
Date	Conc.
01/92	3 J
07/92	2 J
07/92	<10 U
08/92	<40 U
04/01	0.2 J ^U
07/02	<9.6 U
09/02	<9.6 U
09/02	<9.6 U

IR01MWLF1A	
Date	Conc.
07/04	2.1
09/04	8.4
11/04	2.6
03/05	0.57

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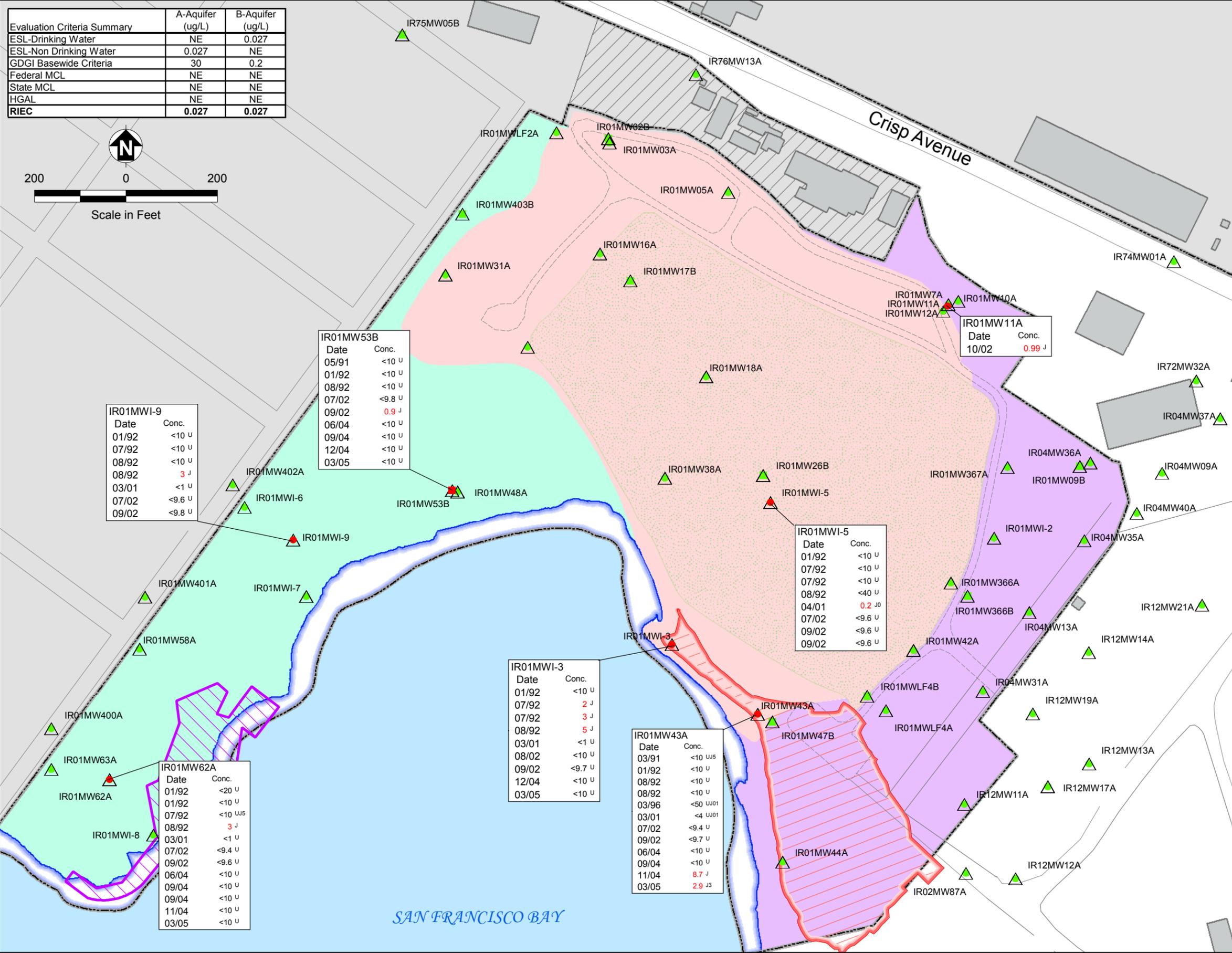
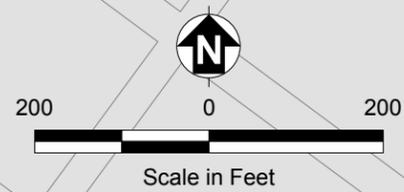
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-36

**ANTHRACENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.027
ESL-Non Drinking Water	0.027	NE
GDGI Basewide Criteria	30	0.2
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.027	0.027



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-37

**BENZO (A) ANTHRACENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

IR01MWI-9	Date	Conc.
	01/92	<10 U
	07/92	<10 U
	08/92	<10 U
	08/92	3 J
	03/01	<1 U
	07/02	<9.6 U
	09/02	<9.8 U

IR01MW53B	Date	Conc.
	05/91	<10 U
	01/92	<10 U
	08/92	<10 U
	07/02	<9.8 U
	09/02	0.9 J
	06/04	<10 U
	09/04	<10 U
	12/04	<10 U
	03/05	<10 U

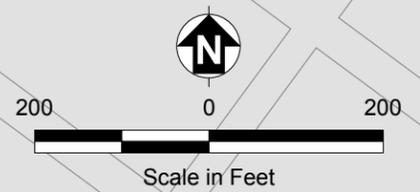
IR01MWI-5	Date	Conc.
	01/92	<10 U
	07/92	<10 U
	07/92	<10 U
	08/92	<40 U
	04/01	0.2 J0
	07/02	<9.6 U
	09/02	<9.6 U
	09/02	<9.6 U

IR01MWI-3	Date	Conc.
	01/92	<10 U
	07/92	2 J
	07/92	3 J
	08/92	5 J
	03/01	<1 U
	08/02	<10 U
	09/02	<9.7 U
	12/04	<10 U
	03/05	<10 U

IR01MW43A	Date	Conc.
	03/91	<10 UJ5
	01/92	<10 U
	08/92	<10 U
	08/92	<10 U
	03/96	<50 UJ01
	03/01	<4 UJ01
	07/02	<9.4 U
	09/02	<9.7 U
	06/04	<10 U
	09/04	<10 U
	11/04	8.7 J
	03/05	2.9 J3

IR01MW62A	Date	Conc.
	01/92	<20 U
	01/92	<10 U
	07/92	<10 UJ5
	08/92	3 J
	03/01	<1 U
	07/02	<9.4 U
	09/02	<9.6 U
	06/04	<10 U
	09/04	<10 U
	09/04	<10 U
	11/04	<10 U
	03/05	<10 U

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.029
ESL-Non Drinking Water	0.029	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.029	0.029



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

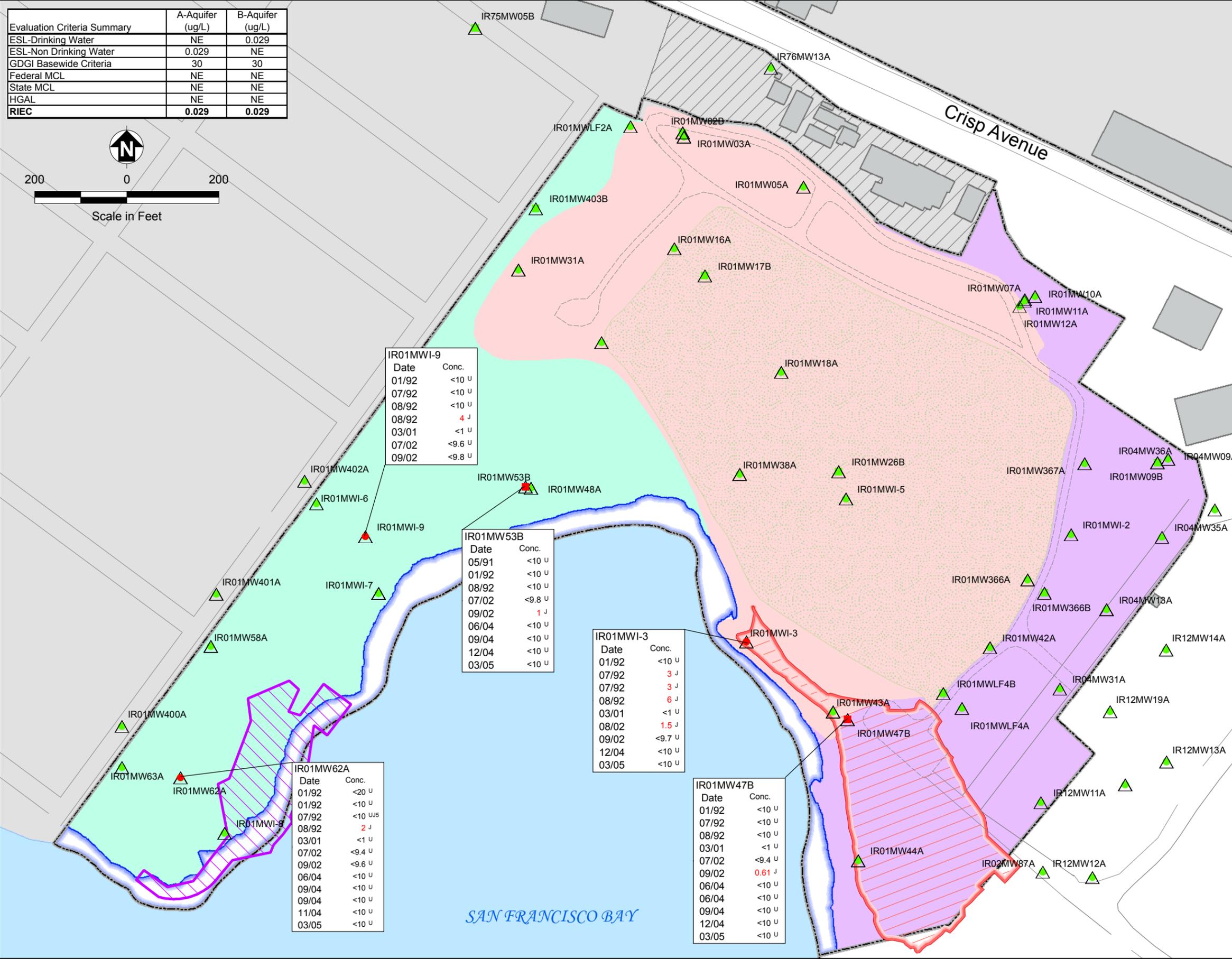
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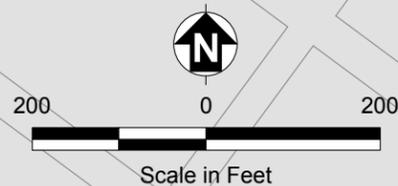
FIGURE 5-38

BENZO (B) FLUORANTHENE IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.029
ESL-Non Drinking Water	0.4	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.4	0.029



IR01MW53B	
Date	Conc.
05/91	<10 U
01/92	<10 U
08/92	<10 U
07/02	<9.8 U
09/02	1.2 J
06/04	<10 U
09/04	<10 U
12/04	<10 U
03/05	<10 U

IR01MWI-3	
Date	Conc.
01/92	<10 U
07/92	<10 U
07/92	<10 U
08/92	<10 U
03/01	<1 U
08/02	1.1 J
09/02	<9.7 U
12/04	<10 U
03/05	<10 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Date	Conc.	Well ID
07/04	2.1	IR01MWLF1A
09/04	8.4	
11/04	2.6	
03/05	0.57	

Sample Date (mm/yy) →

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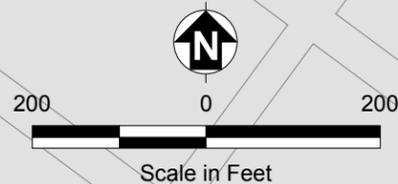
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-39

**BENZO (K) FLUORANTHENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.1
ESL-Non Drinking Water	0.1	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	0.1	0.1



- Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- Not Analyzed for Analyte
- Analyte Not Detected
- Analyte Exceeds Reporting Limit
- Analyte Exceeds Criterion
- Road
- Gravel Road
- Metal Slag Area (final boundary)
- PCB Hot Spot (final boundary)
- Limit of Landfill Cap
- Parcel Boundary
- Building
- UCSF Compound
- Landfill Area
- Adjacent Area
- Panhandle Area
- Shoreline Area
- San Francisco Bay
- Non-Navy Property

Notes:
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 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

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 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
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Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

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FIGURE 5-41

**BENZO (G,H,I) PERYLENE
 IN GROUNDWATER**

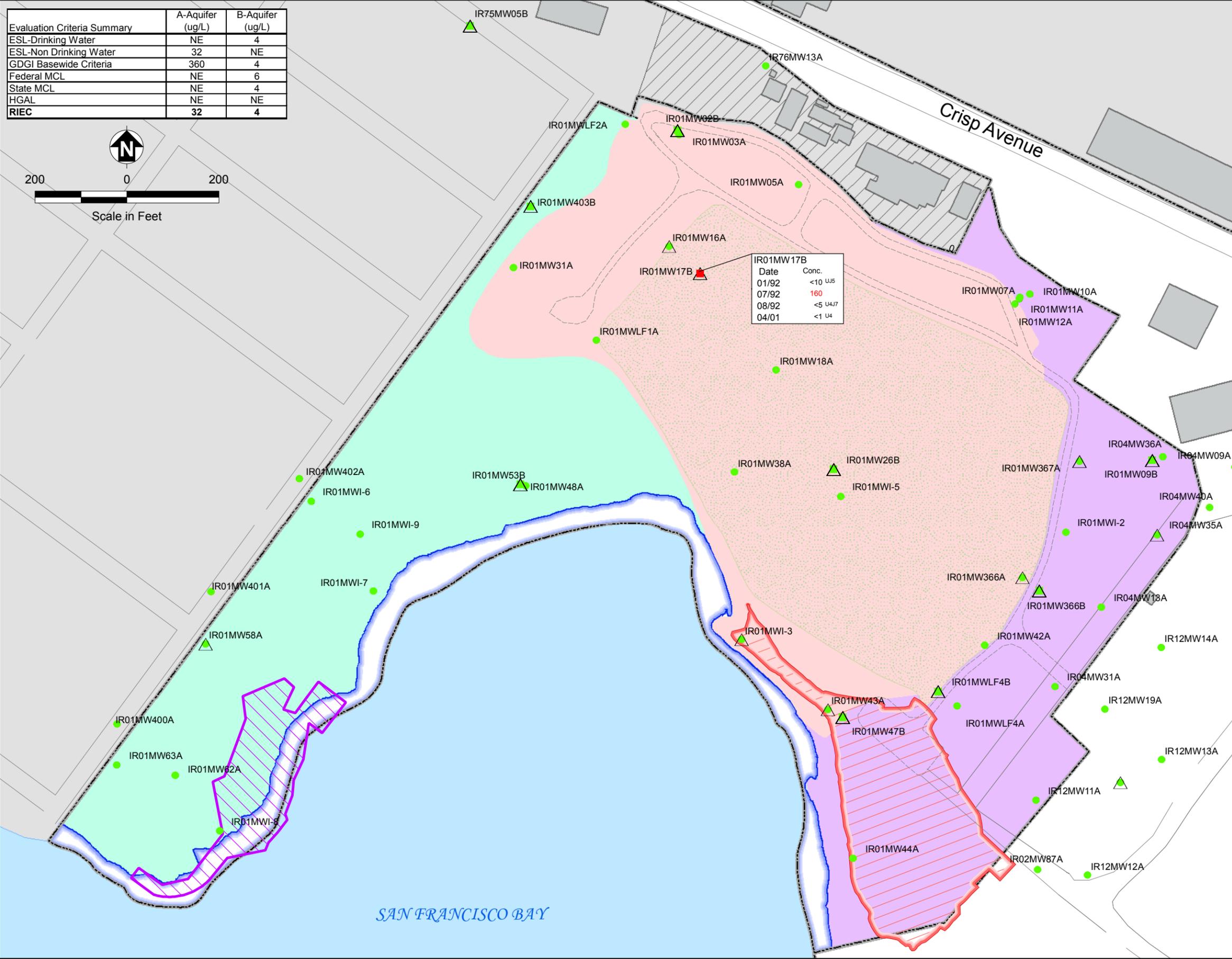
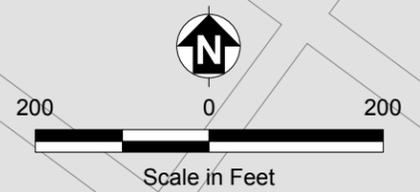
Remedial Investigation/Feasibility Study for Parcel E-2

IR01MWI-3	
Date	Conc.
01/92	<10 U
07/92	<10 U
07/92	<10 U
08/92	3 J
03/01	<1 U
08/02	1.4 J
09/02	<9.7 U
12/04	<10 U
03/05	<10 U

IR01MW43A	
Date	Conc.
03/91	<10 U ⁰⁵
01/92	<10 U
08/92	<10 U
08/92	<10 U
03/01	<4 U ⁰¹
07/02	<9.4 U ⁰⁰
09/02	1.4 J ⁰⁰
06/04	<10 U
09/04	<10 U
11/04	<10 U
03/05	<10 U ⁰³

SAN FRANCISCO BAY

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	4
ESL-Non Drinking Water	32	NE
GDGI Basewide Criteria	360	4
Federal MCL	NE	6
State MCL	NE	4
HGAL	NE	NE
RIEC	32	4



Well ID	Date	Conc.
IR01MW17B	01/92	<10 U _{J5}
	07/92	160
	08/92	<5 U _{J7}
	04/01	<1 U ₄

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

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 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

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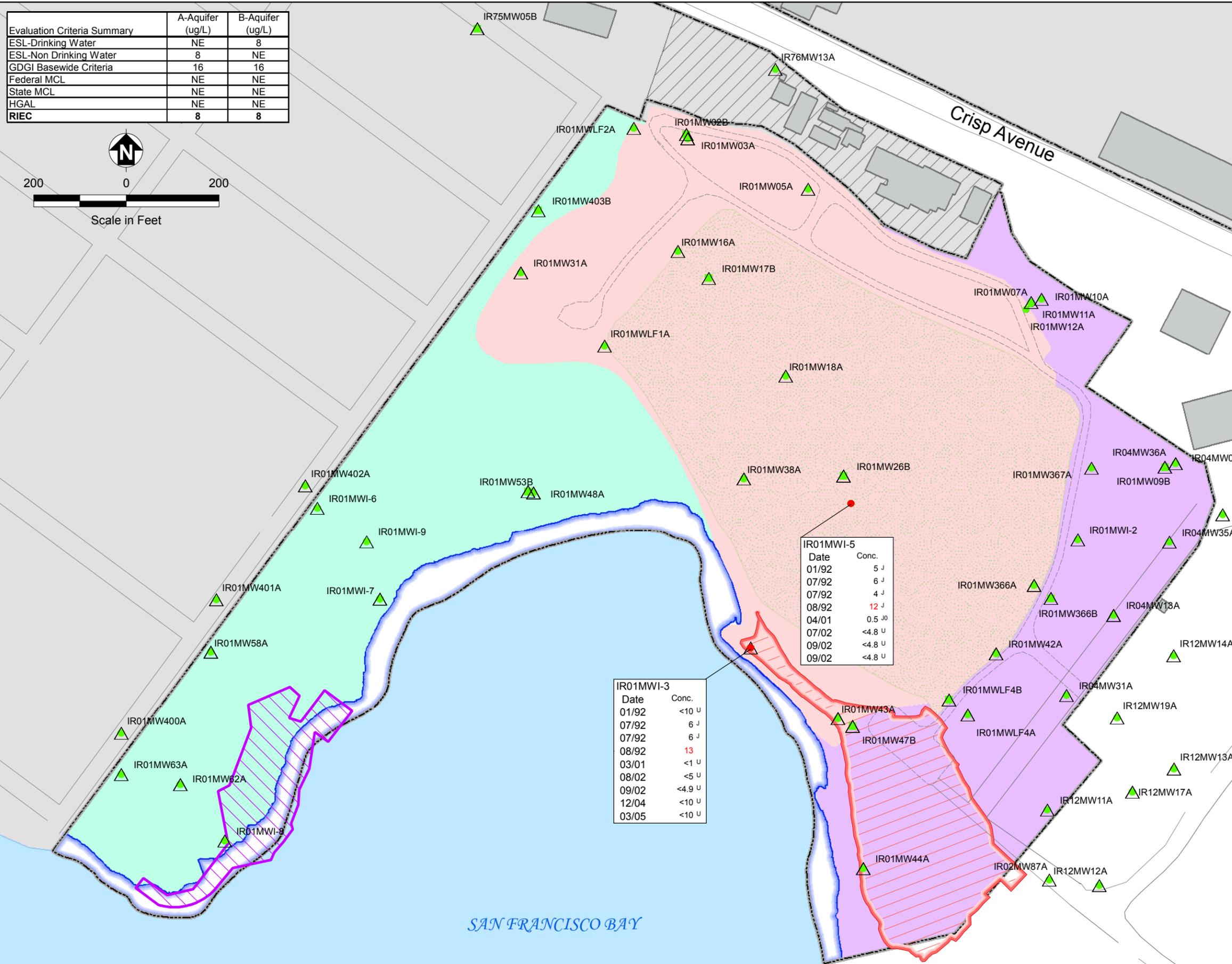
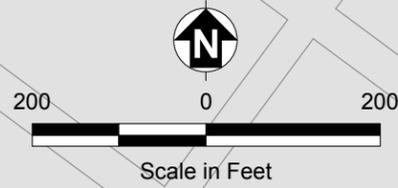
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FIGURE 5-42

BIS (2-ETHYLHEXYL) PHTHALATE IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	8
ESL-Non Drinking Water	8	NE
GDGI Basewide Criteria	16	16
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	8	8



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

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 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

IR01MWI-5	Date	Conc.
	01/92	5 J
	07/92	6 J
	07/92	4 J
	08/92	12 J
	04/01	0.5 UJ
	07/02	<4.8 U
	09/02	<4.8 U
	09/02	<4.8 U

IR01MWI-3	Date	Conc.
	01/92	<10 U
	07/92	6 J
	07/92	6 J
	08/92	13
	03/01	<1 U
	08/02	<5 U
	09/02	<4.9 U
	12/04	<10 U
	03/05	<10 U

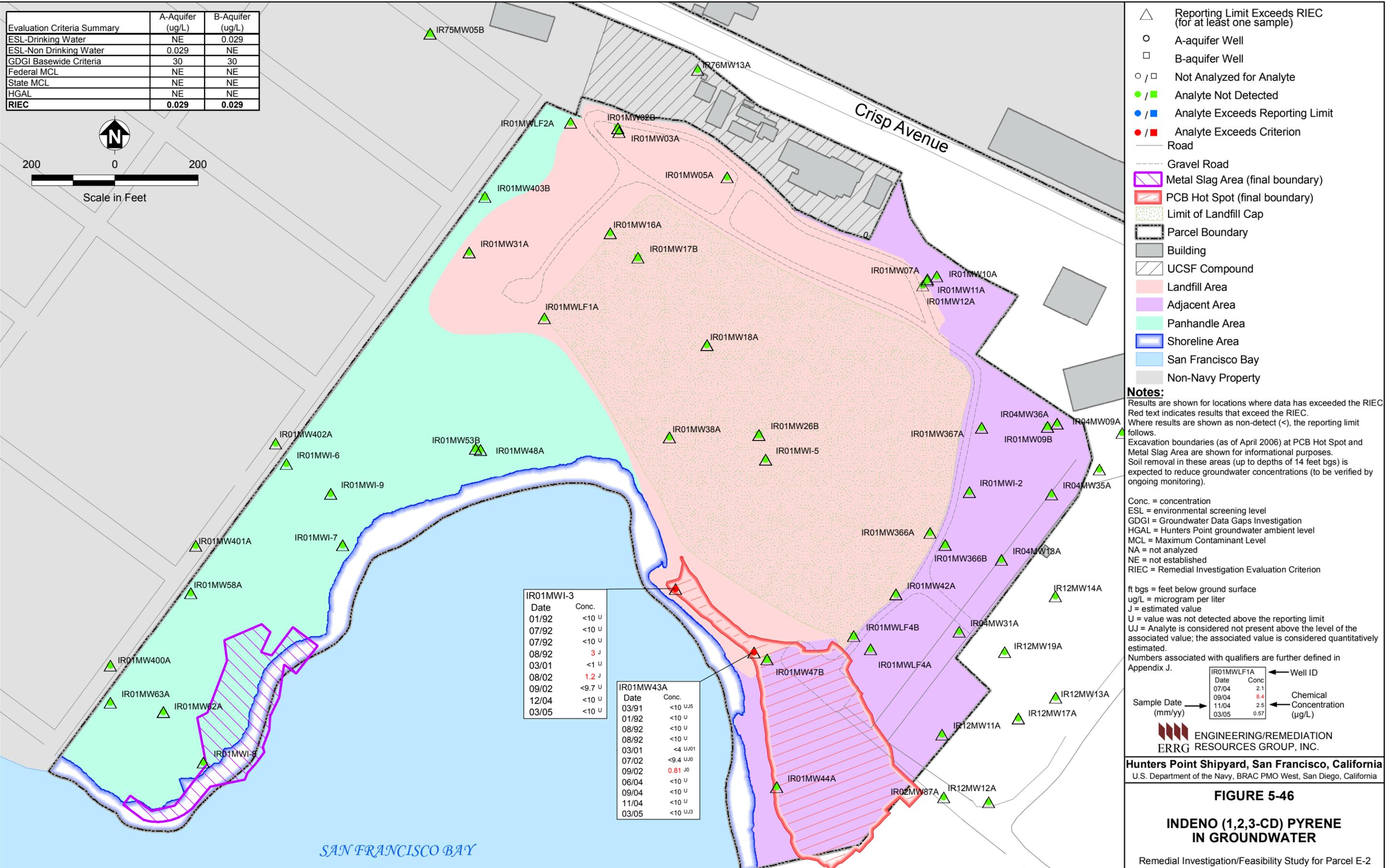
IR01MWLF1A	Date	Conc.
	07/04	2.1
	09/04	8.4
	11/04	2.6
	03/05	0.57

