Naval Facilities Engineering Command Southwest
BRAC PMO West
San Diego, CA

Final

Second Five-Year Review

Former Naval Station Treasure Island, CA

August 5, 2020

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Final
Second Five-Year Review
Former Naval Station Treasure Island
San Francisco, California

Prepared for:

DEPARTMENT OF THE NAVY

REVIEW AND APPROVAL

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ACRONYMS AND ABBREVIATIONS

§	Section
µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
µg/m^3	Micrograms per Cubic Meter
ACM	Asbestos-Containing Material
AFFF	Aqueous Film Forming Foam
AOI	Area of Interest
ARAR	Applicable or Relevant and Appropriate Requirement
ARIC	Area Requiring Institutional Controls
AST	Aboveground Storage Tank
bgs	Below Ground Surface
BaP	Benzo(a)pyrene
BHC	Benzene Hexachloride
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
Cal. Code Regs	California Code of Regulations
Cal/EPA	California Environmental Protection Agency
CCSF	City and County of San Francisco
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm^2	Square Centimeter
COC	Contaminant of Concern
COEC	Contaminant of Ecological Concern
CRUP	Covenant to Restrict Use of Property
DCE	Dichloroethene
DDD	Dichlorodiphenyldichloroethane
Dioxins	Polychlorinated Dibenzo-p-dioxins
DON	United States Department of the Navy
DTSC	California Department of Toxic Substances Control
DTSC HERO	California Department of Toxic Substances Control Human and Ecological Risk Office
EBS	Environmental Baseline Survey
EC	Engineering Control
EIR	Environmental Impact Report
ELCR	Excess Lifetime Cancer Risk
EMB	Emergency Management Branch
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ESD	Explanation of Significant Difference
EU	Exposure Unit
FFS	Focused Feasibility Study
FOST	Finding of Suitability to Transfer
FS	Feasibility Study

FSS	Final Status Survey
FSY	Former Storage Yard
ft^2	Square Foot or Square Feet
HERO	Human and Ecological Risk Office
HHRA	Human Health Risk Assessment
HI	Hazard Index
HRA	Historical Radiological Assessment
HRASTM	HRA Supplemental Technical Memorandum
IC	Institutional Control
ISB	In Situ Bioremediation
IUR	Inhalation Unit Risk
J	Estimated concentration
LHA	Lifetime Health Advisory
LTM	Long-Term Monitoring
LUC	Land Use Control
MCPP	Methylchlorophenoxypropionic Acid
mg/kg	Milligram per Kilogram
MMEC	Multimedia Environmental Compliance Group
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
msl	Mean Sea Level
NAVFAC	Naval Facilities Engineering Command
NAVFAC SW	Naval Facilities Engineering Command Southwest
NAVSTA TI	Naval Station Treasure Island
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
ng/kg	Nanograms per Kilogram
NPL	National Priorities List
NOSSA	Naval Ordnance Safety and Security Activity
NTR	National Toxics Rule
O&M	Operation and Maintenance
OEHHA	California Office of Environmental Health Hazard Assessment
OEW	Ordnance and explosives waste
ORM	Oxygen Release Material
OU	Operable Unit
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCDD	Polychlorinated dibenzodioxin
PCDF	Polychlorinated dibenzofuran
PCE	Tetrachloroethene
pCi/g	Picocurie per Gram
PCSR	Post-Construction Summary Report
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid

pH	Potential of Hydrogen
PID	Photoionization Detector
PMO	Program Management Office
ppt	Parts per Trillion
PRB	Permeable Reactive Barrier
PRC	PRC Environmental Management, Inc.
PRG	Preliminary Remediation Goal
RA	Remedial Action
RAB	Restoration Advisory Board
RACR	Remedial Action Completion Report
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RAWP	Remedial Action Work Plan
RCP	Representative Concentration Pathway
RD	Remedial Design
Regional Water Board	California Environmental Protection Agency Regional Water Quality Control Board, San Francisco Bay Region
RfC	Reference Concentration
RG	Remediation Goal
RI	Remedial Investigation
RIP	Remedy in Place
ROD	Record of Decision
RSL	Regional Screening Level
RURR	Radiological Unrestricted Release Recommendation
SARA	Superfund Amendments and Reauthorization Act
SFPUC	San Francisco Public Utilities Commission
SI	Site Inspection
Site	Installation Restoration Site
SLERA	Screening Level Ecological Risk Assessment
SMP	Site Management Plan
SSSL	Soil Gas Site-Specific Risk-Based Screening Level
SulTech	Sullivan Consulting Group and Tetra Tech EM Inc., A Joint Venture
SVOC	Semivolatile Organic Compound
SWDA	Solid Waste Disposal Area
SWRCB	California State Water Resources Control Board
TBC	To Be Considered
TCDD	Tetrachlorodibenzo-p-dioxin
TCE	Trichloroethene
TCRA	Time-critical Removal Action
TEQ	Toxicity Equivalent
TI	Treasure Island
TIDA	Treasure Island Development Authority
TPH	Total Petroleum Hydrocarbons
TPH-d	Total Petroleum Hydrocarbons, Diesel Range
TPH-g	Total Petroleum Hydrocarbons, Gasoline Range
TPH-mo	Total Petroleum Hydrocarbons, Motor Oil Range
TtEC	Tetra Tech EC, Inc.
TtEMI	Tetra Tech EM Inc.

U	Non-detected concentration
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UU/UE	Unlimited Use/Unrestricted Exposure
VC	Vinyl Chloride
VI	Vapor Intrusion
VOC	Volatile Organic Compound
YBI	Yerba Buena Island
yd^3	Cubic Yard
ZVI	Zero Valent Iron

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EXECUTIVE SUMMARY

The United States Department of the Navy (DON) has completed a Five-Year Review of remedial actions (RA) at the former Naval Station Treasure Island (NAVSTA TI) in San Francisco, California. The remedies at each Installation Restoration Site (Site) are described and published in site-specific documents including: (1) Records of Decision (ROD)/Final Remedial Action Plans (RAP); (2) Remedial Action Work Plans (RAWP); (3) Remedial Action Completion Reports (RACR); and (4) Land Use Control (LUC) Remedial Designs (RD).

The Five-Year Review is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This Five-Year Review was conducted in accordance with: (1) the United States Environmental Protection Agency (USEPA) Office of Solid Waste and Emergency Response Directive 9355.7-03B-P *Comprehensive Five-Year Review Guidance* (USEPA, 2001); (2) the USEPA *Recommended Evaluation of Institutional Controls: Supplement to the 'Comprehensive Five-Year Review Guidance'* (USEPA, 2011); (3) the DON *Navy/Marine Corps Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Reviews* (DON, 2011); (4) the Naval Facilities Engineering Command (NAVFAC) *Toolkit for Preparing Five