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FIGURE 5-45
FLUORANTHENE
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2



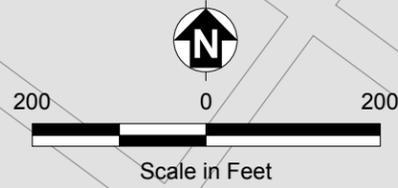
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-46

INDENO (1,2,3-CD) PYRENE IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	17
ESL-Non Drinking Water	24	NE
GDGI Basewide Criteria	235	235
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	24	17



IR01MW02B	Date	Conc.
	05/91	<10 U
	05/91	<10 U
	01/92	37
	08/92	37
	03/01	9
	07/02	<4.8 U
	09/02	<4.8 U
	06/04	<10 U
	08/04	<10 U
	11/04	<10 U
	03/05	<10 U
	03/05	<10 U

IR01MW03A	Date	Conc.
	05/91	32
	01/92	16
	08/92	<10 U
	08/92	3 J
	03/01	<1 U
	07/02	<9.4 U
	09/02	<4.9 U
	06/04	<10 U
	09/04	<10 U
	11/04	<10 U
	03/05	<10 U

IR01MW18A	Date	Conc.
	05/92	57
	05/92	63
	05/92	52
	07/92	26
	07/92	19
	08/92	19
	04/01	0.3 J
	07/02	<4.9 U
	09/02	<4.8 U

IR01MW58A	Date	Conc.
	03/91	72
	01/92	170
	01/92	150
	08/92	190
	06/04	<10 U
	09/04	<10 U
	11/04	<10 U
	03/05	<10 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

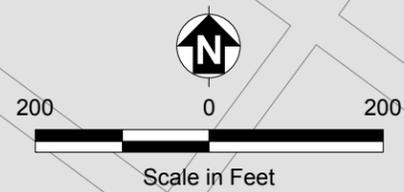
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Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-48
NAPHTHALENE
IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	4.6
ESL-Non Drinking Water	4.6	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	4.6	4.6



IR01MW02B	
Date	Conc.
05/91	9 J
05/91	9 J
01/92	3 J
08/92	6 J
03/01	0.6 J
07/02	<4.8 U
09/02	<4.8 U
06/04	<10 U
08/04	<10 U
11/04	<10 U
03/05	<10 U
03/05	<10 U

IR01MW18A	
Date	Conc.
05/92	22
05/92	20
05/92	18
07/92	13
07/92	<10
08/92	<10
04/01	0.1 J
07/02	<4.9 U
09/02	<4.8 U

IR01MWI-5	
Date	Conc.
01/92	20
07/92	9 J
07/92	5 J
08/92	39 J
04/01	0.3 J0
07/02	1.6 J
09/02	2.1 J
09/02	1.9 J

IR01MW62A	
Date	Conc.
01/92	<20 U
01/92	3 J
07/92	5 J5
08/92	11
03/01	0.9 J
07/02	<9.4 U
09/02	<4.8 U
06/04	<10 U
09/04	<10 U
09/04	<10 U
11/04	<10 U
03/05	<10 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

Sample Date (mm/yy) → ← Concentration (ug/L)

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FIGURE 5-49

**PHENANTHRENE
IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2



Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	2
ESL-Non Drinking Water	2	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	2	2

IR01MW02B	
Date	Conc.
05/91	5 J
05/91	5 J
01/92	<10 U
08/92	<10 U
03/01	0.7 J
07/02	<9.6 U
09/02	0.82 J
06/04	<10 U
08/04	<10 U
11/04	5.2 J
03/05	<10 U

IR01MW05A	
Date	Conc.
05/92	<10 U
05/92	<10 U
07/92	3 J
08/92	<10 U
08/02	<9.6 U
09/02	<9.6 U

IR01MWI-9	
Date	Conc.
01/92	<10 U
07/92	<10 U
08/92	3 J
08/92	6 J
03/01	<1 U
07/02	<9.6 U
09/02	<9.8 U

IR01MWI-5	
Date	Conc.
01/92	5 J
07/92	5 J
07/92	3 J
08/92	15 J
04/01	0.9 J0
07/02	<9.6 U
09/02	<9.6 U
09/02	<9.6 U

IR01MWI-3	
Date	Conc.
01/92	<10 U
07/92	4 J
07/92	4 J
08/92	<10 U
03/01	<1 U
08/02	<10 U
09/02	<9.7 U
12/04	<10 U
03/05	<10 U

IR01MW43A	
Date	Conc.
03/91	3 J5
01/92	<10 U
08/92	<10 U
08/92	<10 U
03/96	<50 UJ01
03/01	0.8 J01
07/02	<9.4 U
09/02	1.3 J
06/04	<10 U
09/04	<10 U
11/04	<10 U
03/05	<10 UJ3

IR01MW62A	
Date	Conc.
01/92	<20 U
01/92	<10 U
07/92	3 J5
08/92	7 J
03/01	0.2 J
07/02	<9.4 U
09/02	<9.6 U
06/04	<10 U
09/04	<10 U
09/04	<10 U
11/04	<10 U
03/05	<10 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.6
03/05	IR01MWLF1A	0.57

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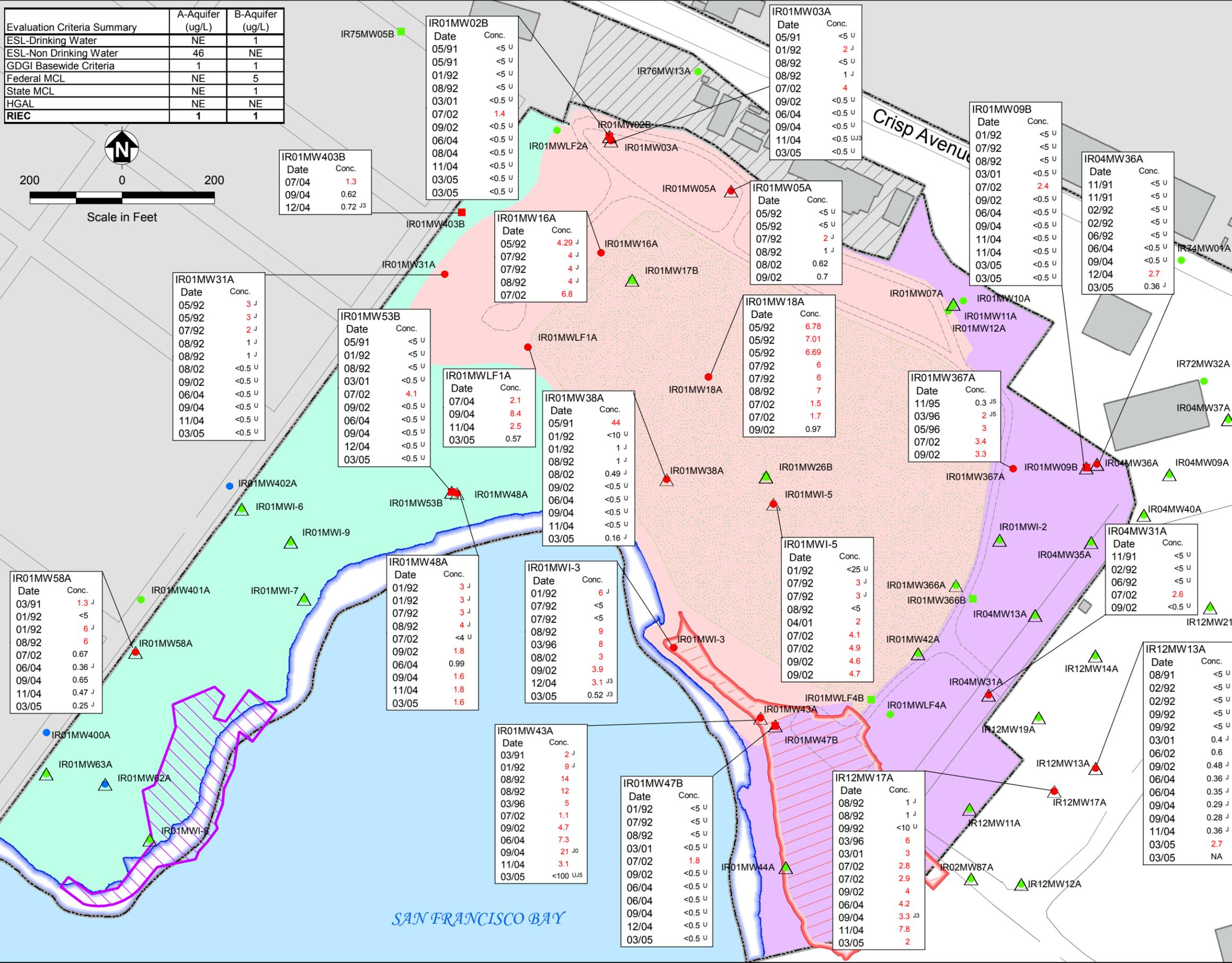
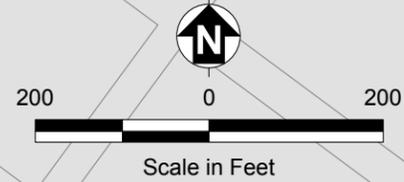
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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-50

**PYRENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	1
ESL-Non Drinking Water	46	NE
GDGI Basewide Criteria	1	1
Federal MCL	NE	5
State MCL	NE	1
HGAL	NE	NE
RIEC	1	1



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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 ERRG RESOURCES GROUP, INC.

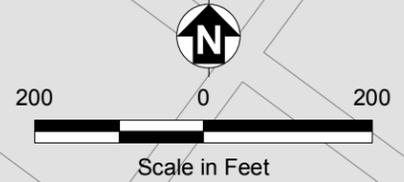
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-1

**BENZENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	5
ESL-Non Drinking Water	15	NE
GDGI Basewide Criteria	5	5
Federal MCL	NE	75
State MCL	NE	5
HGAL	NE	NE
RIEC	5	5



IR01MW03A	
Date	Conc.
05/91	7 J
01/92	7 J
08/92	5 J
08/92	7 J
03/01	<1 U
07/02	<1 U
09/02	0.15 J
06/04	1.1
09/04	<0.5 U
11/04	<0.5 UJ
03/05	<0.5 U

IR01MWI-5	
Date	Conc.
01/92	4 J
07/92	8 J
07/92	8 J
08/92	10 J
04/01	4
07/02	12
07/02	7.7
09/02	7.7
09/02	7.9

IR01MWI-3	
Date	Conc.
01/92	5 J
07/92	7 J
07/92	7 J
08/92	7 J
03/96	<50 U
03/01	4
08/02	5.3
09/02	4.9
12/04	4.4 J3
03/05	4 J3

IR01MW43A	
Date	Conc.
03/91	16 J5
01/92	8 J
08/92	11
08/92	13
03/96	8
03/01	6
07/02	4.1
09/02	7.8
06/04	11
09/04	4.2 J
11/04	7.9 J
03/05	1.8 J3

IR12MW14A	
Date	Conc.
08/91	<10 U
08/91	<10 U
02/92	<10 U
09/92	<10 U
03/01	<1 U
06/02	19
09/02	<0.5 U
09/02	<0.5 U
06/04	<0.5 U
09/04	<0.5 U
12/04	<0.5 U
03/05	<0.5 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Chemical Concentration (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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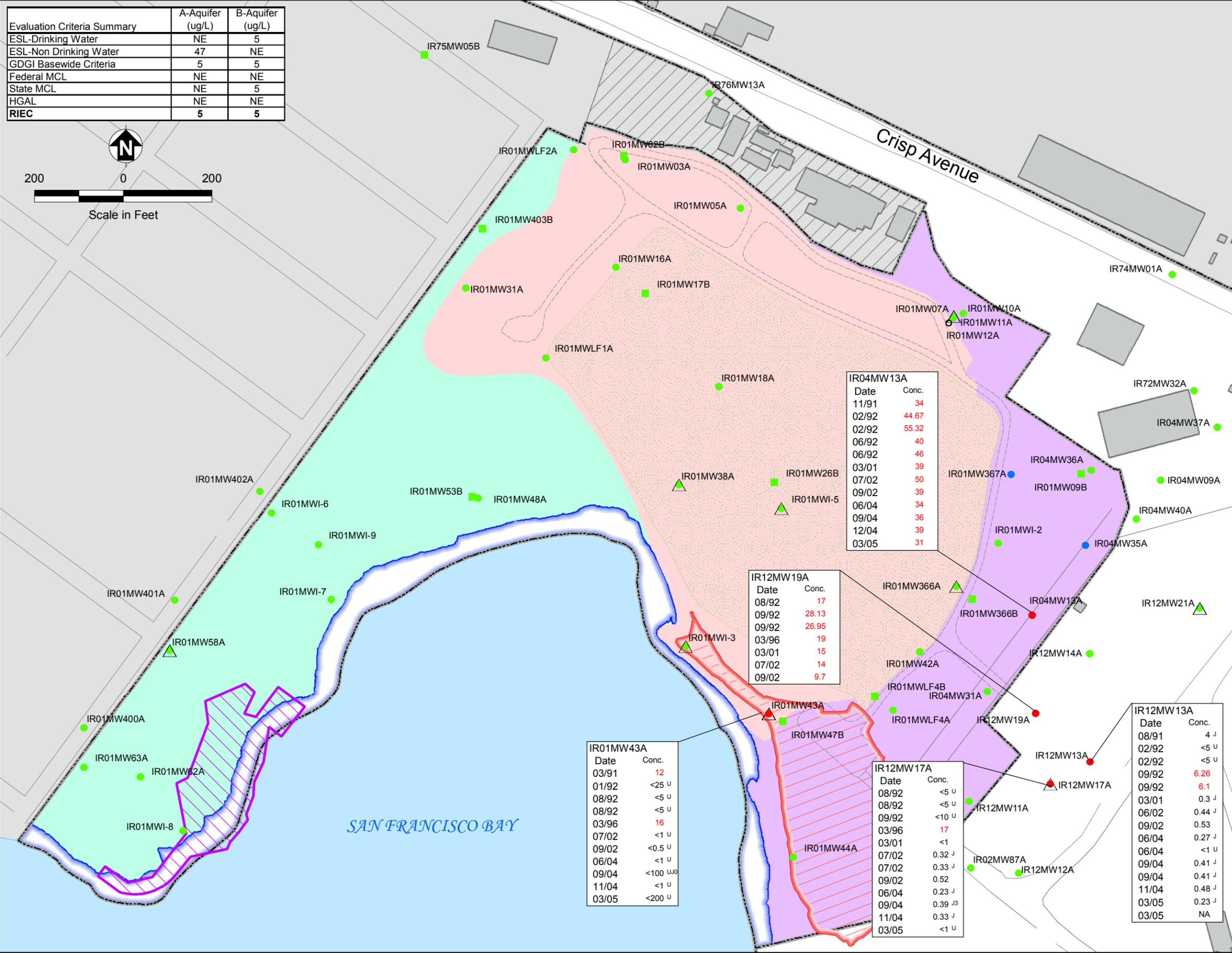
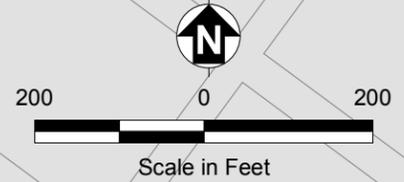
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FIGURE 5-53

**1,4-DICHLOROBENZENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	5
ESL-Non Drinking Water	47	NE
GDGI Basewide Criteria	5	5
Federal MCL	NE	NE
State MCL	NE	5
HGAL	NE	NE
RIEC	5	5



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-54
**1,1-DICHLOROETHANE
 IN GROUNDWATER**
 Remedial Investigation/Feasibility Study for Parcel E-2

IR04MW13A	
Date	Conc.
11/91	34
02/92	44.67
02/92	55.32
06/92	40
06/92	46
03/01	39
07/02	50
09/02	39
06/04	34
09/04	36
12/04	39
03/05	31

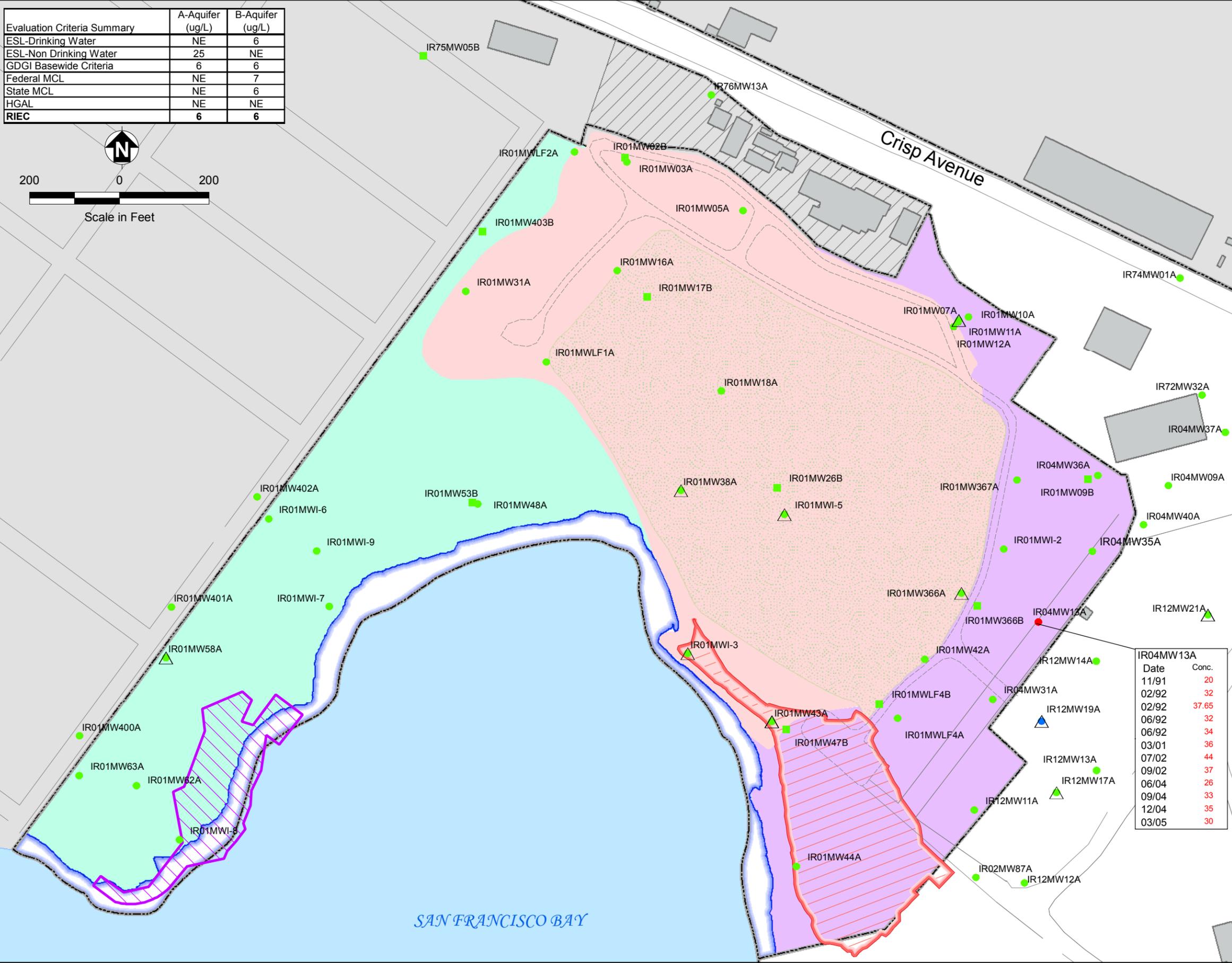
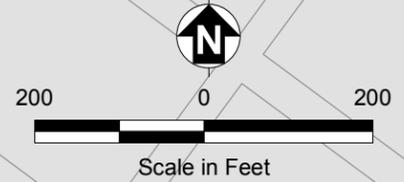
IR12MW19A	
Date	Conc.
08/92	17
09/92	28.13
09/92	26.95
03/96	19
03/01	15
07/02	14
09/02	9.7

IR01MW43A	
Date	Conc.
03/91	12
01/92	<25 U
08/92	<5 U
08/92	<5 U
03/96	16
07/02	<1 U
09/02	<0.5 U
06/04	<1 U
09/04	<100 U ⁰
11/04	<1 U
03/05	<200 U

IR12MW17A	
Date	Conc.
08/92	<5 U
08/92	<5 U
09/92	<10 U
03/96	17
03/01	<1
07/02	0.32 J
07/02	0.33 J
09/02	0.52
06/04	0.23 J
09/04	0.39 J ³
11/04	0.33 J
03/05	<1 U

IR12MW13A	
Date	Conc.
08/91	4 J
02/92	<5 U
02/92	<5 U
09/92	6.26
09/92	6.1
03/01	0.3 J
06/02	0.44 J
09/02	0.53
06/04	0.27 J
06/04	<1 U
09/04	0.41 J
09/04	0.41 J
11/04	0.48 J
03/05	0.23 J
03/05	NA

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	6
ESL-Non Drinking Water	25	NE
GDGI Basewide Criteria	6	6
Federal MCL	NE	7
State MCL	NE	6
HGAL	NE	NE
RIEC	6	6



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR04MW13A	11/91	20
	02/92	32
	02/92	37.65
	06/92	32
	06/92	34
	03/01	36
	07/02	44
	09/02	37
	06/04	26
	09/04	33
12/04	35	
03/05	30	

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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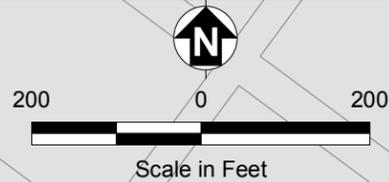
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-55

1,1-DICHLOROETHENE IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.5
ESL-Non Drinking Water	204.4	NE
GDGI Basewide Criteria	0.5	0.5
Federal MCL	NE	0.5
State MCL	NE	0.5
HGAL	NE	NE
RIEC	0.5	0.5



Well ID	Date	Conc.
IR01MW403B	07/04	3.3
	09/04	3
	12/04	3.5 J ³

Well ID	Date	Conc.
IR04MW13A	11/91	<5 u
	02/92	<5 u
	02/92	<5 u
	06/92	<5 u
	06/92	1 J
	03/01	0.8
	07/02	1.6
	09/02	1.5
	06/04	1.1
	09/04	0.74
	12/04	1.2
	03/05	0.6

Well ID	Date	Conc.
IR12MW19A	08/92	2 J
	09/92	<10 u
	09/92	<10 u
	03/96	0.9
	03/01	1
	07/02	0.85
	09/02	0.64

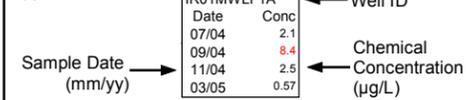
Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.



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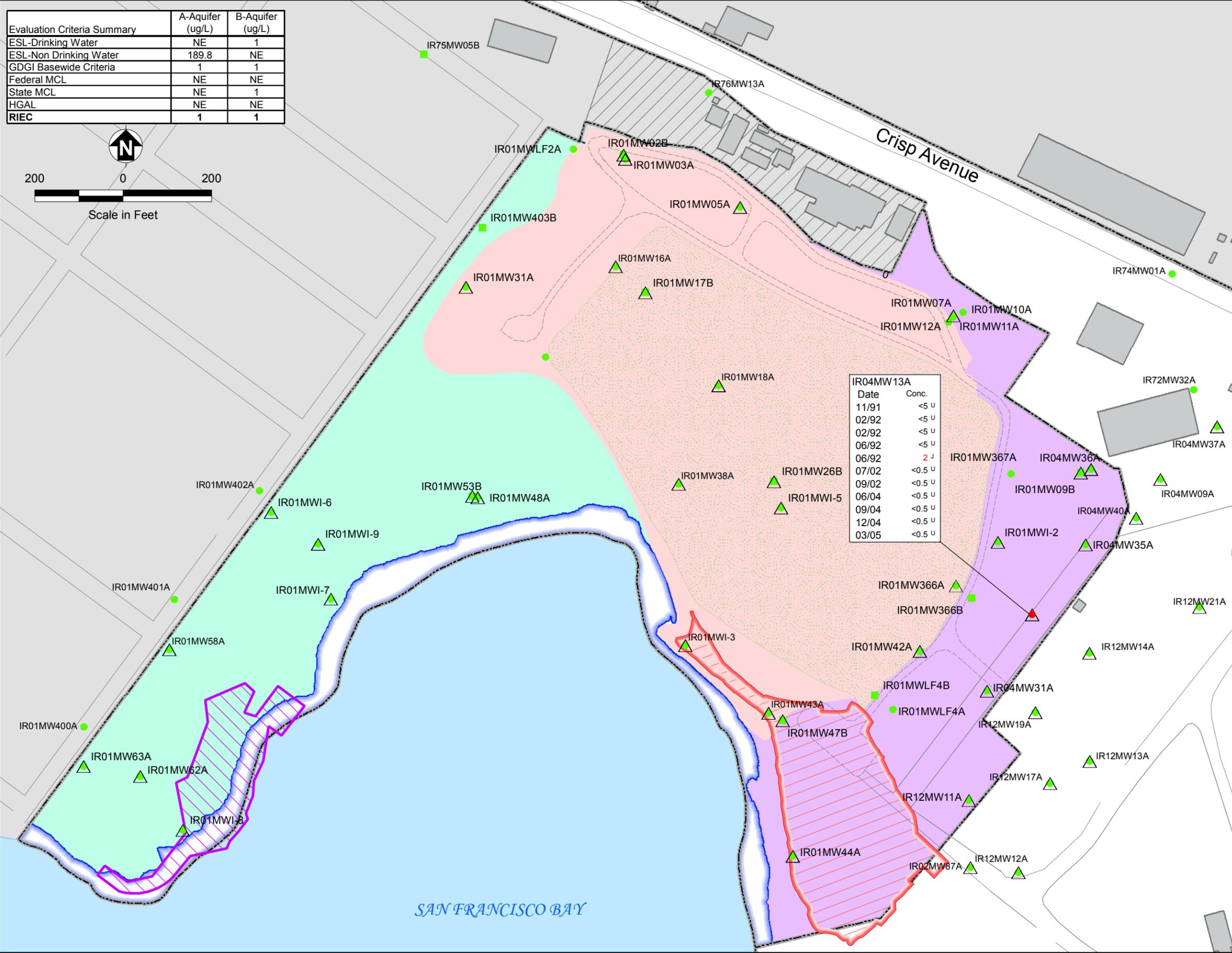
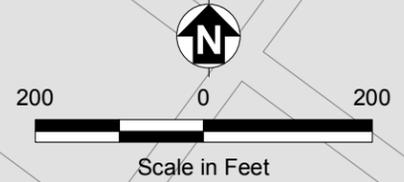
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-56

1,2-DICHLOROETHANE IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	1
ESL-Non Drinking Water	189.8	NE
GDGI Basewide Criteria	1	1
Federal MCL	NE	NE
State MCL	NE	1
HGAL	NE	NE
RIEC	1	1



Well ID	Date	Conc.
IR04MW13A	11/91	<5 U
	02/92	<5 U
	02/92	<5 U
	06/92	<5 U
	06/92	2 J
	07/02	<0.5 U
	09/02	<0.5 U
	06/04	<0.5 U
	09/04	<0.5 U
	12/04	<0.5 U
03/05	<0.5 U	

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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 ERRG RESOURCES GROUP, INC.

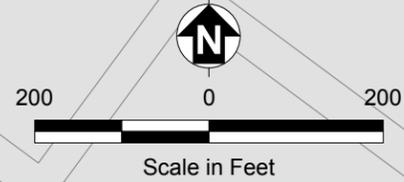
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-58

1,1,2,2-TETRACHLOROETHANE
 IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	5
ESL-Non Drinking Water	120	NE
GDGI Basewide Criteria	5	5
Federal MCL	NE	5
State MCL	NE	5
HGAL	NE	NE
RIEC	5	5



IR01MW31A	
Date	Conc.
05/92	6
05/92	<5 U
07/92	<5 U
08/92	<5 U
08/92	<5 U
08/02	<0.5 U
09/02	<0.5 U
06/04	<0.5 U
09/04	<0.5 U
11/04	<0.5 U
03/05	<0.5 U

IR04MW13A	
Date	Conc.
11/91	19
02/92	38.34
02/92	51.84
06/92	22
06/92	32
03/01	61
07/02	56
09/02	52
06/04	52
09/04	62
12/04	61
03/05	47

IR04MW35A	
Date	Conc.
11/91	<5 U
02/92	5.43
06/92	2 J
07/02	<0.5 U
09/02	0.13 J

IR12MW19A	
Date	Conc.
08/92	<5
09/92	6.88 J
09/92	6.37 J
03/96	6
03/01	5
07/02	3.8
09/02	2.1

IR12MW14A	
Date	Conc.
08/91	<5 U
08/91	<5 U
02/92	<5 U
09/92	<5 U
03/01	<1 U
06/02	56
09/02	<0.5 U
09/02	<0.5 U
06/04	<0.5 U
09/04	<0.5 U
12/04	<0.5 U
03/05	<0.5 U

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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ERRG RESOURCES GROUP, INC.**

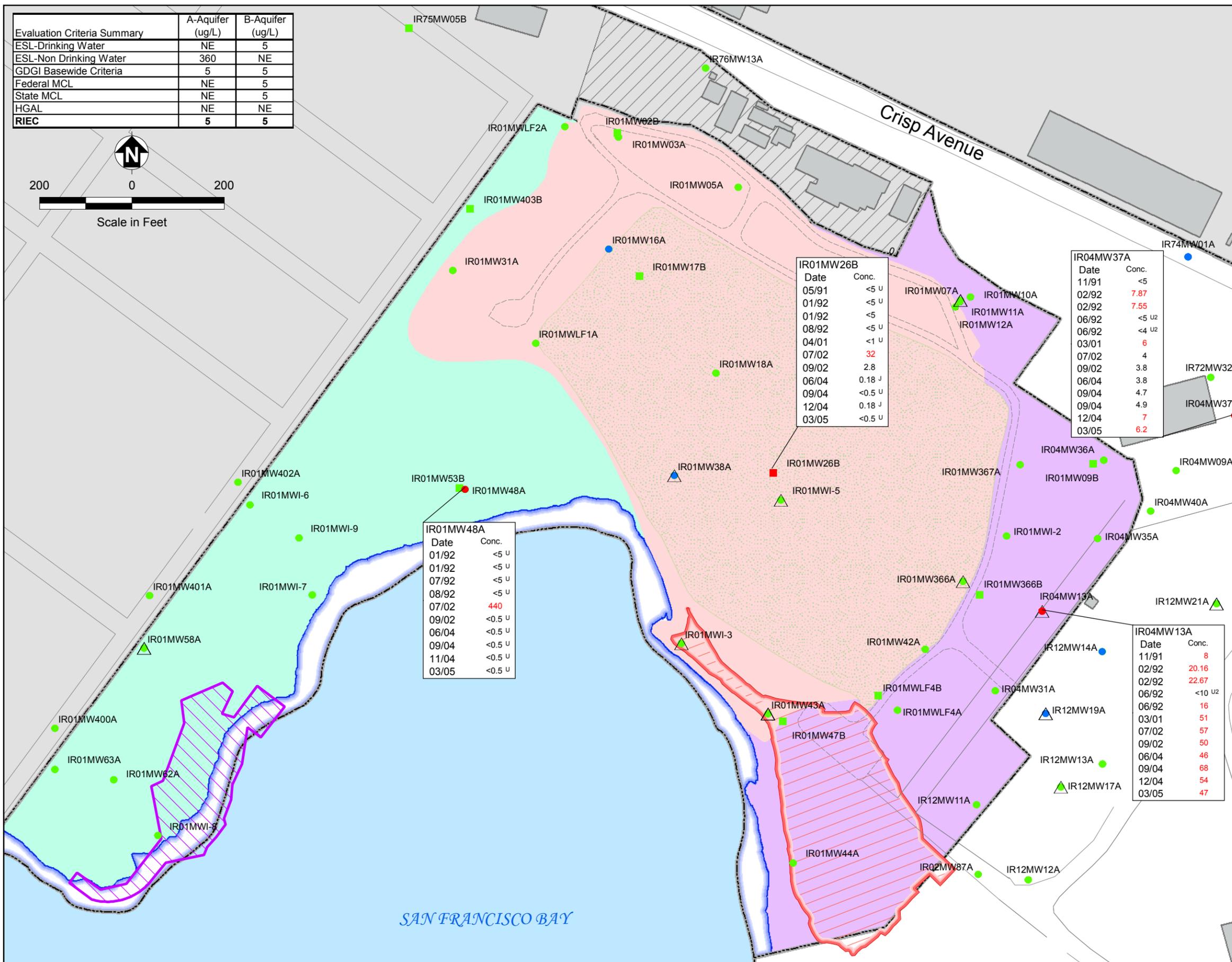
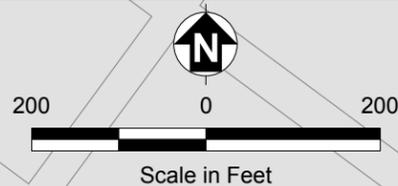
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-59

**TETRACHLOROETHENE
IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	5
ESL-Non Drinking Water	360	NE
GDGI Basewide Criteria	5	5
Federal MCL	NE	5
State MCL	NE	5
HGAL	NE	NE
RIEC	5	5



- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

IR01MW26B	
Date	Conc.
05/91	<5 U
01/92	<5 U
01/92	<5 U
08/92	<5 U
04/01	<1 U
07/02	32
09/02	2.8
06/04	0.18 J
09/04	<0.5 U
12/04	0.18 J
03/05	<0.5 U

IR04MW37A	
Date	Conc.
11/91	<5
02/92	7.87
02/92	7.55
06/92	<5 U2
06/92	<4 U2
03/01	6
07/02	4
09/02	3.8
06/04	3.8
09/04	4.7
09/04	4.9
12/04	7
03/05	6.2

IR01MW48A	
Date	Conc.
01/92	<5 U
01/92	<5 U
07/92	<5 U
08/92	<5 U
07/02	440
09/02	<0.5 U
06/04	<0.5 U
09/04	<0.5 U
11/04	<0.5 U
03/05	<0.5 U

IR04MW13A	
Date	Conc.
11/91	8
02/92	20.16
02/92	22.67
06/92	<10 U2
06/92	16
03/01	51
07/02	57
09/02	50
06/04	46
09/04	68
12/04	54
03/05	47

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.

Numbers associated with qualifiers are further defined in Appendix J.

Well ID	Date	Conc.
IR01MWLF1A	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

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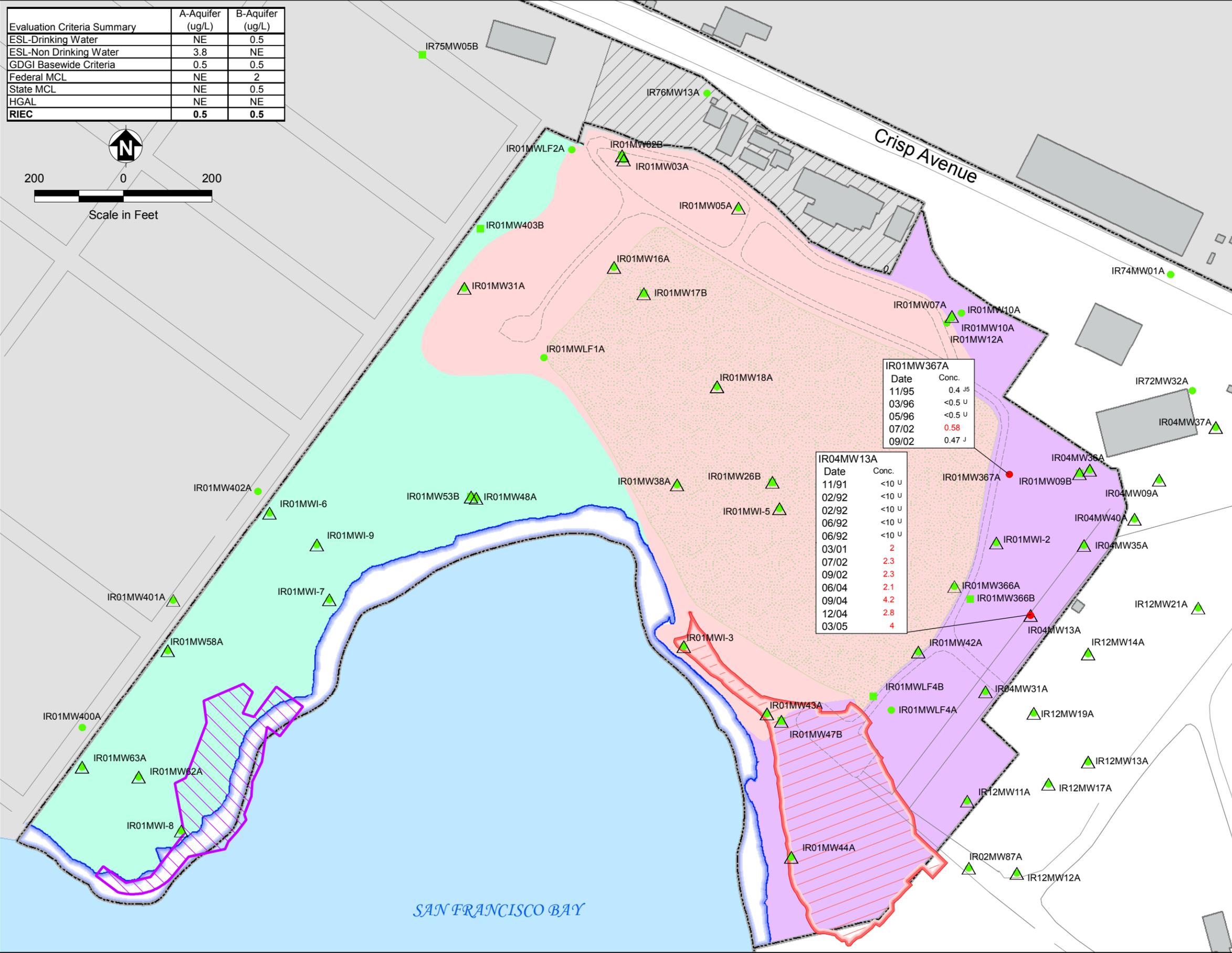
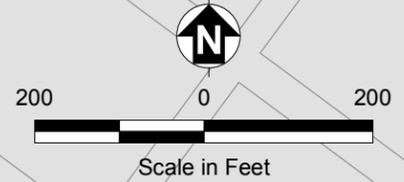
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-61

TRICHLOROETHENE
 IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	0.5
ESL-Non Drinking Water	3.8	NE
GDGI Basewide Criteria	0.5	0.5
Federal MCL	NE	2
State MCL	NE	0.5
HGAL	NE	NE
RIEC	0.5	0.5



IR01MW367A	
Date	Conc.
11/95	0.4 J ^U
03/96	<0.5 U
05/96	<0.5 U
07/02	0.58
09/02	0.47 J

IR04MW13A	
Date	Conc.
11/91	<10 U
02/92	<10 U
02/92	<10 U
06/92	<10 U
06/92	<10 U
03/01	2
07/02	2.3
09/02	2.3
06/04	2.1
09/04	4.2
12/04	2.8
03/05	4

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

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 ERRG RESOURCES GROUP, INC.**

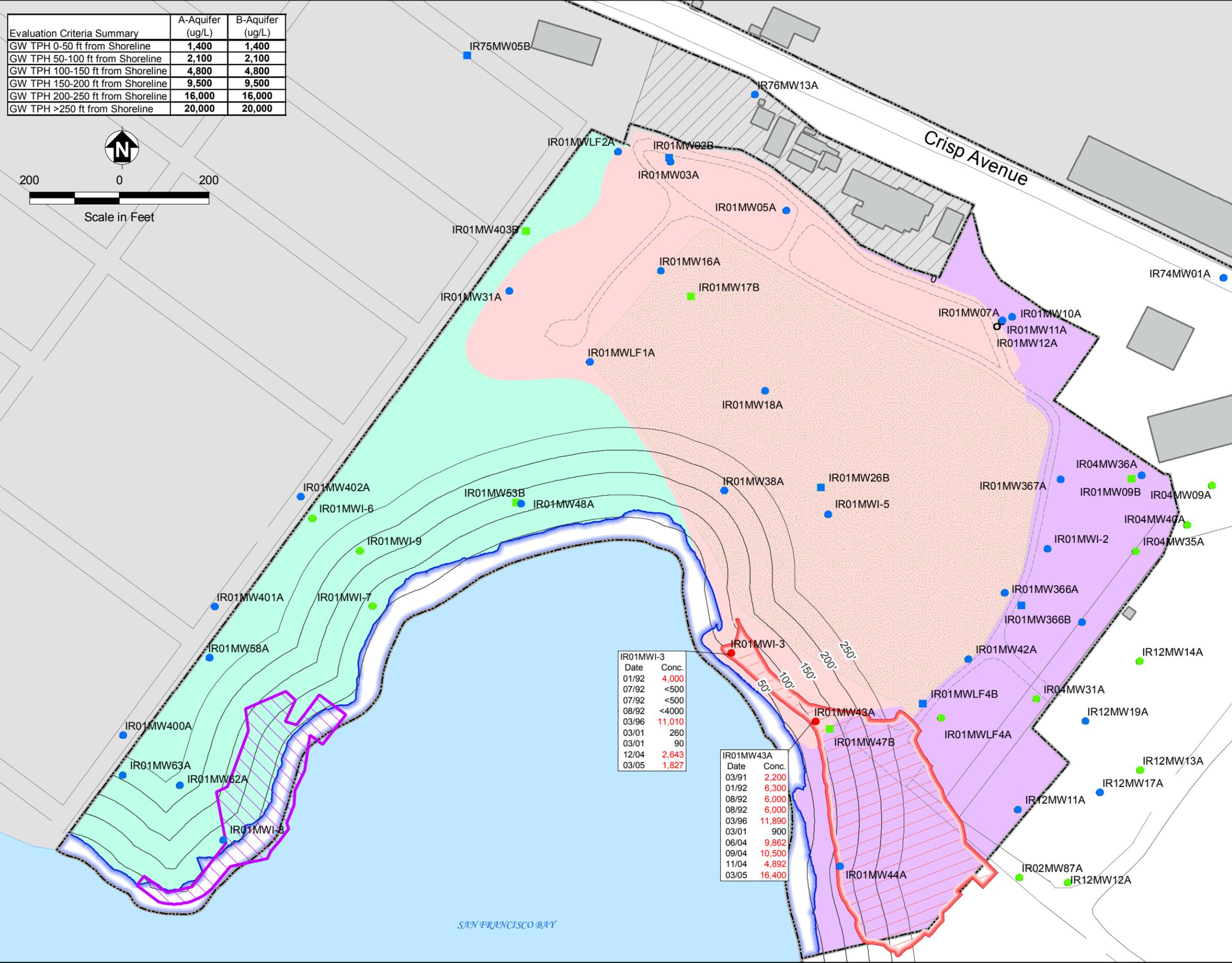
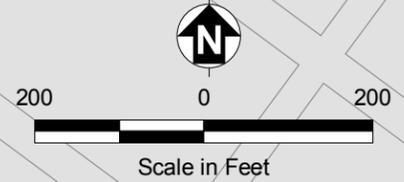
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-62

**VINYL CHLORIDE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
GW TPH 0-50 ft from Shoreline	1,400	1,400
GW TPH 50-100 ft from Shoreline	2,100	2,100
GW TPH 100-150 ft from Shoreline	4,800	4,800
GW TPH 150-200 ft from Shoreline	9,500	9,500
GW TPH 200-250 ft from Shoreline	16,000	16,000
GW TPH >250 ft from Shoreline	20,000	20,000



IR01MWI-3	Date	Conc.
	01/92	4,000
	07/92	<500
	07/92	<500
	08/92	<4000
	03/96	11,010
	03/01	260
	03/01	90
	12/04	2,643
	03/05	1,827

IR01MW43A	Date	Conc.
	03/91	2,200
	01/92	6,300
	08/92	6,000
	08/92	6,000
	03/96	11,890
	03/01	900
	06/04	9,862
	09/04	10,500
	11/04	4,892
	03/05	16,400

- A-aquifer Well
- B-aquifer Well
- /□ Not Analyzed for Analyte
- /■ Analyte Not Detected
- /■ Analyte Exceeds Reporting Limit
- /■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- 250'- Distance from Shoreline in Feet
- ▨ Metal Slag Area (final boundary)
- ▨ PCB Hot Spot (final boundary)
- ▨ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▨ UCSF Compound
- ▨ Landfill Area
- ▨ Adjacent Area
- ▨ Panhandle Area
- ▨ Shoreline Area
- ▨ San Francisco Bay
- ▨ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows. Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion
 ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

IR01MWLF1A	Date	Conc.
	07/04	2.1
	09/04	8.4
	11/04	2.5
	03/05	0.57

ENGINEERING/REMEDIATION
 ERRG RESOURCES GROUP, INC.

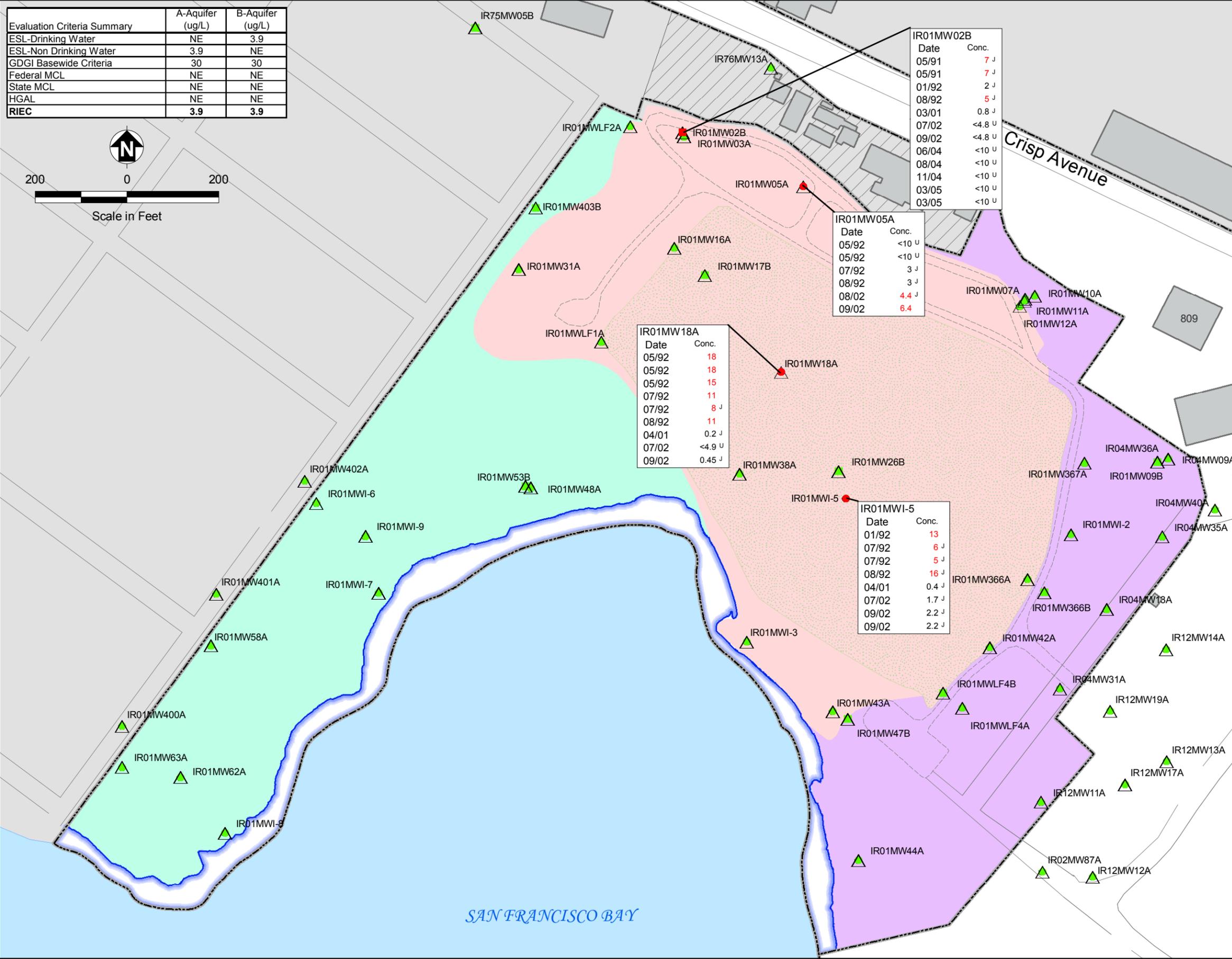
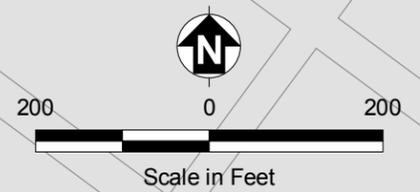
Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-64

TOTAL TPH
 IN GROUNDWATER

Remedial Investigation/Feasibility Study for Parcel E-2

Evaluation Criteria Summary	A-Aquifer (ug/L)	B-Aquifer (ug/L)
ESL-Drinking Water	NE	3.9
ESL-Non Drinking Water	3.9	NE
GDGI Basewide Criteria	30	30
Federal MCL	NE	NE
State MCL	NE	NE
HGAL	NE	NE
RIEC	3.9	3.9



IR01MW02B	
Date	Conc.
05/91	7 J
05/91	7 J
01/92	2 J
08/92	5 J
03/01	0.8 J
07/02	<4.8 U
09/02	<4.8 U
06/04	<10 U
08/04	<10 U
11/04	<10 U
03/05	<10 U
03/05	<10 U

IR01MW05A	
Date	Conc.
05/92	<10 U
05/92	<10 U
07/92	3 J
08/92	3 J
08/02	4.4 J
09/02	6.4

IR01MW18A	
Date	Conc.
05/92	18
05/92	18
05/92	15
07/92	11
07/92	8 J
08/92	11
04/01	0.2 J
07/02	<4.9 U
09/02	0.45 J

IR01MWI-5	
Date	Conc.
01/92	13
07/92	6 J
07/92	5 J
08/92	16 J
04/01	0.4 J
07/02	1.7 J
09/02	2.2 J
09/02	2.2 J

- △ Reporting Limit Exceeds RIEC (for at least one sample)
- A-aquifer Well
- B-aquifer Well
- / □ Not Analyzed for Analyte
- / ■ Analyte Not Detected
- / ■ Analyte Exceeds Reporting Limit
- / ■ Analyte Exceeds Criterion
- Road
- - - Gravel Road
- ▭ Metal Slag Area (final boundary)
- ▭ PCB Hot Spot (final boundary)
- ▭ Limit of Landfill Cap
- ▭ Parcel Boundary
- ▭ Building
- ▭ UCSF Compound
- ▭ Landfill Area
- ▭ Adjacent Area
- ▭ Panhandle Area
- ▭ Shoreline Area
- ▭ San Francisco Bay
- ▭ Non-Navy Property

Notes:
 Results are shown for locations where data has exceeded the RIEC. Red text indicates results that exceed the RIEC. Where results are shown as non-detect (<), the reporting limit follows.
 Excavation boundaries (as of April 2006) at PCB Hot Spot and Metal Slag Area are shown for informational purposes. Soil removal in these areas (up to depths of 14 feet bgs) is expected to reduce groundwater concentrations (to be verified by ongoing monitoring).

Conc. = concentration
 ESL = environmental screening level
 GDGI = Groundwater Data Gaps Investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = Maximum Contaminant Level
 NA = not analyzed
 NE = not established
 RIEC = Remedial Investigation Evaluation Criterion

ft bgs = feet below ground surface
 ug/L = microgram per liter
 J = estimated value
 U = value was not detected above the reporting limit
 UJ = Analyte is considered not present above the level of the associated value; the associated value is considered quantitatively estimated.
 Numbers associated with qualifiers are further defined in Appendix J.

Sample Date (mm/yy)	Well ID	Conc. (ug/L)
07/04	IR01MWLF1A	2.1
09/04	IR01MWLF1A	8.4
11/04	IR01MWLF1A	2.5
03/05	IR01MWLF1A	0.57

ENGINEERING/REMEDIAL
 ERRG RESOURCES GROUP, INC.

Hunters Point Shipyard, San Francisco, California
 U.S. Department of the Navy, BRAC PMO West, San Diego, California

FIGURE 5-65

**FLUORENE
 IN GROUNDWATER**

Remedial Investigation/Feasibility Study for Parcel E-2

Tables

**Table 5-1 Data Summary - Anions Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
UNIONIZED AMMONIA	A	77 / 87 ⁽¹⁾	20 - 1,750 ⁽¹⁾	0 - 2,078 ⁽²⁾
	B	34 / 43 ⁽¹⁾	20 - 500 ⁽¹⁾	0 - 2,271 ⁽²⁾
CHLORIDE	A	225 / 225	200 - 1.0E+06	3,300 - 1.85E+07
	B	73 / 73	200 - 200,000	2,500 - 3.2E+06
FLUORIDE	A	46 / 81	100 - 5,000	84 - 2,100
	B	10 / 44	100 - 2,000	86 - 500
NITRATE	A	39 / 220	10 - 5,000	20 - 16,400
	B	33 / 71	10 - 5,000	300 - 27,600
NITRITE	A	7 / 201	4 - 50,000	6 - 59,000
	B	5 / 63	5 - 5,000	6 - 12,600
TOTAL KJELDAHL NITROGEN	A	80 / 88	70 - 2,500	520 - 43,700
	B	39 / 43	70 - 500	400 - 13,800
ORTHOPHOSPHATE	A	24 / 162	50 - 20,000	75 - 1,400
	B	12 / 56	50 - 2,000	85 - 1,100
CYANIDE	A	21 / 166	0.1 - 10	0.84 - 80
	B	3 / 63	3 - 10	5.4 - 20
SULFATE	A	185 / 225	40 - 100,000	300 - 2,430,000
	B	49 / 73	100 - 50,000	500 - 286,000
SULFIDE	A	33 / 86	3 - 1,000	4 - 3,700
	B	3 / 45	3 - 1,000	5 - 1,600

Notes

⁽¹⁾: Values for ammonia

⁽²⁾: Values for unionized ammonia, calculated based on ammonia detections and other field parameters

µg/L - micrograms per liter

**Table 5-2 Data Summary - Metals Detected in Parcel E-2 Groundwater and HGAL Information
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)	Ambient Level (µg/L)	Detections Exceeding Ambient Level
ALUMINUM	A	55 / 235	10 - 500	15.3 - 183,000	NA	NA
	B	18 / 66	10 - 100	22.2 - 4,040	NA	NA
ANTIMONY	A	91 / 231	0.02 - 32	0.17 - 286	43.3	8
	B	19 / 65	0.1 - 32	0.25 - 96.3	NA	NA
ARSENIC	A	138 / 237	0.2 - 25	1.1 - 208	27.3	21
	B	32 / 64	1 - 5	1.2 - 27.7	NA	NA
BARIUM	A	237 / 238	0.3 - 25	1.2 - 7,480	504	84
	B	64 / 64	0.31 - 10	8.9 - 423	NA	NA
BERYLLIUM	A	19 / 227	0.1 - 10	0.11 - 5.1	1.40	9
	B	3 / 64	0.19 - 2	0.28 - 1.2	NA	NA
CADMIUM	A	27 / 230	0.2 - 25	0.6 - 48.4	5.08	9
	B	6 / 66	0.2 - 5	0.5 - 8	NA	NA
CALCIUM	A	180 / 181	8.2 - 132,000	9,070 - 461,000	NA	NA
	B	34 / 34	9 - 500	5,870 - 112,000	NA	NA
CHROMIUM	A	107 / 234	0.4 - 25	0.52 - 2,750	15.7	32
	B	15 / 65	1.4 - 5	1.6 - 80	NA	NA
CHROMIUM VI	A	0 / 139	10 - 10	NA	NA	NA
	B	1 / 23	10 - 10	130 - 130	NA	NA
COBALT	A	98 / 226	0.4 - 25	0.56 - 529	20.8	10
	B	18 / 64	2 - 8.8	0.69 - 12.6	NA	NA
COPPER	A	71 / 236	0.25 - 50	1.3 - 15,900	28.0	19
	B	20 / 64	1.6 - 25.6	1.1 - 11.8	NA	NA
IRON	A	134 / 181	3.5 - 400	11.4 - 333,000	2,380	63
	B	21 / 34	5 - 400	15.3 - 9,630	NA	NA
LEAD	A	75 / 237	0.004 - 320	0.046 - 6,520	14.4	24
	B	16 / 64	0.02 - 5	0.079 - 13.6	NA	NA
MAGNESIUM	A	181 / 181	4 - 10,000	25,700 - 1.25E+06	1.44E+06	0
	B	34 / 34	20 - 10,000	17,000 - 308,000	NA	NA
MANGANESE	A	225 / 226	0.1 - 25	3.2 - 9,700	8,140	1
	B	64 / 64	0.4 - 25	3.1 - 4,150	NA	NA
MERCURY	A	27 / 233	0.1 - 10	0.11 - 325	0.60	15
	B	1 / 64	0.1 - 0.2	0.36 - 0.36	NA	NA
MOLYBDENUM	A	43 / 149	0.6 - 24.2	1.1 - 40.2	61.9	0
	B	3 / 26	2.9 - 7	6.4 - 17.2	NA	NA
NICKEL	A	159 / 241	0.7 - 28.8	1.8 - 6,260	96.5	25
	B	14 / 64	0.9 - 28.8	1.3 - 75.7	NA	NA
POTASSIUM	A	180 / 181	80 - 8,000	1,600 - 388,000	448,000	0
	B	34 / 34	80 - 883	4,510 - 91,000	NA	NA
SELENIUM	A	18 / 219	1 - 29	2.8 - 22.8	14.5	2
	B	1 / 62	1 - 5	10.3 - 10.3	NA	NA
SILVER	A	14 / 229	0.04 - 7	0.27 - 8.6	7.43	3
	B	0 / 64	1 - 7	NA	NA	NA
SODIUM	A	181 / 181	18 - 55,200	71,700 - 1.07E+07	9.242E+06	3
	B	34 / 34	18 - 33,400	277,000 - 1.7E+06	NA	NA
THALLIUM	A	3 / 213	0.004 - 25	0.021 - 0.116	13.0	0
	B	1 / 61	0.02 - 16	0.203 - 0.203	NA	NA
VANADIUM	A	82 / 150	0.4 - 13	1.3 - 553	26.62	11
	B	9 / 26	1.4 - 15.3	5.2 - 20.3	NA	NA
ZINC	A	70 / 241	0.3 - 250	2.7 - 6,840	75.7	28
	B	12 / 64	1.7 - 50	7.4 - 54.5	NA	NA

Notes:

µg/L - micrograms per liter

HGAL - Hunters Point groundwater ambient level

**Table 5-3 Data Summary - Pesticides and PCBs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
TOTAL PCBs	A	48 / 219	-	0.1 - 74
	B	0 / 66	-	NA
4,4'-DDD	A	3 / 213	0.01 - 10	0.012 - 0.028
	B	0 / 66	0.01 - 0.5	NA
4,4'-DDE	A	3 / 213	0.01 - 5	0.0064 - 0.022
	B	1 / 66	0.01 - 0.5	0.011 - 0.011
4,4'-DDT	A	10 / 213	0.01 - 5	0.0071 - 0.053
	B	0 / 66	0.01 - 0.5	NA
ALDRIN	A	0 / 213	0.005 - 3	NA
	B	0 / 66	0.005 - 0.3	NA
ALPHA-BHC	A	0 / 213	0.005 - 3	NA
	B	0 / 66	0.005 - 0.3	NA
ALPHA-CHLORDANE	A	3 / 213	0.005 - 25	0.0098 - 0.03
	B	0 / 66	0.005 - 3	NA
AZINPHOS METHYL	A	0 / 89	1.9 - 25	NA
	B	0 / 44	1.9 - 5	NA
BETA-BHC	A	3 / 213	0.005 - 3	0.009 - 0.065
	B	1 / 66	0.005 - 0.3	0.038 - 0.038
BOLSTAR	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
COUMAPHOS	A	0 / 89	1 - 5	NA
	B	0 / 44	1 - 2	NA
DEMETON	A	0 / 58	1 - 5	NA
	B	0 / 36	1 - 1	NA
DEMETON-O	A	0 / 29	0.96 - 1	NA
	B	0 / 6	0.96 - 0.96	NA
DEMETON-S	A	0 / 31	0.96 - 1	NA
	B	0 / 8	0.96 - 1	NA
DICHLORVOS	A	0 / 89	0.96 - 5	NA
	B	0 / 44	0.96 - 1	NA
DIMETHOATE	A	0 / 58	0.5 - 2.5	NA
	B	0 / 36	0.5 - 0.5	NA
DISULFOTON	A	0 / 88	0.5 - 2.5	NA
	B	0 / 43	0.5 - 1	NA
DELTA-BHC	A	2 / 213	0.005 - 3	0.004 - 0.01
	B	0 / 66	0.005 - 0.3	NA
DIELDRIN	A	3 / 213	0.01 - 5	0.015 - 0.02
	B	0 / 66	0.01 - 0.5	NA
ENDOSULFAN I	A	1 / 213	0.005 - 3	0.03 - 0.03
	B	0 / 66	0.005 - 0.3	NA
ENDOSULFAN II	A	4 / 213	0.01 - 5	0.016 - 0.08
	B	0 / 66	0.01 - 0.5	NA
ENDOSULFAN SULFATE	A	2 / 213	0.01 - 5	0.015 - 0.04
	B	0 / 66	0.01 - 0.5	NA
ENDRIN	A	3 / 213	0.01 - 5	0.008 - 0.04
	B	0 / 66	0.01 - 0.5	NA
ENDRIN ALDEHYDE	A	4 / 115	0.01 - 1	0.02 - 0.061
	B	0 / 46	0.01 - 0.098	NA
ENDRIN KETONE	A	1 / 178	0.01 - 5	0.07 - 0.07
	B	0 / 58	0.01 - 0.5	NA
EPN	A	0 / 58	0.5 - 2.5	NA
	B	0 / 36	0.5 - 0.5	NA
ETHION	A	0 / 58	0.5 - 2.5	NA
	B	0 / 36	0.5 - 0.5	NA
ETHOPROP	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
FAMPHUR	A	0 / 58	3.5 - 17.5	NA
	B	0 / 36	3.5 - 3.5	NA
FENSULFOTHION	A	0 / 89	0.96 - 12.5	NA
	B	0 / 44	0.96 - 2.5	NA
FENTHION	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
GAMMA-BHC (LINDANE)	A	3 / 213	0.005 - 3	0.008 - 0.03
	B	0 / 66	0.005 - 0.3	NA
GAMMA-CHLORDANE	A	8 / 213	0.005 - 25	0.0094 - 0.1
	B	0 / 66	0.005 - 3	NA

**Table 5-3 Data Summary - Pesticides and PCBs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
HEPTACHLOR	A	8 / 213	0.005 - 3	0.0067 - 0.081
	B	0 / 66	0.005 - 0.3	NA
HEPTACHLOR EPOXIDE	A	3 / 178	0.005 - 3	0.009 - 0.066
	B	0 / 58	0.005 - 0.3	NA
MALATHION	A	0 / 58	0.5 - 2.5	NA
	B	0 / 36	0.5 - 0.5	NA
MERPHOS	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
METHOXYCHLOR	A	0 / 213	0.05 - 25	NA
	B	0 / 66	0.05 - 3	NA
METHYL PARATHION	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
MEVINPHOS	A	0 / 89	1.9 - 17.5	NA
	B	0 / 44	1.9 - 3.5	NA
NALED	A	0 / 89	1.9 - 12.5	NA
	B	0 / 44	1.9 - 2.5	NA
PARATHION	A	0 / 58	0.5 - 2.5	NA
	B	0 / 36	0.5 - 0.5	NA
PHORATE	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
RONNEL	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
STIROPHOS	A	0 / 102	0.5 - 2.5	NA
	B	0 / 51	0.5 - 1	NA
SULFOTEP	A	0 / 58	0.5 - 2.5	NA
	B	0 / 36	0.5 - 0.5	NA
TRICHLORONATE	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
TOKUTHION	A	0 / 89	0.5 - 2.5	NA
	B	0 / 44	0.5 - 1	NA
TOXAPHENE	A	0 / 213	0.5 - 50	NA
	B	0 / 66	0.5 - 5	NA
CHLORPYRIFOS	A	0 / 89	0.5 - 2.5	NA
	B	3 / 44	0.5 - 1	0.014 - 0.1
DIAZINON	A	3 / 89	0.5 - 2.5	0.2 - 0.5
	B	0 / 44	0.5 - 1	NA
HEPTACHLOR EPOXIDE A	A	4 / 35	0.0094 - 0.1	0.007 - 0.037
	B	0 / 8	0.0094 - 0.0098	NA
HEPTACHLOR EPOXIDE B	A	3 / 35	0.0094 - 0.1	0.0051 - 0.015
	B	0 / 8	0.0094 - 0.0098	NA

Notes

µg/L - micrograms per liter

BHC - benzene hexachloride

DDD - dichlorodiphenyldichloroethane

DDE - dichlorodiphenyldichloroethene

DDT - dichlorodiphenyltrichloroethane

PCB - polychlorinated biphenyl

**Table 5-4 Data Summary - SVOCs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
1,2,4-TRICHLOROBENZENE	A	0 / 234	0.5 - 100	NA
	B	0 / 71	0.5 - 10	NA
1,2-DICHLOROBENZENE	A	1 / 199	0.5 - 100	0.2 - 0.2
	B	0 / 64	0.5 - 10	NA
1,3-DICHLOROBENZENE	A	13 / 199	0.5 - 100	0.5 - 13
	B	0 / 64	0.5 - 10	NA
1,4-DICHLOROBENZENE	A	30 / 199	0.5 - 100	0.2 - 16
	B	0 / 64	0.5 - 10	NA
2,2'-OXYBIS(1-CHLOROPROPANE)	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
2,4,5-TRICHLOROPHENOL	A	0 / 157	2 - 250	NA
	B	0 / 30	2 - 50	NA
2,4,6-TRICHLOROPHENOL	A	0 / 230	1 - 100	NA
	B	0 / 67	1 - 10	NA
2,4-DICHLOROPHENOL	A	1 / 230	1 - 100	0.1 - 0.1
	B	0 / 67	1 - 10	NA
2,4-DIMETHYLPHENOL	A	16 / 230	1 - 100	0.1 - 27
	B	1 / 67	1 - 10	2 - 2
2,4-DINITROPHENOL	A	0 / 230	2 - 250	NA
	B	0 / 67	2 - 50	NA
2,4-DINITROTOLUENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
2,6-DINITROTOLUENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
2-CHLORONAPHTHALENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
2-CHLOROPHENOL	A	1 / 230	1 - 100	0.07 - 0.07
	B	0 / 67	1 - 10	NA
2-METHYLNAPHTHALENE	A	30 / 234	1 - 100	0.2 - 24
	B	6 / 71	1 - 10	2 - 13
2-METHYLPHENOL	A	5 / 230	1 - 100	0.2 - 8
	B	0 / 67	1 - 10	NA
2-NITROANILINE	A	0 / 157	2 - 250	NA
	B	0 / 30	2 - 50	NA
2-NITROPHENOL	A	1 / 234	1 - 100	2.3 - 2.3
	B	0 / 71	1 - 20	NA
3,3'-DICHLOROBENZIDINE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 24	NA
3-NITROANILINE	A	0 / 161	2 - 250	NA
	B	0 / 34	2 - 50	NA
4,6-DINITRO-2-METHYLPHENOL	A	0 / 230	2 - 250	NA
	B	0 / 67	2 - 50	NA
4-BROMOPHENYL-PHENYLETHER	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
4-CHLORO-3-METHYLPHENOL	A	1 / 230	1 - 100	14 - 14
	B	0 / 67	1 - 20	NA
4-CHLOROANILINE	A	0 / 161	1 - 100	NA
	B	0 / 34	1 - 10	NA
4-CHLOROPHENYL-PHENYLETHER	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
4-METHYLPHENOL	A	29 / 230	1 - 100	0.6 - 35
	B	1 / 67	1 - 10	3 - 3
4-NITROANILINE	A	0 / 161	2 - 250	NA
	B	0 / 34	2 - 50	NA
4-NITROPHENOL	A	1 / 230	2 - 250	7.5 - 7.5
	B	0 / 67	2 - 50	NA
ACENAPHTHENE	A	40 / 234	1 - 100	0.2 - 29
	B	5 / 71	1 - 10	2 - 12
ACENAPHTHYLENE	A	11 / 234	1 - 100	0.27 - 2
	B	0 / 71	1 - 10	NA
ANTHRACENE	A	6 / 234	1 - 100	0.2 - 3
	B	0 / 71	1 - 10	NA
AZOBENZENE	A	0 / 4	9.4 - 9.4	NA
	B	0 / 3	9.4 - 10	NA

**Table 5-4 Data Summary - SVOCs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
BENZO(A)ANTHRACENE	A	9 / 234	1 - 100	0.2 - 8.7
	B	1 / 71	1 - 10	0.9 - 0.9
BENZO(A)PYRENE	A	6 / 232	1 - 100	1.4 - 3
	B	1 / 71	1 - 10	0.83 - 0.83
BENZO(B)FLUORANTHENE	A	6 / 232	1 - 100	1.5 - 6
	B	2 / 71	1 - 10	0.61 - 1
BENZO(G,H,I)PERYLENE	A	3 / 232	1 - 100	1.4 - 3
	B	0 / 71	1 - 10	NA
BENZO(K)FLUORANTHENE	A	1 / 232	1 - 100	1.1 - 1.1
	B	1 / 71	1 - 10	1.2 - 1.2
BENZOIC ACID	A	7 / 213	47 - 200	1.5 - 22
	B	0 / 67	47 - 50	NA
BENZYL ALCOHOL	A	1 / 178	9.4 - 50	0.75 - 0.75
	B	0 / 60	9.4 - 20	NA
BIS(2-CHLOROETHOXY)METHANE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
BIS(2-CHLOROETHYL)ETHER	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
BIS(2-ETHYLHEXYL)PHTHALATE	A	1 / 234	1 - 100	3.1 - 3.1
	B	1 / 71	1 - 10	160 - 160
BUTYLBENZYLPHthalate	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
CARBAZOLE	A	4 / 56	1 - 100	0.3 - 0.69
	B	2 / 11	1 - 9.6	0.36 - 0.4
CHRYSENE	A	15 / 234	1 - 100	0.1 - 8.6
	B	1 / 71	1 - 10	1.2 - 1.2
DIBENZ(A,H)ANTHRACENE	A	1 / 232	1 - 100	1.3 - 1.3
	B	0 / 71	1 - 10	NA
DIBENZOFURAN	A	19 / 234	1 - 100	0.36 - 17
	B	4 / 71	1 - 10	3 - 8
DIETHYLPHthalate	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
DIMETHYLPHthalate	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
DI-N-BUTYLPHthalate	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
DI-N-OCTYLPHthalate	A	0 / 232	1 - 100	NA
	B	0 / 71	1 - 10	NA
FLUORANTHENE	A	20 / 234	1 - 100	0.3 - 13
	B	4 / 71	1 - 10	0.3 - 7
FLUORENE	A	38 / 234	1 - 100	0.1 - 18
	B	5 / 71	1 - 10	0.8 - 7
HEXACHLORO BENZENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
HEXACHLOROBUTADIENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
HEXACHLOROCYCLOPENTADIENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 50	NA
HEXACHLOROETHANE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
INDENO(1,2,3-CD)PYRENE	A	3 / 232	1 - 100	0.81 - 3
	B	0 / 71	1 - 10	NA
ISOPHORONE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
NAPHTHALENE	A	55 / 234	1 - 100	0.08 - 190
	B	7 / 71	1 - 10	2.3 - 37
NITROBENZENE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
N-NITROSO-DI-N-PROPYLAMINE	A	0 / 234	1 - 100	NA
	B	0 / 71	1 - 10	NA
N-NITROSODIMETHYLAMINE	A	0 / 77	9.4 - 25	NA
	B	0 / 40	9.4 - 10	NA
N-NITROSODIPHENYLAMINE	A	6 / 234	1 - 100	0.4 - 6
	B	0 / 71	1 - 10	NA

**Table 5-4 Data Summary - SVOCs Detected in Parcel E-2 Groundwater
 Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
PENTACHLOROPHENOL	A	2 / 230	2 - 250	2 - 6
	B	0 / 67	2 - 50	NA
PHENANTHRENE	A	29 / 234	1 - 100	0.1 - 39
	B	5 / 71	1 - 10	0.6 - 9
PHENOL	A	40 / 230	1 - 100	0.8 - 120
	B	0 / 67	1 - 10	NA
PYRENE	A	18 / 234	1 - 100	0.2 - 15
	B	5 / 71	1 - 10	0.7 - 5.2

Notes

µg/L - micrograms per liter

SVOC - semi-volatile organic compounds

**Table 5-5 Data Summary - VOCs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
1,1,1,2 TETRACHLOROETHANE	A	0 / 79	0.5 - 100	NA
	B	0 / 40	0.5 - 1	NA
1,1,1-TRICHLOROETHANE	A	12 / 255	0.5 - 100	21 - 159.16
	B	0 / 73	0.5 - 5	NA
1,1,2-TRICHLOROETHANE	A	0 / 255	0.5 - 100	NA
	B	0 / 73	0.5 - 5	NA
1,1,2,2-TETRACHLOROETHANE	A	1 / 254	0.5 - 100	2 - 2
	B	0 / 73	0.5 - 5	NA
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	A	0 / 123	0.5 - 100	NA
	B	0 / 47	0.5 - 5	NA
1,1-DICHLOROETHANE	A	27 / 255	0.5 - 200	0.1 - 55.32
	B	0 / 73	0.5 - 5	NA
1,1-DICHLOROETHENE	A	12 / 255	0.5 - 100	20 - 44
	B	0 / 73	0.5 - 5	NA
1,1-DICHLOROPROPENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
1,2,3-TRICHLOROBENZENE	A	0 / 47	1 - 20	NA
	B	0 / 10	1 - 2	NA
1,2,3-TRICHLOROPROPANE	A	0 / 79	1 - 200	NA
	B	1 / 40	1 - 1	0.55 - 0.55
1,2,4-TRICHLOROBENZENE	A	2 / 143	0.5 - 100	0.32 - 0.52
	B	1 / 53	0.5 - 10	0.5 - 0.5
1,2,4-TRIMETHYLBENZENE	A	2 / 3	1 - 4	1.8 - 3.7
	B	3 / 3	1 - 1	1.1 - 2.2
1,2-DIBROMO-3-CHLOROPROPANE	A	0 / 143	1 - 400	NA
	B	0 / 53	1 - 2	NA
1,2-DIBROMOETHANE	A	0 / 67	1 - 20	NA
	B	0 / 16	1 - 2	NA
1,2-DICHLOROBENZENE	A	20 / 143	0.5 - 100	0.09 - 13
	B	1 / 53	0.5 - 10	0.09 - 0.09
1,2-DICHLOROETHANE	A	10 / 255	0.5 - 100	0.18 - 1.6
	B	5 / 73	0.5 - 5	0.13 - 3.5
1,2-DICHLOROETHENE (TOTAL)	A	10 / 112	0.5 - 25	0.8 - 10
	B	0 / 20	5 - 5	NA
1,2-DICHLOROPROPANE	A	0 / 255	0.5 - 100	NA
	B	0 / 73	0.5 - 5	NA
1,3,5-TRIMETHYLBENZENE	A	2 / 3	1 - 4	0.8 - 1.1
	B	3 / 3	1 - 1	0.4 - 0.7
1,3-DICHLOROBENZENE	A	23 / 143	0.5 - 100	0.16 - 7.7
	B	0 / 53	0.5 - 10	NA
1,3-DICHLOROPROPANE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
1,4-DICHLOROBENZENE	A	36 / 143	0.5 - 100	0.11 - 12
	B	0 / 53	0.5 - 10	NA
2,2-DICHLOROPROPANE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
2-BUTANONE	A	1 / 179	4 - 200	3 - 3
	B	0 / 36	5 - 20	NA
2-CHLOROTOLUENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
2-HEXANONE	A	3 / 176	1.2 - 200	2 - 3
	B	0 / 36	5 - 20	NA
4-CHLOROTOLUENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
4-METHYL-2-PENTANONE	A	4 / 178	4 - 200	1.9 - 26.95
	B	0 / 36	5 - 20	NA
ACETONE	A	1 / 178	1.3 - 200	66 - 66
	B	0 / 36	2 - 20	NA
BENZENE	A	101 / 255	0.5 - 100	0.16 - 44
	B	8 / 73	0.5 - 5	0.46 - 4.1
BROMOBENZENE	A	0 / 79	0.5 - 100	NA
	B	0 / 40	0.5 - 1	NA
BROMOCHLOROMETHANE	A	0 / 67	0.5 - 11	NA
	B	0 / 16	0.5 - 1	NA
BROMODICHLOROMETHANE	A	0 / 255	0.5 - 100	NA
	B	0 / 73	0.5 - 5	NA

**Table 5-5 Data Summary - VOCs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
BROMOFORM	A	0 / 255	0.5 - 100	NA
	B	0 / 73	0.5 - 5	NA
BROMOMETHANE	A	1 / 255	0.5 - 200	0.38 - 0.38
	B	1 / 73	0.5 - 10	2.3 - 2.3
CARBON DISULFIDE	A	22 / 179	0.5 - 25	0.19 - 8
	B	2 / 36	0.5 - 5	3 - 3
CARBON TETRACHLORIDE	A	0 / 255	0.5 - 100	NA
	B	1 / 73	0.5 - 5	3 - 3
CHLORO BENZENE	A	68 / 254	0.5 - 100	0.12 - 24
	B	1 / 73	0.5 - 5	0.44 - 0.44
CHLOROETHANE	A	15 / 255	0.5 - 100	0.21 - 10
	B	1 / 73	0.5 - 10	0.3 - 0.3
CHLOROFORM	A	9 / 255	0.5 - 100	0.17 - 2.4
	B	11 / 73	0.5 - 5	0.17 - 4.4
CHLOROMETHANE	A	5 / 255	0.5 - 100	0.2 - 0.4
	B	0 / 73	0.5 - 10	NA
CIS-1,2-DICHLOROETHENE	A	28 / 143	0.5 - 100	0.12 - 50
	B	5 / 53	0.5 - 1	0.21 - 0.8
CIS-1,3-DICHLOROPROPENE	A	0 / 255	0.5 - 100	NA
	B	0 / 73	0.5 - 5	NA
CYCLOHEXANE	A	10 / 43	1 - 10	0.21 - 2.4
	B	1 / 7	1 - 1	0.55 - 0.55
DIBROMOCHLOROMETHANE	A	0 / 255	0.5 - 100	NA
	B	0 / 73	0.5 - 5	NA
DIBROMOMETHANE	A	0 / 79	0.5 - 100	NA
	B	0 / 40	0.5 - 1	NA
DICHLORODIFLUOROMETHANE	A	0 / 123	0.5 - 200	NA
	B	0 / 47	0.5 - 1	NA
ETHYLBENZENE	A	47 / 254	0.5 - 100	0.13 - 25
	B	6 / 73	0.5 - 5	0.24 - 1
HEXACHLOROBUTADIENE	A	0 / 3	1 - 100	NA
	B	0 / 3	1 - 10	NA
ISOPROPYLBENZENE	A	21 / 47	1 - 20	0.07 - 60
	B	1 / 10	1 - 2	0.09 - 0.09
METHYL ACETATE	A	0 / 43	1 - 10	NA
	B	0 / 7	1 - 1	NA
METHYLCYCLOHEXANE	A	7 / 43	1 - 10	0.2 - 2.1
	B	1 / 7	1 - 1	0.2 - 0.2
METHYLENE CHLORIDE	A	0 / 255	0.5 - 1000	NA
	B	0 / 73	2 - 15	NA
NAPHTHALENE	A	2 / 3	1 - 100	0.3 - 2.7
	B	1 / 3	1 - 10	0.3 - 0.3
N-BUTYLBENZENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
O-XYLENE	A	18 / 47	0.5 - 5	0.11 - 4.8
	B	4 / 10	0.5 - 1	1.2 - 2.3
PARA-ISOPROPYL TOLUENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
PROPYLBENZENE	A	2 / 3	1 - 4	0.4 - 0.8
	B	1 / 3	1 - 1	0.2 - 0.2
SEC-BUTYLBENZENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
STYRENE	A	0 / 178	0.5 - 25	NA
	B	0 / 36	0.5 - 5	NA
TERT-BUTYLBENZENE	A	0 / 3	1 - 4	NA
	B	0 / 3	1 - 1	NA
TERT-BUTYL METHYL ETHER	A	19 / 143	0.5 - 100	0.08 - 1.7
	B	0 / 53	0.5 - 1	NA
TETRACHLOROETHENE	A	22 / 254	0.5 - 100	0.11 - 62
	B	1 / 73	0.5 - 5	0.23 - 0.23
TOLUENE	A	50 / 254	0.5 - 100	0.1 - 7
	B	14 / 73	0.5 - 5	0.12 - 1.6
TRANS-1,2-DICHLOROETHENE	A	11 / 143	0.5 - 100	0.23 - 7.2
	B	0 / 53	0.5 - 1	NA
TRANS-1,3-DICHLOROPROPENE	A	0 / 255	0.5 - 100	NA
	B	1 / 73	0.5 - 5	0.67 - 0.67

**Table 5-5 Data Summary - VOCs Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
TRICHLOROETHENE	A	23 / 255	0.5 - 100	0.12 - 440
	B	8 / 73	0.5 - 5	0.18 - 32
TRICHLOROFLUOROMETHANE	A	1 / 123	0.5 - 100	0.39 - 0.39
	B	0 / 47	0.5 - 1	NA
VINYL CHLORIDE	A	12 / 255	0.5 - 100	0.36 - 4.2
	B	0 / 73	0.5 - 10	NA
XYLENE (TOTAL)	A	53 / 207	0.5 - 100	0.2 - 170
	B	6 / 63	0.5 - 5	0.22 - 2.2
VINYL ACETATE	A	0 / 102	10 - 50	NA
	B	0 / 23	10 - 10	NA

Notes

µg/L - micrograms per liter

SVOC - semi-volatile organic compounds

**Table 5-6 Data Summary - Petroleum Hydrocarbons Detected in Parcel E-2 Groundwater
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Detection Frequency	Range of Reporting Limits (µg/L)	Range of Results (µg/L)
GASOLINE-RANGE ORGANICS	A	33 / 183	20 - 2,000	16 - 1,100
	B	3 / 60	20 - 500	11 - 22
DIESEL-RANGE ORGANICS	A	72 / 183	50 - 4,000	69 - 6,600
	B	8 / 60	50 - 500	130 - 490
MOTOR OIL RANGE ORGANICS	A	48 / 82	100 - 2,500	110 - 9,800
	B	0 / 40	100 - 500	NA
TOTAL OIL AND GREASE	A	23 / 70	5,000 - 8,000	3,600 - 12,900
	B	7 / 36	5,000 - 5,000	3,500 - 6,000
TOTAL PETROLEUM HYDROCARBONS	A	102 / 183	NA ⁽¹⁾	16 - 16,400
	B	10 / 60	NA ⁽¹⁾	100 - 512

Notes

⁽¹⁾: Values for TPH are calculated, and thus have no laboratory reporting limits

µg/L - micrograms per liter

Table 5-7 Limits and Standards for Parcel E-2 Aquifers– Anions
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
UNIONIZED AMMONIA	A	NA		NA		NA		NA		NA		25	Basin Plan, Annual Median	25	GDGI	77
	B	NA		NA		--		--		NA		25		25	GDGI	34
CHLORIDE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		--	NA	--		NA		--		NA		NA
FLUORIDE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		4,000	NA	2,000		NA		2000		2,000	State MCL	0
NITRATE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		--	NA	--		NA		--		NA		NA
NITRITE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		1,000	NA	1,000		NA		1,000		1,000	Federal, State MCL	2
TOTAL KJELDAHL NITROGEN	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		--	NA	--		NA		--		NA		NA
ORTHOPHOSPHATE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		--	NA	--		NA		--		NA		NA
CYANIDE	A	NA		1	Aquatic Habitat Goal	NA	NA	NA		NA	NA	1	Based on ESL	1	NDW ESL	20
	B	1	Aquatic Habitat Goal	NA		200	NA	150		NA	NA	1	Based on ESL	1	DW ESL	3
SULFATE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		--	NA	--		NA		--		NA		NA
SULFIDE	A	NA		NA		NA	NA	NA		NA		--		NA		NA
	B	NA		NA		--	NA	--		NA		--		NA		NA

Notes:

DW = drinking water
 ESL = environmental screening level
 GDGI = groundwater data gaps investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = maximum contaminant level
 NDW = non drinking water
 RI = remedial investigation
 mg/L = milligrams per liter
 µg/L = micrograms per liter

References:

- (1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1a. Groundwater Screening Levels (groundwater IS a current or potential drinking water resource)*, Interim Final - February 2005.
- (2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1b. Groundwater Screening Levels (groundwater IS NOT a current or potential drinking water resource)*, Interim Final - February 2005.
- (3) U.S. Environmental Protection Agency, Title 40, Code of Federal Regulations, Parts 141 [Primary MCLs] and 143 [Secondary MCLs], <http://www.epa.gov/waterscience/drinking/standards>
- (4) California Department of Health Servicesm Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003) <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>.
- (5) PRC. Environmental Management, Inc. 1996. *Technical Memorandum: Estimation of HPS Groundwater Ambient Levels, HPS, San Francisco, California*. September 16.
- (6) Tetra Tech. 2003. *Final Parcel E Groundwater Summary Report Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California*. October 17.

Table 5-8 Limits and Standards for Parcel E-2 Aquifers– Metals
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
ALUMINUM	A	NA		--		NA	NA	NA		--		--		NA		NA
	B	--		NA		NA	NA	1,000		NA		1,000		1000	State MCL	2
ANTIMONY	A	NA		30	Aquatic Habitat Goal	NA	NA	NA		43.3		43.26		43.3	HGAL, GDGI	8
	B	6	DW Toxicity	NA		6	NA	6		NA		6		6	DW ESL	7
ARSENIC	A	NA		36	Aquatic Habitat Goal	NA	NA	NA		27.3		36		36	NDW ESL	17
	B	36	Aquatic Habitat Goal	NA		10	NA	50		NA		50		10	Federal MCL	4
BARIUM	A	NA		1,000	Aquatic Habitat Goal	NA	NA	NA		504		504.2		1000	NDW ESL	35
	B	1,000	DW Toxicity	NA		2,000	NA	1,000		NA		1,000		1000	DW ESL	0
BERYLLIUM	A	NA		2.65	Aquatic Habitat Goal	NA	NA	NA		1.40		1.4		2.65	NDW ESL	4
	B	2.65	Aquatic Habitat Goal	NA		4	NA	4		NA		4		2.65	DW ESL	0
CADMIUM	A	NA		1.1	Aquatic Habitat Goal	NA	NA	NA		5.08		9.3	Based on ESL	5.08	HGAL	9
	B	1.1	Aquatic Habitat Goal	NA		5	NA	5		NA		5	Based on ESL	1.1	DW ESL	4
CALCIUM	A	NA		--		NA	NA	NA		--		--		NA		NA
	B	--		NA		--	NA	--		NA		--		NA		NA
CHROMIUM	A	NA		180	Aquatic Habitat Goal	NA	NA	NA		15.7		1,030	One-tenth EPA acute toxicity	180	NDW ESL	11
	B	50	DW Toxicity	NA		100	NA	50		NA		50	One-tenth EPA acute toxicity	50	DW ESL	4
CHROMIUM VI	A	NA		11	Aquatic Habitat Goal	NA	NA	NA		--		50		11	NDW ESL	0
	B	11	Aquatic Habitat Goal	NA		--	NA	--		NA		50		11	DW ESL	1
COBALT	A	NA		3	Aquatic Habitat Goal	NA	NA	NA		20.8		20.8		20.8	HGAL, GDGI	10
	B	3	Aquatic Habitat Goal	NA		--	NA	--		NA		--		3	DW ESL	1
COPPER	A	NA		3.1	Aquatic Habitat Goal	NA	NA	NA		28.0		28.04	Based on ESL	28.0	HGAL, GDGI	19
	B	3.1	Aquatic Habitat Goal	NA		1,300	NA	1,300		NA		3.1	Based on ESL	3.1	DW ESL	11
IRON	A	NA		--		NA	NA	NA		2,380		2,380		2380	HGAL, GDGI	63
	B	--		NA		300	NA	--		NA		--		300	Federal MCL	15
LEAD	A	NA		2.5	Aquatic Habitat Goal	NA	NA	NA		14.4		14.44	Based on HGAL	14.4	HGAL, GDGI	24
	B	2.5	Aquatic Habitat Goal	NA		15	NA	15		NA		8.1		2.5	DW ESL	8
MAGNESIUM	A	NA		--		NA	NA	NA		1,440,000		1,440,000		1,440,000	HGAL, GDGI	0
	B	--		NA		--	NA	--		NA		--		NA		NA
MANGANESE	A	NA		--		NA	NA	NA		8,140		8,140		8140	HGAL, GDGI	1
	B	--		NA		--	NA	--		NA		--		NA		NA
MERCURY	A	NA		0.012	Aquatic Habitat Goal	NA	NA	NA		0.60		0.94		0.60	HGAL	15
	B	0.012	Aquatic Habitat Goal	NA		2	NA	2		NA		0.94		0.012	DW ESL	1
MOLYBDENUM	A	NA		240	Aquatic Habitat Goal	NA	NA	NA		61.9		61.9		61.9	HGAL, GDGI	0
	B	35	DW Toxicity	NA		--	NA	--		NA		--		35	DW ESL	0
NICKEL	A	NA		8.2	Aquatic Habitat Goal	NA	NA	NA		96.5		96.48	Based on ESL	96.5	HGAL, GDGI	25
	B	8.2	Aquatic Habitat Goal	NA		--	NA	100		NA		8.2	Based on ESL	8.2	DW ESL	5
POTASSIUM	A	NA		--		NA	NA	NA		448,000		448,000		448,000	HGAL, GDGI	0
	B	2		NA		--	NA	--		NA		--		2	DW ESL	34
SELENIUM	A	NA		5	Aquatic Habitat Goal	NA	NA	NA		14.5		71		14.5	HGAL	2
	B	5	Aquatic Habitat Goal	NA		50	NA	50		NA		50		5	DW ESL	1
SILVER	A	NA		0.19	Aquatic Habitat Goal	NA	NA	NA		7.43		7.43	Based on ESL	7.43	HGAL, GDGI	3
	B	0.19	Aquatic Habitat Goal	NA		--	NA	--		NA		0.19	Based on ESL	0.19	DW ESL	0
SODIUM	A	NA		--		NA	NA	NA		9,242,000		9,242,000		9,242,000	HGAL, GDGI	3
	B	--		NA		--	NA	--		NA		--		NA		NA
THALLIUM	A	NA		20	Aquatic Habitat Goal	NA	NA	NA		13.0		213	One-tenth EPA acute toxicity	20	NDW ESL	0
	B	2	DW Toxicity	NA		2	NA	2		NA		2	One-tenth EPA acute toxicity	2	DW ESL	0
VANADIUM	A	NA		19	Aquatic Habitat Goal	NA	NA	NA		26.6		26.62		26.6	HGAL, GDGI	11
	B	15	DW Toxicity	NA		--	NA	--		NA		--		15	DW ESL	3
ZINC	A	NA		81	Aquatic Habitat Goal	NA	NA	NA		75.7		81	Based on ESL	81	NDW ESL	28
	B	81	Aquatic Habitat Goal	NA		--	NA	--		NA		81	Based on ESL	81	DW ESL	0

Notes:

DW = drinking water
 EPA - U.S. Environmental Protection Agency
 ESL = environmental screening level
 GDGI = groundwater data gaps investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = maximum contaminant level

NDW = non drinking water
 RI = remedial investigation
 mg/L = milligrams per liter
 µg/L = micrograms per liter

References:

- (1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1a. Groundwater Screening Levels (groundwater IS a current or potential drinking water resource)*, Interim Final - February 2005.
- (2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1b. Groundwater Screening Levels (groundwater IS NOT a current or potential drinking water resource)*, Interim Final - February 2005.
- (3) U.S. Environmental Protection Agency, Title 40, Code of Federal Regulations, Parts 141 [Primary MCLs] and 143 [Secondary MCLs], <http://www.epa.gov/waterscience/drinking/standards>
- (4) California Department of Health Servicesm Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003) <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>.
- (5) PRC. Environmental Management, Inc. 1996. *Technical Memorandum: Estimation of HPS Groundwater Ambient Levels, HPS, San Francisco, California*.September 16.
- (6) Tetra Tech. 2003. *Final Parcel E Groundwater Summary Report Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California*.October 17.

Table 5-9 Limits and Standards for Parcel E-2 Aquifers-- Pesticides and PCBs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
TOTAL PCBs	A	NA		0.014		NA		NA		NA		0.03	Based on ESL for total PCBs	0.014	NDW ESL	48
	B	0.014		NA		500		--		NA		0.03	Based on ESL for total PCBs	0.014	DW ESL	0
4,4'-DDD	A	NA		0.001	Aquatic Habitat Goal	NA		NA		NA		0.36		0.001	NDW ESL	3
	B	0.001	Aquatic Habitat Goal	NA		--		--		NA		0.36		0.001	DW ESL	0
4,4'-DDE	A	NA		0.001	Aquatic Habitat Goal	NA		NA		NA		1.4		0.001	NDW ESL	3
	B	0.001	Aquatic Habitat Goal	NA		--		--		NA		1.4		0.001	DW ESL	1
4,4'-DDT	A	NA		0.001	Aquatic Habitat Goal	NA		NA		NA		0.001		0.001	NDW ESL	10
	B	0.001	Aquatic Habitat Goal	NA		--		--		NA		0.001		0.001	DW ESL	0
ALDRIN	A	NA		0.13	Aquatic Habitat Goal	NA		NA		NA		0.13		0.13		0
	B	0.002	DW Toxicity	NA		--		--		NA		0.13		0.002		0
ALPHA-BHC	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
ALPHA-CHLORDANE	A	NA		--		NA		NA		NA		0.004		0.004	GDGI	3
	B	--		NA		--		--		NA		0.004		0.004	GDGI	0
AZINPHOS METHYL	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BETA-BHC	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BOLSTAR	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
COUMAPHOS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DEMETON	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DEMETON-O	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DEMETON-S	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DICHLORVOS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DIMETHOATE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DISULFOTON	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DELTA-BHC	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DIELDRIN	A	NA		1.9E-03	Aquatic Habitat Goal	NA		NA		NA		0.0019		0.0019	NDW ESL	3
	B	1.9E-03	Aquatic Habitat Goal	NA		--		--		NA		0.0019		0.0019	DW ESL	0
ENDOSULFAN I	A	NA		8.7E-03	Aquatic Habitat Goal	NA		NA		NA		0.0087		0.0087	NDW ESL	1
	B	8.7E-03	Aquatic Habitat Goal	NA		--		--		NA		0.0087		0.0087	DW ESL	0
ENDOSULFAN II	A	NA		0.0087		NA		NA		NA		0.0087		0.0087	NDW ESL	4
	B	0.0087		NA		--		--		NA		0.0087		0.0087	DW ESL	0
ENDOSULFAN SULFATE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
ENDRIN	A	NA		2.3E-03	Aquatic Habitat Goal	NA		NA		NA		0.0023		0.0023	NDW ESL	3
	B	2.3E-03	Aquatic Habitat Goal	NA		2		2		NA		0.0023		0.0023	DW ESL	0
ENDRIN ALDEHYDE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
ENDRIN KETONE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
EPN	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
ETHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
ETHOPROP	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
FAMPHUR	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
FENSULFOTHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
FENTHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
GAMMA-BHC (LINDANE)	A	NA		0.08		NA		NA		NA		0.016		0.016	GDGI	2
	B	0.08		NA		0.2		0.2		NA		0.016		0.016	GDGI	0

Table 5-9 Limits and Standards for Parcel E-2 Aquifers-- Pesticides and PCBs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
GAMMA-CHLORDANE	A	NA		--		NA		NA		NA		0.004		0.004		8
	B	--		NA		--		--		NA		0.004		0.004		0
HEPTACHLOR	A	NA		3.8E-03	Aquatic Habitat Goal	NA		NA		NA		0.0036		0.0036		8
	B	3.8E-03	Aquatic Habitat Goal	NA		0.4		0.01		NA		0.0036		0.0036		0
HEPTACHLOR EPOXIDE	A	NA		3.8E-03	Aquatic Habitat Goal	NA		NA		NA		0.0036		0.0036		3
	B	3.8E-03	Aquatic Habitat Goal	NA		0.2		0.01		NA		0.0036		0.0036		0
MALATHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
MERPHOS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
METHOXYCHLOR	A	NA		0.019	Aquatic Habitat Goal	NA		NA		NA		--		0.019		0
	B	0.019	Aquatic Habitat Goal	NA		40		30		NA		40		0.019		0
METHYL PARATHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
MEVINPHOS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
NALED	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
PARATHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
PHORATE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
RONNEL	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
STIROPHOS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
SULFOTEP	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
TRICHLORONATE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
TOKUTHION	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
TOXAPHENE	A	NA		0.0002	Aquatic Habitat Goal	NA		NA		NA		0.0002		0.0002		0
	B	0.0002	Aquatic Habitat Goal	NA		3		3		NA		0.0002		0.0002		0
CHLORPYRIFOS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DIAZINON	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
HEPTACHLOR EPOXIDE A	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
HEPTACHLOR EPOXIDE B	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA

Notes:

µg/L = micrograms per liter
 BHC - benzene hexachloride
 DDD - dichlorodiphenyldichloroethane
 DDE - dichlorodiphenyldichloroethene
 DDT - dichlorodiphenyltrichloroethane
 DW = drinking water
 EPN = Ethyl p-nitrophenyl phenylphosphorothioate
 ESL = environmental screening level
 GDGI = groundwater data gaps investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = maximum contaminant level
 mg/L = milligrams per liter
 NDW = non drinking water
 PCB = polychlorinated biphenyl
 RI = remedial investigation

References:

- (1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1a. Groundwater Screening Levels (groundwater IS a current or potential drinking water resource)*, Interim Final - February 2005.
- (2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1b. Groundwater Screening Levels (groundwater IS NOT a current or potential drinking water resource)*, Interim Final - February 2005.
- (3) U.S. Environmental Protection Agency, Title 40, Code of Federal Regulations, Parts 141 [Primary MCLs] and 143 [Secondary MCLs], <http://www.epa.gov/waterscience/drinking/standards>
- (4) California Department of Health Servicesm Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003) <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>.
- (5) PRC. Environmental Management, Inc. 1996. *Technical Memorandum: Estimation of HPS Groundwater Ambient Levels, HPS, San Francisco, California*. September 16.
- (6) Tetra Tech. 2003. *Final Parcel E Groundwater Summary Report Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California*. October 17.

Table 5-10 Limits and Standards for Parcel E-2 Aquifers– SVOCs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
1,2,4-TRICHLOROBENZENE	A	NA		25	Aquatic Habitat Goal	NA		NA		NA		70		25	NDW ESL	0
	B	25	Aquatic Habitat Goal	NA		70		5		NA		70		5	State MCL	0
1,2-DICHLOROBENZENE	A	NA		14	Aquatic Habitat Goal	NA		NA		NA		129		14	NDW ESL	0
	B	10	Ceiling Value	NA		600		600		NA		129		10	DW ESL	0
1,3-DICHLOROBENZENE	A	NA		64.5	Aquatic Habitat Goal	NA		NA		NA		129		64.5	NDW ESL	0
	B	64.5	Aquatic Habitat Goal	NA		--		--		NA		129		64.5	DW ESL	0
1,4-DICHLOROBENZENE	A	NA		15	Aquatic Habitat Goal	NA		NA		NA		5		5	GDGI	16
	B	5	Ceiling Value	NA		75		5		NA		5		5	DW ESL	0
2,2'-OXYBIS(1-CHLOROPROPANE)	A	NA		61		NA		NA		NA		--		61	NDW ESL	0
	B	0.5		NA		--		--		NA		--		0.5	DW ESL	0
2,4,5-TRICHLOROPHENOL	A	NA		11	Aquatic Habitat Goal	NA		NA		NA		--		11	NDW ESL	0
	B	11	Aquatic Habitat Goal	NA		--		--		NA		--		11	DW ESL	0
2,4,6-TRICHLOROPHENOL	A	NA		485	Aquatic Habitat Goal	NA		NA		NA		--		485	NDW ESL	0
	B	0.5	DW Toxicity	NA		--		--		NA		--		0.5	DW ESL	0
2,4-DICHLOROPHENOL	A	NA		3	Ceiling Value	NA		NA		NA		--		3	NDW ESL	0
	B	0.3	Ceiling Value	NA		--		--		NA		--		0.3	DW ESL	0
2,4-DIMETHYLPHENOL	A	NA		110	Aquatic Habitat Goal	NA		NA		NA		--		110	NDW ESL	0
	B	100	DW Toxicity	NA		--		--		NA		--		100	DW ESL	0
2,4-DINITROPHENOL	A	NA		75	Aquatic Habitat Goal	NA		NA		NA		485		75	NDW ESL	0
	B	14	DW Toxicity	NA		--		--		NA		485		14	DW ESL	0
2,4-DINITROTOLUENE	A	NA		1.15E+02	Aquatic Habitat Goal	NA		NA		NA		59		59	GDGI	0
	B	1.13E-01	DW Toxicity	NA		--		--		NA		59		0.11	DW ESL	0
2,6-DINITROTOLUENE	A	NA		--		NA		NA		NA		59		59	GDGI	0
	B	--		NA		--		--		NA		59		59	GDGI	0
2-CHLORONAPHTHALENE	A	NA		--		NA		NA		NA		0.75		0.75	GDGI	0
	B	--		NA		--		--		NA		0.75		0.75	GDGI	0
2-CHLOROPHENOL	A	NA		1.8	Ceiling Value	NA		NA		NA		--		1.8	NDW ESL	0
	B	0.18	Ceiling Value	NA		--		--		NA		--		0.18	DW ESL	0
2-METHYLNAPHTHALENE	A	NA		2.1	Aquatic Habitat Goal	NA		NA		NA		30		2.1	NDW ESL	20
	B	2.1	Aquatic Habitat Goal	NA		--		--		NA		30		2.1	DW ESL	5
2-METHYLPHENOL	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
2-NITROANILINE	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
2-NITROPHENOL	A	NA		--		NA		NA		NA		485		485	GDGI	0
	B	--		NA		--		--		NA		485		485	GDGI	0
3,3'-DICHLOROBENZIDINE	A	NA		250	Aquatic Habitat Goal	NA		NA		NA		--		250	NDW ESL	0
	B	2.92E-02	DW Toxicity	NA		--		--		NA		--		0.029	DW ESL	0
3-NITROANILINE	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
4,6-DINITRO-2-METHYLPHENOL	A	NA		--		NA		NA		NA		485		485	GDGI	0
	B	--		NA		--		--		NA		485		485	GDGI	0
4-BROMOPHENYL-PHENYLETHER	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
4-CHLORO-3-METHYLPHENOL	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
4-CHLOROANILINE	A	NA		5	Aquatic Habitat Goal	NA		NA		NA		--		5	NDW ESL	0
	B	5	Aquatic Habitat Goal	NA		--		--		NA		--		5	DW ESL	0
4-CHLOROPHENYL-PHENYLETHER	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
4-METHYLPHENOL	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
4-NITROANILINE	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
4-NITROPHENOL	A	NA		--		NA		NA		NA		485		485	GDGI	0
	B	--		NA		--		--		NA		485		485	GDGI	0
ACENAPHTHENE	A	NA		23	Aquatic Habitat Goal	NA		NA		NA		710		23	NDW ESL	2
	B	20	Ceiling Value	NA		--		--		NA		710		20	DW ESL	0
ACENAPHTHYLENE	A	NA		30	Aquatic Habitat Goal	NA		NA		NA		30		30	NDW ESL	0
	B	30	Aquatic Habitat Goal	NA		--		--		NA		30		30	DW ESL	0
ANTHRACENE	A	NA		0.73	Aquatic Habitat Goal	NA		NA		NA		30		0.73	NDW ESL	3
	B	0.73	Aquatic Habitat Goal	NA		--		--		NA		30		0.73	DW ESL	0
AZOBENZENE	A	NA		--		NA		NA		NA		--		NA	NA	NA
	B	--		NA		--		--		NA		--		NA	NA	NA
BENZO(A)ANTHRACENE	A	NA		0.027	Aquatic Habitat Goal	NA		NA		NA		30		0.027	NDW ESL	9
	B	0.027	Aquatic Habitat Goal	NA		--		--		NA		0.2		0.027	DW ESL	1

Table 5-10 Limits and Standards for Parcel E-2 Aquifers– SVOCs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
BENZO(A)PYRENE	A	NA		0.014	Aquatic Habitat Goal	NA		NA		NA		30		0.014	NDW ESL	6
	B	0.014	Aquatic Habitat Goal	NA		0.2		0.2		NA		0.2		0.014	DW ESL	1
BENZO(B)FLUORANTHENE	A	NA		2.92E-02	Aquatic Habitat Goal	NA		NA		NA		30		0.029	NDW ESL	6
	B	2.92E-02	Aquatic Habitat Goal	NA		--		--		NA		30		0.029	DW ESL	2
BENZO(G,H,I)PERYLENE	A	NA		0.1	Aquatic Habitat Goal	NA		NA		NA		30		0.1	NDW ESL	3
	B	0.1	Aquatic Habitat Goal	NA		--		--		NA		30		0.1	DW ESL	0
BENZO(K)FLUORANTHENE	A	NA		0.4	Ceiling Value	NA		NA		NA		30		0.4	NDW ESL	1
	B	2.92E-02	DW Toxicity	NA		--		--		NA		30		0.029	DW ESL	1
BENZOIC ACID	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BENZYL ALCOHOL	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BIS(2-CHLOROETHOXY)METHANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BIS(2-CHLOROETHYL)ETHER	A	NA		61	Aquatic Habitat Goal	NA		NA		NA		--		61	NDW ESL	0
	B	1.40E-02	DW Toxicity	NA		--		--		NA		--		0.014	DW ESL	0
BIS(2-ETHYLHEXYL)PHTHALATE	A	NA		32	Aquatic Habitat Goal	NA		NA		NA		360		32	NDW ESL	0
	B	4	DW Toxicity	NA		6		4		NA		4		4	DW ESL	1
BUTYLBENZYLPHTHALATE	A	NA		--		NA		NA		NA		294.4		294.4	GDGI	0
	B	--		NA		--		--		NA		294.4		294.4	GDGI	0
CARBAZOLE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
CHRYSENE	A	NA		0.35	Aquatic Habitat Goal	NA		NA		NA		30		0.35	NDW ESL	13
	B	2.92E-01	DW Toxicity	NA		--		--		NA		30		0.29	DW ESL	1
DIBENZ(A,H)ANTHRACENE	A	NA		0.25	Ceiling Value	NA		NA		NA		30		0.25	NDW ESL	1
	B	8.54E-03	DW Toxicity	NA		--		--		NA		30		0.0085	DW ESL	0
DIBENZOFURAN	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DIETHYLPHTHALATE	A	NA		1.5	Aquatic Habitat Goal	NA		NA		NA		294.4		1.5	NDW ESL	0
	B	1.5	Aquatic Habitat Goal	NA		--		--		NA		294.4		1.5	DW ESL	0
DIMETHYLPHTHALATE	A	NA		1.5	Aquatic Habitat Goal	NA		NA		NA		--		1.5	NDW ESL	0
	B	1.5	Aquatic Habitat Goal	NA		--		--		NA		--		1.5	DW ESL	0
DI-N-BUTYLPHTHALATE	A	NA		--		NA		NA		NA		294.4		294.4	GDGI	0
	B	--		NA		--		--		NA		294.4		294.4	GDGI	0
DI-N-OCTYLPHTHALATE	A	NA		--		NA		NA		NA		294.4		294.4	GDGI	0
	B	--		NA		--		--		NA		294.4		294.4	GDGI	0
FLUORANTHENE	A	NA		8	Aquatic Habitat Goal	NA		NA		NA		16		8	NDW ESL	2
	B	8	Aquatic Habitat Goal	NA		--		--		NA		16		8	DW ESL	0
FLUORENE	A	NA		3.9	Aquatic Habitat Goal	NA		NA		NA		30		3.9	NDW ESL	12
	B	3.9	Aquatic Habitat Goal	NA		--		--		NA		30		3.9	DW ESL	3
HEXACHLOROBENZENE	A	NA		3.68	Aquatic Habitat Goal	NA		NA		NA		129		3.68	NDW ESL	0
	B	1	DW Toxicity	NA		1		1		NA		1		1	DW ESL	0
HEXACHLOROBUTADIENE	A	NA		4.65	Aquatic Habitat Goal	NA		NA		NA		3.2		3.2	GDGI	0
	B	0.21	DW Toxicity	NA		--		--		NA		3.2		0.21	DW ESL	0
HEXACHLOROCYCLOPENTADIENE	A	NA		--		NA		NA		NA		0.7		0.7	GDGI	0
	B	--		NA		50		50		NA		0.7		0.7	GDGI	0
HEXACHLOROETHANE	A	NA		12	Aquatic Habitat Goal	NA		NA		NA		94		12	NDW ESL	0
	B	0.7	DW Toxicity	NA		--		--		NA		94		0.7	DW ESL	0
INDENO(1,2,3-CD)PYRENE	A	NA		2.92E-02	Aquatic Habitat Goal	NA		NA		NA		30		0.029	NDW ESL	3
	B	2.92E-02	Aquatic Habitat Goal	NA		--		--		NA		30		0.029	DW ESL	0
ISOPHORONE	A	NA		--		NA		NA		NA		1290		1290	GDGI	0
	B	--		NA		--		--		NA		1290		1290	GDGI	0
NAPHTHALENE	A	NA		24	Aquatic Habitat Goal	NA		NA		NA		235		24	NDW ESL	9
	B	17	DW Toxicity	NA		--		--		NA		235		17	DW ESL	2
NITROBENZENE	A	NA		--		NA		NA		NA		668		668	GDGI	0
	B	--		NA		--		--		NA		668		668	GDGI	0
N-NITROSO-DI-N-PROPYLAMINE	A	NA		--		NA		NA		NA		330,000		330,000	GDGI	0
	B	--		NA		--		--		NA		330,000		330,000	GDGI	0
N-NITROSODIMETHYLAMINE	A	NA		--		NA		NA		NA		330,000		330,000	GDGI	0
	B	--		NA		--		--		NA		330,000		330,000	GDGI	0
N-NITROSODIPHENYLAMINE	A	NA		--		NA		NA		NA		330,000		330,000	GDGI	0
	B	--		NA		--		--		NA		330,000		330,000	GDGI	0
PENTACHLOROPHENOL	A	NA		7.9	Aquatic Habitat Goal	NA		NA		NA		7.9	Based on ESL	7.9	NDW ESL	0
	B	1	DW Toxicity	NA		1		1		NA		1	Based on ESL	1	DW ESL	0
PHENANTHRENE	A	NA		4.6	Aquatic Habitat Goal	NA		NA		NA		30		4.6	NDW ESL	10
	B	4.6	Aquatic Habitat Goal	NA		--		--		NA		30		4.6	DW ESL	3

Table 5-10 Limits and Standards for Parcel E-2 Aquifers– SVOCs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
PHENOL	A	NA		1,280	Aquatic Habitat Goal	NA		NA		NA		580		580	GDGI	0
	B	5	Ceiling Value	NA		--		--		NA		580		5	DW ESL	0
PYRENE	A	NA		2	Aquatic Habitat Goal	NA		NA		NA		30		2	NDW ESL	12
	B	2	Aquatic Habitat Goal	NA		--		--		NA		30		2	DW ESL	3

Notes:

µg/L = micrograms per liter
 DW = drinking water
 ESL = environmental screening level
 GDGI = groundwater data gaps investigation
 HGAL = Hunters Point groundwater ambient level
 MCL = maximum contaminant level
 mg/L = milligrams per liter
 NDW = non drinking water
 RI = remedial investigation
 SVOC = semi-volatile organic compounds

References:

- (1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1a. Groundwater Screening Levels (groundwater IS a current or potential drinking water resource)* Interim Final - February 2005.
- (2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1b. Groundwater Screening Levels (groundwater IS NOT a current or potential drinking water resource)*, Interim Final - February 2005.
- (3) U.S. Environmental Protection Agency, Title 40, Code of Federal Regulations, Parts 141 [Primary MCLs] and 143 [Secondary MCLs], <http://www.epa.gov/waterscience/drinking/standards>
- (4) California Department of Health Servicesm Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003) <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>
- (5) PRC. Environmental Management, Inc. 1996. *Technical Memorandum: Estimation of HPS Groundwater Ambient Levels, HPS, San Francisco, California*. September 16.
- (6) Tetra Tech. 2003. *Final Parcel E Groundwater Summary Report Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California*. October 17.

**Table 5-11 Limits and Standards for Parcel E-2 Aquifers– VOCs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
1,1,1,2 TETRACHLOROETHANE	A	NA		930	Aquatic Habitat Goal	NA		NA		NA		--		932		0
	B	1.3	DW Toxicity	NA		--		--		NA		--		1.3		0
1,1,1-TRICHLOROETHANE	A	NA		62	Aquatic Habitat Goal	NA		NA		NA		200		62	NDW ESL	5
	B	62	Aquatic Habitat Goal	NA		200		200		NA		200		62	DW ESL	0
1,1,2-TRICHLOROETHANE	A	NA		350	Indoor Air Impacts	NA		NA		NA		5		5	GDGI	0
	B	5	DW Toxicity	NA		5		5		NA		5		5	DW ESL, Fed MCL, State MCL, GDGI	0
1,1,2,2-TETRACHLOROETHANE	A	NA		1.9E+02	Indoor Air Impacts	NA		NA		NA		1	One-tenth EPA acute toxicity	1	GDGI	1
	B	1	DW Toxicity	NA		--		1		NA		1	One-tenth EPA acute toxicity	1	DW ESL	0
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	A	NA		--		NA		NA		NA		1200		1200		0
	B	--		NA		--		1200		NA		1200		1200		0
1,1-DICHLOROETHANE	A	NA		47	Aquatic Habitat Goal	NA		NA		NA		5		5	GDGI	14
	B	5	DW Toxicity	NA		--		5		NA		5		5	DW ESL	0
1,1-DICHLOROETHENE	A	NA		25	Aquatic Habitat Goal	NA		NA		NA		6	One-tenth EPA acute toxicity	6	GDGI	12
	B	6	DW Toxicity	NA		7		6		NA		6	One-tenth EPA acute toxicity	6	DW ESL	0
1,1-DICHLOROPROPENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
1,2,3-TRICHLOROBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
1,2,3-TRICHLOROPROPANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	25	Aquatic Habitat Goal	NA		70		5		NA		--		NA		NA
1,2,4-TRICHLOROBENZENE	A											70		25	NDW ESL	0
	B											70		5	State MCL	0
1,2,4-TRIMETHYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
1,2-DIBROMO-3-CHLOROPROPANE	A	NA		0.2	Aquatic Habitat Goal	NA		NA		NA		0.2		0.2		0
	B	0.2	Aquatic Habitat Goal	NA		0.2		0.2		NA		0.2		0.2		0
1,2-DIBROMOETHANE	A	NA		150	Indoor Air Impacts	NA		NA		NA		0.05		0.05		0
	B	0.05	DW Toxicity	NA		0.05		0.05		NA		0.05		0.05		0
1,2-DICHLOROBENZENE	A	NA		14	Aquatic Habitat Goal	NA		NA		NA		129		14	NDW ESL	0
	B	10	Ceiling value	NA		600		600		NA		129		10	DW ESL	0
1,2-DICHLOROETHANE	A	NA		2.0E+02	Indoor Air Impacts	NA		NA		NA		0.5	One-tenth EPA acute toxicity	0.5	GDGI	8
	B	0.5	DW Toxicity	NA		0.5		0.5		NA		0.5	One-tenth EPA acute toxicity	0.5	DW ESL	3
1,2-DICHLOROETHENE (TOTAL)	A	NA		--		NA		NA		NA		22,400	One-tenth EPA acute toxicity	22400	GDGI	0
	B	--		NA		--		--		NA		22,400	One-tenth EPA acute toxicity	22400	GDGI	0
1,2-DICHLOROPROPANE	A	NA		100	Ceiling value	--		--		NA		5		5		0
	B	5	DW Toxicity	NA		5		5		NA		5		5		0
1,3,5-TRIMETHYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
1,3-DICHLOROBENZENE	A	NA		64.5	Aquatic Habitat Goal	NA		NA		NA		129		64.5	NDW ESL	0
	B	64.5	Aquatic Habitat Goal	NA		--		--		NA		129		64.5	DW ESL	0
1,3-DICHLOROPROPANE	A	NA		--		NA		NA		NA		0.5		0.5		0
	B	--		NA		--		0.5		NA		0.5		0.5		0
1,4-DICHLOROBENZENE	A	NA		15	Aquatic Habitat Goal	NA		NA		NA		5	EPA Chronic toxicity	5	GDGI	9
	B	5	Ceiling value	NA		75		5		NA		5	EPA Chronic toxicity	5	DW ESL	0
2,2-DICHLOROPROPANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
2-BUTANONE	A	NA		14,000		NA		NA		NA		--		14000	NDW ESL	0
	B	4,200		NA		--		--		NA		--		4200	DW ESL	0
2-CHLOROTOLUENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
2-HEXANONE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
4-CHLOROTOLUENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
4-METHYL-2-PENTANONE	A	NA		170		NA		NA		NA		--		170	NDW ESL	0
	B	120		NA		--		--		NA		--		120	DW ESL	0

**Table 5-11 Limits and Standards for Parcel E-2 Aquifers– VOCs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
ACETONE	A	NA		1,500	Aquatic Habitat Goal	NA		NA		NA		--		1500	NDW ESL	0
	B	1,500	Aquatic Habitat Goal	NA		--		--		NA		--		1500	DW ESL	0
BENZENE	A	NA		46	Aquatic Habitat Goal	NA		NA		NA		1	One-tenth EPA acute toxicity	1	GDGI	77
	B	1	DW Toxicity	NA		5		1		NA		1	One-tenth EPA acute toxicity	1	DW ESL	5
BROMOBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BROMOCHLOROMETHANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
BROMODICHLOROMETHANE	A	NA		1.7E+02	Indoor Air Impacts	NA		NA		NA		100		100	GDGI	0
	B	100	DW Toxicity	NA		80		--		NA		100		100	DW ESL	0
BROMOFORM	A	NA		3200	Aquatic Habitat Goal	NA		NA		NA		100		100		0
	B	100	DW Toxicity	NA		100		--		NA		100		100		0
BROMOMETHANE	A	NA		160	Aquatic Habitat Goal	NA		NA		NA		6,400		160	NDW ESL	0
	B	9.8	DW Toxicity	NA		--		--		NA		6,400		9.8	DW ESL	0
CARBON DISULFIDE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
CARBON TETRACHLORIDE	A	NA		9.3E+00	Indoor Air Impacts	NA		NA		NA		0.5	EPA Chronic toxicity	0.5	GDGI	0
	B	0.5	DW Toxicity	NA		5		0.5		NA		0.5	EPA Chronic toxicity	0.5	DW ESL	1
CHLOROBENZENE	A	NA		25	Aquatic Habitat Goal	NA		NA		NA		70	EPA Chronic Toxicity	25	NDW ESL	0
	B	25	Aquatic Habitat Goal	NA		100		70		NA		70	EPA Chronic Toxicity	25	DW ESL	0
CHLOROETHANE	A	NA		1.2E+01	Aquatic Habitat Goal	NA		NA		NA		--		12	NDW ESL	0
	B	1.2E+01	Aquatic Habitat Goal	NA		--		--		NA		--		12	DW ESL	0
CHLOROFORM	A	NA		3.3E+02	Indoor Air Impacts	NA		NA		NA		100		100	GDGI	0
	B	70	DW Toxicity	NA		--		--		NA		100		70	DW ESL	0
CHLOROMETHANE	A	NA		4.1E+01	Indoor Air Impacts	NA		NA		NA		6,400		41	NDW ESL	0
	B	1.3E+00	DW Toxicity	NA		--		--		NA		6,400		1.4	DW ESL	0
CIS-1,2-DICHLOROETHENE	A	NA		590	Aquatic Habitat Goal	NA		NA		NA		6	One-tenth EPA acute toxicity	6	GDGI	7
	B	6	DW Toxicity	NA		70		6		NA		6	One-tenth EPA acute toxicity	6	DW ESL	0
CIS-1,3-DICHLOROPROPENE	A	NA		--		NA		NA		NA		0.5		0.5		0
	B	--		NA		--		--		NA		0.5		0.5		0
CYCLOHEXANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DIBROMOCHLOROMETHANE	A	NA		--		NA		NA		NA		100		100		0
	B	--		NA		60		--		NA		100		60		0
DIBROMOMETHANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
DICHLORODIFLUOROMETHANE	A	NA		--		NA		NA		NA		6400		6400		0
	B	--		NA		--		--		NA		6400		6400		0
ETHYLBENZENE	A	NA		290	Aquatic Habitat Goal	NA		NA		NA		43	One-tenth EPA acute toxicity	43	GDGI	0
	B	30	Ceiling value	NA		700		300		NA		43	One-tenth EPA acute toxicity	30	DW ESL	0
HEXACHLOROBUTADIENE	A	NA		4.7	Aquatic Habitat Goal	NA		NA		NA		3.2		3.2		0
	B	0.21	DW Toxicity	NA		--		--		NA		3.2		0.21		NA
ISOPROPYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
METHYL ACETATE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
METHYLCYCLOHEXANE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
METHYLENE CHLORIDE	A	NA		2200	Aquatic Habitat Goal	NA		NA		NA		5		5		0
	B	5	DW Toxicity	NA		5		5		NA		5		5		0
NAPHTHALENE	A	NA		24	Aquatic Habitat Goal	NA		NA		NA		235		24	NDW ESL	0
	B	17	DW Toxicity	NA		--		--		NA		235		17	DW ESL	0
N-BUTYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
O-XYLENE	A	NA		100	Aquatic Habitat Goal	NA		NA		NA		--		NA		NA
	B	20	Ceiling value	NA		10,000		--		NA		--		10000	Federal MCL	0
PARA-ISOPROPYL TOLUENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
PROPYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA

**Table 5-11 Limits and Standards for Parcel E-2 Aquifers– VOCs
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Detections Exceeding RI Evaluation Criteria
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
SEC-BUTYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
STYRENE	A	NA		100	Aquatic Habitat Goal	NA		NA		NA		100		100		0
	B	10	Ceiling value	NA		100		100		NA		100		100		0
TERT-BUTYLBENZENE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
TERT-BUTYL METHYL ETHER	A	NA		1800	Ceiling Value	NA		NA		NA		--		1800	NDW ESL	0
	B	5	Ceiling value	NA		--		13		NA		--		5	DW ESL	0
TETRACHLOROETHENE	A	NA		120	Aquatic Habitat Goal	NA		NA		NA		5	EPA Chronic toxicity	5	GDGI	14
	B	5	DW Toxicity	NA		5		5		NA		5	EPA Chronic toxicity	5	DW ESL	0
TOLUENE	A	NA		130	Aquatic Habitat Goal	NA		NA		NA		150		130	NDW ESL	0
	B	40	Ceiling value	NA		1,000		150		NA		150		40	DW ESL	0
TRANS-1,2-DICHLOROETHENE	A	NA		590	Aquatic Habitat Goal	NA		NA		NA		10		10	GDGI	0
	B	10	DW Toxicity	NA		100		10		NA		1		1	GDGI	0
TRANS-1,3-DICHLOROPROPENE	A	NA		--	Indoor Air Impacts	NA		NA		NA		79		79	GDGI	0
	B	--	DW Toxicity	NA		--		--		NA		79		79	GDGI	0
TRICHLOROETHENE	A	NA		360	Aquatic Habitat Goal	NA		NA		NA		5	EPA Chronic toxicity	5	GDGI	12
	B	5	DW Toxicity	NA		5		5		NA		5	EPA Chronic toxicity	5	DW ESL	1
TRICHLOROFUOROMETHANE	A	NA		--		NA		NA		NA		150		150	GDGI	0
	B	--		NA		--		150		NA		150		150	GDGI	0
VINYL CHLORIDE	A	NA		3.85E+00	Indoor Air Impacts	NA		NA		NA		0.5		0.5	GDGI	8
	B	0.5	DW Toxicity	NA		2		0.5		NA		0.5		0.5	DW ESL	0
XYLENE (TOTAL)	A	NA		100	Aquatic Habitat Goal	NA		NA		NA		1,750		100	NDW ESL	3
	B	20	Ceiling value	NA		10,000		1,750		NA		1,750		20	DW ESL	0
VINYL ACETATE	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA

Notes:

- µg/L = micrograms per liter
- DW = drinking water
- EPA = U.S. Environmental Protection Agency
- ESL = environmental screening level
- GDGI = groundwater data gaps investigation
- HGAL = Hunters Point groundwater ambient level
- MCL = maximum contaminant level
- mg/L = milligrams per liter
- NDW = non drinking water
- RI = remedial investigation

References:

- (1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1a. Groundwater Screening Levels (groundwater IS a current or potential drinking water resource)*, Interim Final - February 2005.
- (2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1b. Groundwater Screening Levels (groundwater IS NOT a current or potential drinking water resource)*, Interim Final - February 2005.
- (3) U.S. Environmental Protection Agency, Title 40, Code of Federal Regulations, Parts 141 [Primary MCLs] and 143 [Secondary MCLs], <http://www.epa.gov/waterscience/drinking/standards>
- (4) California Department of Health Servicesm Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003) <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>.
- (5) PRC. Environmental Management, Inc. 1996. *Technical Memorandum: Estimation of HPS Groundwater Ambient Levels, HPS, San Francisco, California*.September 16.
- (6) Tetra Tech. 2003. *Final Parcel E Groundwater Summary Report Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California*.October 17.

**Table 5-12 Limits and Standards for Parcel E-2 Aquifers– Petroleum Hydrocarbons
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	ESL - Drinking Water ⁽¹⁾		ESL - Non Drinking Water ⁽²⁾		Federal MCL ⁽³⁾		State MCL ⁽⁴⁾		HGAL ⁽⁵⁾		GDGI Evaluation Criteria ⁽⁶⁾		RI Evaluation Criteria		Exceeding RI Evaluation
		Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (mg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	Conc. (µg/L)	Comments	
GASOLINE-RANGE ORGANICS	A	NA		500		NA		NA		NA		--		500	NDW ESL	2
	B	100		NA		--		--		NA		--		100	DW ESL	0
DIESEL-RANGE ORGANICS	A	NA		640		NA		NA		NA		--		640	NDW ESL	53
	B	100		NA		--		--		NA		--		100	DW ESL	8
MOTOR OIL RANGE ORGANICS	A	NA		--		NA		NA		NA		--		NA		NA
	B	--		NA		--		--		NA		--		NA		NA
TOTAL OIL AND GREASE	A	NA		640		NA		NA								
	B	100		NA		--		--								
TOTAL PETROLEUM HYDROCARBONS	A	NA		--		NA		NA		NA		--		1,400 - 20,000	Based on distance from shoreline	13
	B	--		NA		--		--		NA		--		1,400 - 20,000	Based on distance from shoreline	0

Notes:
µg/L = micrograms per liter
DW = drinking water
ESL = environmental screening level
GDGI = groundwater data gaps investigation
HGAL = Hunters Point groundwater ambient level
MCL = maximum contaminant level
mg/L = milligrams per liter
NDW = non drinking water
RI = remedial investigation
TPH = total petroleum hydrocarbon

- References:**
- (1) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1a. Groundwater Screening Levels (groundwater IS a current or potential drinking water resource)*, Interim Final - February 2005.
 - (2) California Regional Water Quality Control Board, San Francisco Bay Region, *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Appendix 1, Table F-1b. Groundwater Screening Levels (groundwater IS NOT a current or potential drinking water resource)*, Interim Final - February 2005.
 - (3) U.S. Environmental Protection Agency, Title 40, Code of Federal Regulations, Parts 141 [Primary MCLs] and 143 [Secondary MCLs], <http://www.epa.gov/waterscience/drinking/standards>
 - (4) California Department of Health Servicesm Division of Drinking Water and Environmental Management, *Drinking Water Standards* (16 May 2003) <http://www.dhs.ca.gov/ps/ddwem/chemicals/mcl/regextract.pdf>.
 - (5) PRC. Environmental Management, Inc. 1996. *Technical Memorandum: Estimation of HPS Groundwater Ambient Levels, HPS, San Francisco, California*. September 16.
 - (6) Tetra Tech. 2003. *Final Parcel E Groundwater Summary Report Phase III Data Gaps Investigation, Hunters Point Shipyard, San Francisco, California*. October 17.

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Anions								
UNIONIZED AMMONIA	A	25	Basin Plan, Annual Median	77	20 - 1,750	77 / 87 ⁽¹⁾	9	10
	B	25	Basin Plan, Annual Median	34	20 - 500	34 / 43 ⁽¹⁾	34	80
CHLORIDE	A	NA		NA	200 - 1.0E+06	225 / 225	0	0
	B	NA		NA	200 - 200,000	73 / 73	0	0
FLUORIDE	A	NA		NA	100 - 5,000	46 / 81	0	0
	B	2,000	State MCL	0	100 - 2,000	10 / 44	0	0
NITRATE	A	NA		NA	10 - 5,000	39 / 220	0	0
	B	NA		NA	10 - 5,000	33 / 71	2	3
NITRITE	A	NA		NA	4 - 50,000	7 / 201	0	0
	B	1,000	Federal, State MCL	2	5 - 5,000	5 / 63	5	8
TOTAL KJELDAHL NITROGEN	A	NA		NA	70 - 2,500	80 / 88	0	0
	B	NA		NA	70 - 500	39 / 43	0	0
ORTHOPHOSPHATE	A	NA		NA	50 - 20,000	24 / 162	0	0
	B	NA		NA	50 - 2,000	12 / 56	0	0
CYANIDE	A	1	NDW ESL	20	0.1 - 10	21 / 166	143	86
	B	1	DW ESL	3	3 - 10	3 / 63	60	91
SULFATE	A	NA		NA	40 - 100,000	185 / 225	0	0
	B	NA		NA	100 - 50,000	49 / 73	0	0
SULFIDE	A	NA		NA	3 - 1,000	33 / 86	0	0
ALUMINIUM	A	NA		NA	10 - 500	55 / 235	0	0
	B	1000	State MCL	2	10 - 100	18 / 66	19	29
ANTIMONY	A	43.26	HGAL, GDGI	8	0.02 - 32	91 / 231	0	0
	B	6	DW ESL	7	0.1 - 32	19 / 65	0	0
ARSENIC	A	36	NDW ESL	17	0.2 - 25	138 / 237	0	0
	B	10	Federal MCL	4	1 - 5	32 / 64	0	0
BARIUM	A	1000	NDW ESL	35	0.3 - 25	237 / 238	0	0
	B	1000	DW ESL	0	0.31 - 10	64 / 64	0	0
BERYLLIUM	A	2.65	NDW ESL	4	0.1 - 10	19 / 227	4	21
	B	2.65	DW ESL	0	0.19 - 2	3 / 64	0	0
CADMIUM	A	5.08	HGAL	9	0.2 - 25	27 / 230	5	2
	B	1.1	DW ESL	4	0.2 - 5	6 / 66	55	83
CALCIUM	A	NA		NA	8.2 - 132,000	180 / 181	0	0
	B	NA		NA	9 - 500	34 / 34	0	0
CHROMIUM	A	180	NDW ESL	11	0.4 - 25	107 / 234	0	0
	B	50	DW ESL	4	1.4 - 5	15 / 65	0	0
CHROMIUM VI	A	11	NDW ESL	0	10 - 10	0 / 139	0	0
	B	11	DW ESL	1	10 - 10	1 / 23	0	0
COBALT	A	20.8	HGAL, GDGI	10	0.4 - 25	98 / 226	1	<1
	B	3	DW ESL	1	2 - 8.8	18 / 64	41	64
COPPER	A	28.04	HGAL, GDGI	19	0.25 - 50	71 / 236	0	0
	B	3.1	DW ESL	11	1.6 - 25.6	20 / 64	38	59
IRON	A	2380	HGAL, GDGI	63	3.5 - 400	134 / 181	0	0
	B	300	Federal MCL	15	5 - 400	21 / 34	0	0
LEAD	A	14.44	HGAL, GDGI	24	0.004 - 320	75 / 237	6	3
	B	2.5	DW ESL	8	0.02 - 5	16 / 64	29	45

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Metals (continued)								
MAGNESIUM	A	1440000	HGAL, GDGI	0	4 - 10,000	181 / 181	0	0
	B	NA		NA	20 - 10,000	34 / 34	0	0
MANGANESE	A	8140	HGAL, GDGI	1	0.1 - 25	225 / 226	0	0
	B	NA		NA	0.4 - 25	64 / 64	0	0
MERCURY	A	0.6	HGAL	15	0.1 - 10	27 / 233	0	0
	B	0.012	DW ESL	1	0.1 - 0.2	1 / 64	63	98
MOLYBDENUM	A	61.9	HGAL, GDGI	0	0.6 - 24.2	43 / 149	0	0
	B	35	DW ESL	0	2.9 - 7	3 / 26	0	0
NICKEL	A	96.48	HGAL, GDGI	25	0.7 - 28.8	159 / 241	0	0
	B	8.2	DW ESL	5	0.9 - 28.8	14 / 64	20	31
POTASSIUM	A	448000	HGAL, GDGI	0	80 - 8,000	180 / 181	0	0
	B	NA		NA	80 - 883	34 / 34	0	0
SELENIUM	A	14.5	HGAL	2	1 - 29	18 / 219	16	7
	B	5	DW ESL	1	1 - 5	1 / 62	0	0
SILVER	A	7.43	HGAL, GDGI	3	0.04 - 7	14 / 229	0	0
	B	0.19	DW ESL	0	1 - 7	0 / 64	64	100
SODIUM	A	9242000	HGAL, GDGI	3	18 - 55,200	181 / 181	0	0
	B	NA		NA	18 - 33,400	34 / 34	0	0
THALLIUM	A	20	NDW ESL	0	0.004 - 25	3 / 213	3	1
	B	2	DW ESL	0	0.02 - 16	1 / 61	43	70
VANADIUM	A	26.62	HGAL, GDGI	11	0.4 - 13	82 / 150	0	0
	B	15	DW ESL	3	1.4 - 15.3	9 / 26	1	4
ZINC	A	81	NDW ESL	28	0.3 - 250	70 / 241	5	2
	B	81	DW ESL	0	1.7 - 50	12 / 64	0	0
Volatile Organic Compounds								
1,1,1,2 TETRACHLOROETHANE	A	932		0	0.5 - 100	0 / 79	2	1
	B	1.3		0	0.5 - 1	0 / 40	0	0
1,1,1-TRICHLOROETHANE	A	62	NDW ESL	5	0.5 - 100	12 / 255	11	4
	B	62	DW ESL	0	0.5 - 5	0 / 73	0	0
1,1,2-TRICHLOROETHANE	A	5	GDGI	0	0.5 - 100	0 / 255	106	42
	B	5	JW ESL, Federal & State MCL, GDG	0	0.5 - 5	0 / 73	20	27
1,1,2,2-TETRACHLOROETHANE	A	1	GDGI	1	0.5 - 100	1 / 254	0	0
	B	1	DW ESL	0	0.5 - 5	0 / 73	0	0
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	A	1200		0	0.5 - 100	0 / 123	0	0
	B	1200		0	0.5 - 5	0 / 47	0	0
1,1-DICHLOROETHANE	A	5	GDGI	14	0.5 - 200	27 / 255	11	4
	B	5	DW ESL	0	0.5 - 5	0 / 73	0	0
1,1-DICHLOROETHENE	A	6	GDGI	12	0.5 - 100	12 / 255	11	4
	B	6	DW ESL	0	0.5 - 5	0 / 73	0	0
1,1-DICHLOROPROPENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
1,2,3-TRICHLOROBENZENE	A	NA		NA	1 - 20	0 / 47	0	0
	B	NA		NA	1 - 2	0 / 10	0	0
1,2,3-TRICHLOROPROPANE	A	NA		NA	1 - 200	0 / 79	0	0
	B	NA		NA	1 - 1	1 / 40	0	0

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Volatile Organic Compounds (continued)								
1,2,4-TRICHLOROBENZENE	A	25	NDW ESL	0	0.5 - 100	2 / 143	3	2
	B	5	State MCL	0	0.5 - 10	1 / 53	0	0
1,2,4-TRIMETHYLBENZENE	A	NA		NA	1 - 4	2 / 3	0	0
	B	NA		NA	1 - 1	3 / 3	0	0
1,2-DIBROMO-3-CHLOROPROPANE	A	0.2		0	1 - 400	0 / 143	0	0
	B	0.2		0	1 - 2	0 / 53	0	0
1,2-DIBROMOETHANE	A	0.05		0	1 - 20	0 / 67	0	0
	B	0.05		0	1 - 2	0 / 16	0	0
1,2-DICHLOROBENZENE	A	14	NDW ESL	0	0.5 - 100	20 / 143	3	2
	B	10	DW ESL	0	0.5 - 10	1 / 53	0	0
1,2-DICHLOROETHANE	A	0.5	GDGI	8	0.5 - 100	10 / 255	108	42
	B	0.5	DW ESL	3	0.5 - 5	5 / 73	23	32
1,2-DICHLOROETHENE (TOTAL)	A	22400	GDGI	0	0.5 - 25	10 / 112	0	0
	B	22400	GDGI	0	5 - 5	0 / 20	0	0
1,2-DICHLOROPROPANE	A	5		0	0.5 - 100	0 / 255	0	0
	B	5		0	0.5 - 5	0 / 73	0	0
1,3,5-TRIMETHYLBENZENE	A	NA		NA	1 - 4	2 / 3	0	0
	B	NA		NA	1 - 1	3 / 3	0	0
1,3-DICHLOROBENZENE	A	64.5	NDW ESL	0	0.5 - 100	23 / 143	2	1
	B	64.5	DW ESL	0	0.5 - 10	0 / 53	0	0
1,3-DICHLOROPROPANE	A	0.5		0	1 - 4	0 / 3	0	0
	B	0.5		0	1 - 1	0 / 3	0	0
1,4-DICHLOROBENZENE	A	5	GDGI	9	0.5 - 100	36 / 143	3	100
	B	5	DW ESL	0	0.5 - 10	0 / 53	0	0
2,2-DICHLOROPROPANE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
2-BUTANONE	A	14000	NDW ESL	0	4 - 200	1 / 179	0	0
	B	4200	DW ESL	0	5 - 20	0 / 36	0	0
2-CHLOROTOLUENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
2-HEXANONE	A	NA		NA	1.2 - 200	3 / 176	0	0
	B	NA		NA	5 - 20	0 / 36	0	0
4-CHLOROTOLUENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
4-METHYL-2-PENTANONE	A	170	NDW ESL	0	4 - 200	4 / 178	1	1
	B	120	DW ESL	0	5 - 20	0 / 36	0	0
ACETONE	A	1500	NDW ESL	0	1.3 - 200	1 / 178	0	0
	B	1500	DW ESL	0	2 - 20	0 / 36	0	0
BENZENE	A	1	GDGI	77	0.5 - 100	101 / 255	66	26
	B	1	DW ESL	5	0.5 - 5	8 / 73	20	27
BROMOBENZENE	A	NA		NA	0.5 - 100	0 / 79	0	0
	B	NA		NA	0.5 - 1	0 / 40	0	0
BROMOCHLOROMETHANE	A	NA		NA	0.5 - 11	0 / 67	0	0
	B	NA		NA	0.5 - 1	0 / 16	0	0
BROMODICHLOROMETHANE	A	100	GDGI	0	0.5 - 100	0 / 255	0	0
	B	100	DW ESL	0	0.5 - 5	0 / 73	0	0

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	RI Evaluation Criteria Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Volatile Organic Compounds (continued)								
BROMOFORM	A	100		0	0.5 - 100	0 / 255	0	0
	B	100		0	0.5 - 5	0 / 73	0	0
BROMOMETHANE	A	160	NDW ESL	0	0.5 - 200	1 / 255	2	1
	B	9.8	DW ESL	0	0.5 - 10	1 / 73	20	27
CARBON DISULFIDE	A	NA		NA	0.5 - 25	22 / 179	0	0
	B	NA		NA	0.5 - 5	2 / 36	0	0
CARBON TETRACHLORIDE	A	0.5	GDGI	0	0.5 - 100	0 / 255	109	43
	B	0.5	DW ESL	1	0.5 - 5	1 / 73	22	30
CHLOROBENZENE	A	25	NDW ESL	0	0.5 - 100	68 / 254	3	1
	B	25	DW ESL	0	0.5 - 5	1 / 73	0	0
CHLOROETHANE	A	12.07	NDW ESL	0	0.5 - 100	15 / 255	10	4
	B	12.07	DW ESL	0	0.5 - 10	1 / 73	0	0
CHLOROFORM	A	100	GDGI	0	0.5 - 100	9 / 255	0	0
	B	70	DW ESL	0	0.5 - 5	11 / 73	0	0
CHLOROMETHANE	A	41	NDW ESL	0	0.5 - 100	5 / 255	9	4
	B	1.4	DW ESL	0	0.5 - 10	0 / 73	20	27
CIS-1,2-DICHLOROETHENE	A	6	GDGI	7	0.5 - 100	28 / 143	4	3
	B	6	DW ESL	0	0.5 - 1	5 / 53	0	0
CIS-1,3-DICHLOROPROPENE	A	0.5		0	0.5 - 100	0 / 255	0	0
	B	0.5		0	0.5 - 5	0 / 73	0	0
CYCLOHEXANE	A	NA		NA	1 - 10	10 / 43	0	0
	B	NA		NA	1 - 1	1 / 7	0	0
DIBROMOCHLOROMETHANE	A	100		0	0.5 - 100	0 / 255	0	0
	B	60		0	0.5 - 5	0 / 73	0	0
DIBROMOMETHANE	A	NA		NA	0.5 - 100	0 / 79	0	0
	B	NA		NA	0.5 - 1	0 / 40	0	0
DICHLORODIFLUOROMETHANE	A	6400		0	0.5 - 200	0 / 123	0	0
	B	6400		0	0.5 - 1	0 / 47	0	0
ETHYLBENZENE	A	43	GDGI	0	0.5 - 100	47 / 254	3	1
	B	30	DW ESL	0	0.5 - 5	6 / 73	0	0
HEXACHLOROBUTADIENE	A	3.2		0	1 - 100	0 / 3	0	0
	B	0.21		0	1 - 10	0 / 3	0	0
ISOPROPYLBENZENE	A	NA		NA	1 - 20	21 / 47	0	0
	B	NA		NA	1 - 2	1 / 10	0	0
METHYL ACETATE	A	NA		NA	1 - 10	0 / 43	0	0
	B	NA		NA	1 - 1	0 / 7	0	0
METHYLCYCLOHEXANE	A	NA		NA	1 - 10	7 / 43	0	0
	B	NA		NA	1 - 1	1 / 7	0	0
METHYLENE CHLORIDE	A	5		0	0.5 - 1000	0 / 255	0	0
	B	5		0	2 - 15	0 / 73	0	0
NAPHTHALENE	A	24	NDW ESL	0	1 - 100	2 / 3	0	0
	B	17	DW ESL	0	1 - 10	1 / 3	0	0
N-BUTYLBENZENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
O-XYLENE	A	NA		NA	0.5 - 5	18 / 47	0	0
	B	10000	Federal MCL	0	0.5 - 1	4 / 10	0	0

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Volatile Organic Compounds (continued)								
PARA-ISOPROPYL TOLUENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
PROPYLBENZENE	A	NA		NA	1 - 4	2 / 3	0	0
	B	NA		NA	1 - 1	1 / 3	0	0
SEC-BUTYLBENZENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
STYRENE	A	100		0	0.5 - 25	0 / 178	0	0
	B	100		0	0.5 - 5	0 / 36	0	0
TERT-BUTYLBENZENE	A	NA		NA	1 - 4	0 / 3	0	0
	B	NA		NA	1 - 1	0 / 3	0	0
TERT-BUTYL METHYL ETHER	A	1800	NDW ESL	0	0.5 - 100	19 / 143	0	0
	B	5	DW ESL	0	0.5 - 1	0 / 53	0	0
TETRACHLOROETHENE	A	5	GDGI	14	0.5 - 100	22 / 254	11	4
	B	5	DW ESL	0	0.5 - 5	1 / 73	0	0
TOLUENE	A	130	NDW ESL	0	0.5 - 100	50 / 254	0	0
	B	40	DW ESL	0	0.5 - 5	14 / 73	0	0
TRANS-1,2-DICHLOROETHENE	A	10	GDGI	0	0.5 - 100	11 / 143	4	3
	B	1	GDGI	0	0.5 - 1	0 / 53	0	0
TRANS-1,3-DICHLOROPROPENE	A	79	GDGI	0	0.5 - 100	0 / 255	2	1
	B	79	GDGI	0	0.5 - 5	1 / 73	0	0
TRICHLOROETHENE	A	5	GDGI	12	0.5 - 100	23 / 255	12	5
	B	5	DW ESL	1	0.5 - 5	8 / 73	0	0
TRICHLOROFLUOROMETHANE	A	150	GDGI	0	0.5 - 100	1 / 123	0	0
	B	150	GDGI	0	0.5 - 1	0 / 47	0	0
VINYL CHLORIDE	A	0.5	GDGI	8	0.5 - 100	12 / 255	109	43
	B	0.5	DW ESL	0	0.5 - 10	0 / 73	0	0
XYLENE (TOTAL)	A	100	NDW ESL	3	0.5 - 100	53 / 207	0	0
	B	20	DW ESL	0	0.5 - 5	6 / 63	0	0
VINYL ACETATE	A	NA		NA	10 - 50	0 / 102	0	0
	B	NA		NA	10 - 10	0 / 23	0	0
Semivolatile Organic Compounds								
1,2,4-TRICHLOROBENZENE	A	25	NDW ESL	0	0.5 - 100	0 / 234	3	1
	B	5	State MCL	0	0.5 - 10	0 / 71	67	94
1,2-DICHLOROBENZENE	A	14	NDW ESL	0	0.5 - 100	1 / 199	6	3
	B	10	DW ESL	0	0.5 - 10	0 / 64	0	0
1,3-DICHLOROBENZENE	A	64.5	NDW ESL	0	0.5 - 100	13 / 199	0	0
	B	64.5	DW ESL	0	0.5 - 10	0 / 64	0	0
1,4-DICHLOROBENZENE	A	5	GDGI	16	0.5 - 100	30 / 199	153	77
	B	5	DW ESL	0	0.5 - 10	0 / 64	60	94
2,2'-OXYBIS(1-CHLOROPROPANE)	A	61	NDW ESL	0	1 - 100	0 / 234	1	<1
	B	0.5	DW ESL	0	1 - 10	0 / 71	71	100
2,4,5-TRICHLOROPHENOL	A	11	NDW ESL	0	2 - 250	0 / 157	108	69
	B	11	DW ESL	0	2 - 50	0 / 30	16	53
2,4,6-TRICHLOROPHENOL	A	485	NDW ESL	0	1 - 100	0 / 230	0	0
	B	0.5	DW ESL	0	1 - 10	0 / 67	67	100

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	RI Evaluation Criteria Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Semivolatile Organic Compounds (continued)								
2,4-DICHLOROPHENOL	A	3	NDW ESL	0	1 - 100	1 / 230	221	96
	B	0.3	DW ESL	0	1 - 10	0 / 67	67	100
2,4-DIMETHYLPHENOL	A	110	NDW ESL	0	1 - 100	16 / 230	0	0
	B	100	DW ESL	0	1 - 10	1 / 67	0	0
2,4-DINITROPHENOL	A	75	NDW ESL	0	2 - 250	0 / 230	6	3
	B	14	DW ESL	0	2 - 50	0 / 67	63	94
2,4-DINITROTOLUENE	A	59	GDGI	0	1 - 100	0 / 234	1	<1
	B	0.11	DW ESL	0	1 - 10	0 / 71	71	100
2,6-DINITROTOLUENE	A	59	GDGI	0	1 - 100	0 / 234	1	<1
	B	59	GDGI	0	1 - 10	0 / 71	0	0
2-CHLORONAPHTHALENE	A	0.75	GDGI	0	1 - 100	0 / 234	234	100
	B	0.75	GDGI	0	1 - 10	0 / 71	71	100
2-CHLOROPHENOL	A	1.8	NDW ESL	0	1 - 100	1 / 230	221	96
	B	0.18	DW ESL	0	1 - 10	0 / 67	67	100
2-METHYLNAPHTHALENE	A	2.1	NDW ESL	20	1 - 100	30 / 234	197	84
	B	2.1	DW ESL	5	1 - 10	6 / 71	61	86
2-METHYLPHENOL	A	NA		NA	1 - 100	5 / 230	0	0
	B	NA		NA	1 - 10	0 / 67	0	0
2-NITROANILINE	A	NA		NA	2 - 250	0 / 157	0	0
	B	NA		NA	2 - 50	0 / 30	0	0
2-NITROPHENOL	A	485	GDGI	0	1 - 100	1 / 234	0	0
	B	485	GDGI	0	1 - 20	0 / 71	0	0
3,3'-DICHLOROBENZIDINE	A	250	NDW ESL	0	1 - 100	0 / 234	0	0
	B	0.029	DW ESL	0	1 - 24	0 / 71	0	0
3-NITROANILINE	A	NA		NA	2 - 250	0 / 161	71	100
	B	NA		NA	2 - 50	0 / 34	0	0
4,6-DINITRO-2-METHYLPHENOL	A	485	GDGI	0	2 - 250	0 / 230	0	0
	B	485	GDGI	0	2 - 50	0 / 67	0	0
4-BROMOPHENYL-PHENYLETHER	A	NA		NA	1 - 100	0 / 234	0	0
	B	NA		NA	1 - 10	0 / 71	0	0
4-CHLORO-3-METHYLPHENOL	A	NA		NA	1 - 100	1 / 230	0	0
	B	NA		NA	1 - 20	0 / 67	0	0
4-CHLOROANILINE	A	5	NDW ESL	0	1 - 100	0 / 161	151	94
	B	5	DW ESL	0	1 - 10	0 / 34	30	88
4-CHLOROPHENYL-PHENYLETHER	A	NA		NA	1 - 100	0 / 234	0	0
	B	NA		NA	1 - 10	0 / 71	0	0
4-METHYLPHENOL	A	NA		NA	1 - 100	29 / 230	0	0
	B	NA		NA	1 - 10	1 / 67	0	0
4-NITROANILINE	A	NA		NA	2 - 250	0 / 161	0	0
	B	NA		NA	2 - 50	0 / 34	0	0
4-NITROPHENOL	A	485	GDGI	0	2 - 250	1 / 230	0	0
	B	485	GDGI	0	2 - 50	0 / 67	0	0
ACENAPHTHENE	A	23	NDW ESL	2	1 - 100	40 / 234	3	1
	B	20	DW ESL	0	1 - 10	5 / 71	0	0
ACENAPHTHYLENE	A	30	NDW ESL	0	1 - 100	11 / 234	3	1
	B	30	DW ESL	0	1 - 10	0 / 71	0	0

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	RI Evaluation Criteria Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Semivolatile Organic Compounds (continued)								
ANTHRACENE	A	0.73	NDW ESL	3	1 - 100	6 / 234	228	97
	B	0.73	DW ESL	0	1 - 10	0 / 71	71	100
AZOBENZENE	A	NA		NA	9.4 - 9.4	0 / 4	0	0
	B	NA		NA	9.4 - 10	0 / 3	0	0
BENZO(A)ANTHRACENE	A	0.027	NDW ESL	9	1 - 100	9 / 234	225	96
	B	0.027	DW ESL	1	1 - 10	1 / 71	70	99
BENZO(A)PYRENE	A	0.014	NDW ESL	6	1 - 100	6 / 232	226	97
	B	0.014	DW ESL	1	1 - 10	1 / 71	70	99
BENZO(B)FLUORANTHENE	A	0.029	NDW ESL	6	1 - 100	6 / 232	226	97
	B	0.029	DW ESL	2	1 - 10	2 / 71	69	97
BENZO(G,H,I)PERYLENE	A	0.1	NDW ESL	3	1 - 100	3 / 232	229	99
	B	0.1	DW ESL	0	1 - 10	0 / 71	71	100
BENZO(K)FLUORANTHENE	A	0.4	NDW ESL	1	1 - 100	1 / 232	231	100
	B	0.029	DW ESL	1	1 - 10	1 / 71	70	99
BENZOIC ACID	A	NA		NA	47 - 200	7 / 213	0	0
	B	NA		NA	47 - 50	0 / 67	0	0
BENZYL ALCOHOL	A	NA		NA	9.4 - 50	1 / 178	0	0
	B	NA		NA	9.4 - 20	0 / 60	0	0
BIS(2-CHLOROETHOXY)METHANE	A	NA		NA	1 - 100	0 / 234	0	0
	B	NA		NA	1 - 10	0 / 71	0	0
BIS(2-CHLOROETHYL)ETHER	A	61	NDW ESL	0	1 - 100	0 / 234	1	<1
	B	0.014	DW ESL	0	1 - 10	0 / 71	71	100
BIS(2-ETHYLHEXYL)PHTHALATE	A	32	NDW ESL	0	1 - 100	1 / 234	8	3
	B	4	DW ESL	1	1 - 10	1 / 71	60	85
BUTYLBENZYLPHthalATE	A	294.4	GDGI	0	1 - 100	0 / 234	0	0
	B	294.4	GDGI	0	1 - 10	0 / 71	0	0
CARBAZOLE	A	NA		NA	1 - 100	4 / 56	0	0
	B	NA		NA	1 - 9.6	2 / 11	0	0
CHRYSENE	A	0.35	NDW ESL	13	1 - 100	15 / 234	219	94
	B	0.29	DW ESL	1	1 - 10	1 / 71	70	99
DIBENZ(A,H)ANTHRACENE	A	0.25	NDW ESL	1	1 - 100	1 / 232	231	100
	B	0.0085	DW ESL	0	1 - 10	0 / 71	71	100
DIBENZOFURAN	A	NA		NA	1 - 100	19 / 234	0	0
	B	NA		NA	1 - 10	4 / 71	0	0
DIETHYLPHthalATE	A	1.5	NDW ESL	0	1 - 100	0 / 234	225	96
	B	1.5	DW ESL	0	1 - 10	0 / 71	67	94
DIMETHYLPHthalATE	A	1.5	NDW ESL	0	1 - 100	0 / 234	225	96
	B	1.5	DW ESL	0	1 - 10	0 / 71	67	94
DI-N-BUTYLPHthalATE	A	294.4	GDGI	0	1 - 100	0 / 234	0	0
	B	294.4	GDGI	0	1 - 10	0 / 71	0	0
DI-N-OCTYLPHthalATE	A	294.4	GDGI	0	1 - 100	0 / 232	0	0
	B	294.4	GDGI	0	1 - 10	0 / 71	0	0
FLUORANTHENE	A	8	NDW ESL	2	1 - 100	20 / 234	174	57
	B	8	DW ESL	0	1 - 10	4 / 71	57	80
FLUORENE	A	3.9	NDW ESL	12	1 - 100	38 / 234	192	82
	B	3.9	DW ESL	3	1 - 10	5 / 71	63	89

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Semivolatile Organic Compounds (continued)								
HEXACHLOROBENZENE	A	3.68	NDW ESL	0	1 - 100	0 / 234	225	96
	B	1	DW ESL	0	1 - 10	0 / 71	67	94
HEXACHLOROBUTADIENE	A	3.2	GDGI	0	1 - 100	0 / 234	225	96
	B	0.21	DW ESL	0	1 - 10	0 / 71	71	100
HEXACHLOROCYCLOPENTADIENE	A	0.7	GDGI	0	1 - 100	0 / 234	234	100
	B	0.7	GDGI	0	1 - 50	0 / 71	71	100
HEXACHLOROETHANE	A	12	NDW ESL	0	1 - 100	0 / 234	7	3
	B	0.7	DW ESL	0	1 - 10	0 / 71	71	100
INDENO(1,2,3-CD)PYRENE	A	0.029	NDW ESL	3	1 - 100	3 / 232	229	99
	B	0.029	DW ESL	0	1 - 10	0 / 71	71	100
ISOPHORONE	A	1290	GDGI	0	1 - 100	0 / 234	0	0
	B	1290	GDGI	0	1 - 10	0 / 71	0	0
NAPHTHALENE	A	24	NDW ESL	9	1 - 100	55 / 234	2	1
	B	17	DW ESL	2	1 - 10	7 / 71	0	0
NITROBENZENE	A	668	GDGI	0	1 - 100	0 / 234	0	0
	B	668	GDGI	0	1 - 10	0 / 71	0	0
N-NITROSO-DI-N-PROPYLAMINE	A	330000	GDGI	0	1 - 100	0 / 234	0	0
	B	330000	GDGI	0	1 - 10	0 / 71	0	0
N-NITROSODIMETHYLAMINE	A	330000	GDGI	0	9.4 - 25	0 / 77	0	0
	B	330000	GDGI	0	9.4 - 10	0 / 40	0	0
N-NITROSODIPHENYLAMINE	A	330000	GDGI	0	1 - 100	6 / 234	0	0
	B	330000	GDGI	0	1 - 10	0 / 71	0	0
PENTACHLOROPHENOL	A	7.9	NDW ESL	0	2 - 250	2 / 230	112	49
	B	1	DW ESL	0	2 - 50	0 / 67	67	100
PHENANTHRENE	A	4.6	NDW ESL	10	1 - 100	29 / 234	199	85
	B	4.6	DW ESL	3	1 - 10	5 / 71	63	89
PHENOL	A	580	GDGI	0	1 - 100	40 / 230	0	0
	B	5	DW ESL	0	1 - 10	0 / 67	19	28
PYRENE	A	2	NDW ESL	12	1 - 100	18 / 234	209	89
	B	2	DW ESL	3	1 - 10	5 / 71	63	89
PCBs and Pesticides								
TOTAL PCBs	A	0.014	NDW ESL	48	-	48 / 219	219	100
	B	0.014	DW ESL	0	-	0 / 66	66	100
4,4'-DDD	A	0.001	NDW ESL	3	0.01 - 10	3 / 213	210	99
	B	0.001	DW ESL	0	0.01 - 0.5	0 / 66	66	100
4,4'-DDE	A	0.001	NDW ESL	3	0.01 - 5	3 / 213	210	99
	B	0.001	DW ESL	1	0.01 - 0.5	1 / 66	65	98
4,4'-DDT	A	0.001	NDW ESL	10	0.01 - 5	10 / 213	203	95
	B	0.001	DW ESL	0	0.01 - 0.5	0 / 66	66	100
ALDRIN	A	0.13		0	0.005 - 3	0 / 213	53	25
	B	0.002		0	0.005 - 0.3	0 / 66	66	100
ALPHA-BHC	A	NA		NA	0.005 - 3	0 / 213	0	0
	B	NA		NA	0.005 - 0.3	0 / 66	0	0
ALPHA-CHLORDANE	A	0.004	GDGI	3	0.005 - 25	3 / 213	210	99
	B	0.004	GDGI	0	0.005 - 3	0 / 66	66	100

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	RI Evaluation Criteria Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
PCBs and Pesticides (continued)								
AZINPHOS METHYL	A	NA		NA	1.9 - 25	0 / 89	0	0
	B	NA		NA	1.9 - 5	0 / 44	0	0
BETA-BHC	A	NA		NA	0.005 - 3	3 / 213	0	0
	B	NA		NA	0.005 - 0.3	1 / 66	0	0
BOLSTAR	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
COUMAPHOS	A	NA		NA	1 - 5	0 / 89	0	0
	B	NA		NA	1 - 2	0 / 44	0	0
DEMETON	A	NA		NA	1 - 5	0 / 58	0	0
	B	NA		NA	1 - 1	0 / 36	0	0
DEMETON-O	A	NA		NA	0.96 - 1	0 / 29	0	0
	B	NA		NA	0.96 - 0.96	0 / 6	0	0
DEMETON-S	A	NA		NA	0.96 - 1	0 / 31	0	0
	B	NA		NA	0.96 - 1	0 / 8	0	0
DICHLORVOS	A	NA		NA	0.96 - 5	0 / 89	0	0
	B	NA		NA	0.96 - 1	0 / 44	0	0
DIMETHOATE	A	NA		NA	0.5 - 2.5	0 / 58	0	0
	B	NA		NA	0.5 - 0.5	0 / 36	0	0
DISULFOTON	A	NA		NA	0.5 - 2.5	0 / 88	0	0
	B	NA		NA	0.5 - 1	0 / 43	0	0
DELTA-BHC	A	NA		NA	0.005 - 3	2 / 213	0	0
	B	NA		NA	0.005 - 0.3	0 / 66	0	0
DIELDRIN	A	0.0019	NDW ESL	3	0.01 - 5	3 / 213	210	99
	B	0.0019	DW ESL	0	0.01 - 0.5	0 / 66	66	100
ENDOSULFAN I	A	0.0087	NDW ESL	1	0.005 - 3	1 / 213	204	96
	B	0.0087	DW ESL	0	0.005 - 0.3	0 / 66	65	98
ENDOSULFAN II	A	0.0087	NDW ESL	4	0.01 - 5	4 / 213	209	98
	B	0.0087	DW ESL	0	0.01 - 0.5	0 / 66	66	100
ENDOSULFAN SULFATE	A	NA		NA	0.01 - 5	2 / 213	0	0
	B	NA		NA	0.01 - 0.5	0 / 66	0	0
ENDRIN	A	0.0023	NDW ESL	3	0.01 - 5	3 / 213	0	0
	B	0.0023	DW ESL	0	0.01 - 0.5	0 / 66	0	0
ENDRIN ALDEHYDE	A	NA		NA	0.01 - 1	4 / 115	0	0
	B	NA		NA	0.01 - 0.098	0 / 46	0	0
ENDRIN KETONE	A	NA		NA	0.01 - 5	1 / 178	0	0
	B	NA		NA	0.01 - 0.5	0 / 58	0	0
EPN	A	NA		NA	0.5 - 2.5	0 / 58	0	0
	B	NA		NA	0.5 - 0.5	0 / 36	0	0
ETHION	A	NA		NA	0.5 - 2.5	0 / 58	0	0
	B	NA		NA	0.5 - 0.5	0 / 36	0	0
ETHOPROP	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
FAMPHUR	A	NA		NA	3.5 - 17.5	0 / 58	0	0
	B	NA		NA	3.5 - 3.5	0 / 36	0	0
FENSULFOTHION	A	NA		NA	0.96 - 12.5	0 / 89	0	0
	B	NA		NA	0.96 - 2.5	0 / 44	0	0

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	RI Evaluation Criteria Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
PCBs and Pesticides (continued)								
FENTHION	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
GAMMA-BHC (LINDANE)	A	0.016	GDGI	2	0.005 - 3	3 / 213	203	95
	B	0.016	GDGI	0	0.005 - 0.3	0 / 66	65	98
GAMMA-CHLORDANE	A	0.004	GDGI	8	0.005 - 25	8 / 213	205	96
	B	0.004	GDGI	0	0.005 - 3	0 / 66	66	100
HEPTACHLOR	A	0.0036	GDGI	8	0.005 - 3	8 / 213	205	96
	B	0.0036	GDGI	0	0.005 - 0.3	0 / 66	66	100
HEPTACHLOR EPOXIDE	A	0.0036	GDGI	3	0.005 - 3	3 / 178	175	98
	B	0.0036	GDGI	0	0.005 - 0.3	0 / 58	58	100
HEPTACHLOR EPOXIDE A	A	NA		NA	0.0094 - 0.1	4 / 35	0	0
	B	NA		NA	0.0094 - 0.0098	0 / 8	0	0
HEPTACHLOR EPOXIDE B	A	NA		NA	0.0094 - 0.1	3 / 35	0	0
	B	NA		NA	0.0094 - 0.0098	0 / 8	0	0
MALATHION	A	NA		NA	0.5 - 2.5	0 / 58	0	0
	B	NA		NA	0.5 - 0.5	0 / 36	0	0
MERPPOS	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
METHOXYCHLOR	A	0.019		0	0.05 - 25	0 / 213	213	100
	B	0.019		0	0.05 - 3	0 / 66	66	100
METHYL PARATHION	A	NA		NA	0.5 - 2.5	0 / 89	213	100
	B	NA		NA	0.5 - 1	0 / 44	66	100
MEVINPHOS	A	NA		NA	1.9 - 17.5	0 / 89	0	0
	B	NA		NA	1.9 - 3.5	0 / 44	0	0
NALED	A	NA		NA	1.9 - 12.5	0 / 89	0	0
	B	NA		NA	1.9 - 2.5	0 / 44	0	0
PARATHION	A	NA		NA	0.5 - 2.5	0 / 58	0	0
	B	NA		NA	0.5 - 0.5	0 / 36	0	0
PHORATE	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
RONNEL	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
STIOPHOS	A	NA		NA	0.5 - 2.5	0 / 102	0	0
	B	NA		NA	0.5 - 1	0 / 51	0	0
SULFOTEP	A	NA		NA	0.5 - 2.5	0 / 58	0	0
	B	NA		NA	0.5 - 0.5	0 / 36	0	0
TRICHLORONATE	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
TOKUTHION	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0
TOXAPHENE	A	0.0002		0	0.5 - 50	0 / 213	0	0
	B	0.0002		0	0.5 - 5	0 / 66	0	0
CHLORPYRIFOS	A	NA		NA	0.5 - 2.5	0 / 89	0	0
	B	NA		NA	0.5 - 1	3 / 44	0	0
DIAZINON	A	NA		NA	0.5 - 2.5	3 / 89	0	0
	B	NA		NA	0.5 - 1	0 / 44	0	0

**Table 5-13 List of All RIECs that Apply to Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Analyte	Aquifer	Conc. (µg/L)	RI Evaluation Criteria Comments	Detections Exceeding RIEC	Range of Reporting Limits (mg/L)	Detection Frequency	Reporting Limits Exceeding RIEC	Frequency of Reporting Limits Exceeding RIEC (%)
Petroleum Hydrocarbons								
GASOLINE-RANGE ORGANICS	A	500	NDW ESL	2	20 - 2,000	33 / 183	3	2
	B	100	DW ESL	0	20 - 500	3 / 60	17	28
DIESEL-RANGE ORGANICS	A	640	NDW ESL	53	50 - 4,000	72 / 183	18	10
	B	100	DW ESL	8	50 - 500	8 / 60	17	28
MOTOR OIL RANGE ORGANICS	A	NA		NA	100 - 2,500	48 / 82	0	0
	B	NA		NA	100 - 500	0 / 40	0	0
TOTAL OIL AND GREASE	A	640	NDW ESL	23	5,000 - 8,000	23 / 70	47	67
	B	100	DW ESL	7	5,000 - 5,000	7 / 36	29	81
TOTAL PETROLEUM HYDROCARBONS (TPH)	A	1,400 - 20,000	Based on distance from shoreline	NA	NA	102 / 183	18	10
	B	1,400 - 20,001	Based on distance from shoreline	NA	NA	10 / 60	17	28

Notes:

(1) = Detection frequency for ammonia

µg/L = micrograms per liter

% = Percent

BHC - benzene hexachloride

DDD - dichlorodiphenyldichloroethane

DDE - dichlorodiphenyldichloroethene

DDT - dichlorodiphenyltrichloroethane

DW = drinking water

ESL = Environmental Screening Level

GDGI = Groundwater Data Gaps Investigation

HGAL = Hunters Point groundwater ambient levels

MCL = Maximum Contaminant Level

mg/L = milligrams per liter

NDW = non drinking water

PCB - polychlorinated biphenyl

RIEC = Remedial Investigation Evaluation Criteria

**Table 5-14 List of All Possible Areas of Concern in Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Well ID	Aquifer	General Description of Well Location	Contaminant Group	Contaminant Exceeding RI Evaluation Criteria	Potential Reason for Inadequate Extent Delineation
IR01MW48A	A	Located along shoreline in Panhandle Area	Anion	Unionized Ammonia	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Error introduced in calculation of unionized ammonia using ammonia concentrations and field parameters 1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well
			VOC	Benzene	
IR01MWI-3	A	Located along shoreline in Landfill Area, within PCB Hotspot removal area	Anion	Unionized Ammonia	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown 4) Error introduced in calculation of unionized ammonia using ammonia concentrations and field parameters 1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown 1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown 1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown
			Metal	Barium	
			VOC	Benzene	
			Petroleum Hydrocarbons	TPH (Total)	

**Table 5-14 List of All Possible Areas of Concern in Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Well ID	Aquifer	General Description of Well Location	Contaminant Group	Contaminant Exceeding RI Evaluation Criteria	Potential Reason for Inadequate Extent Delineation
IR01MW43A	A	Located along shoreline in Landfill Area, within PCB Hotspot removal area	Anion	Unionized Ammonia	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Error introduced in calculation of unionized ammonia using ammonia concentrations and field parameters
			Metal	Chromium (Total)	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Short data history since elevated concentrations detected
			Metal	Zinc	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Short data history since elevated concentrations detected
			PCB	PCBs (Total)	1) Effect of PCB Hotspot removal action unknown 2) No data on Bay side of well
			SVOC	Benzo(a)anthracene	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Short data history since elevated concentrations detected 4) Effect of PCB Hotspot removal action unknown
			SVOC	Chrysene	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown
			VOC	Benzene	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown
			VOC	1,4-Dichlorobenzene	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown
		Petroleum Hydrocarbons	TPH (Total)	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown	
IR01MW47B	B	Located along shoreline in Landfill Area, within PCB Hotspot removal area	Anion	Unionized Ammonia	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Error introduced in calculation of unionized ammonia using ammonia concentrations and field parameters
IR01MWI-8	A	Located along shoreline in Panhandle Area, in the vicinity of the Metal Slag removal area	Metal	Selenium	1) Contamination due to past operations conducted in the vicinity of the Metal Slag Area; effect of Metal Slag removal action unknown 2) No data on Bay side of well 3) Short data history since elevated concentrations detected

**Table 5-14 List of All Possible Areas of Concern in Parcel E-2 Aquifers
Hunters Point Shipyard Parcel E-2 Remedial Investigation/Feasibility Study**

Well ID	Aquifer	General Description of Well Location	Contaminant Group	Contaminant Exceeding RI Evaluation Criteria	Potential Reason for Inadequate Extent Delineation
IR01MW44A	A	Located along shoreline in the East Adjacent Area, within PCB Hotspot removal area	Metal	Zinc	1) No method for predicting concentrations in mixing zone and in Bay 2) No data on Bay side of well 3) Effect of PCB Hotspot removal action unknown 1) Effect of PCB Hotspot removal action unknown 2) No data on Bay side of well
			PCB	PCBs (Total)	
IR01MWI-6	A	Located along shoreline in Panhandle Area	PCB	PCBs (Total)	1) Short data history since elevated concentration detected; no data collected since 1992 2) No data on cross-gradient side of well, on non-Navy property

Notes:

PCB - polychlorinated biphenyl
 SVOC = semi-volatile organic compounds
 TPH = total petroleum hydrocarbon
 VOC = volatile organic compounds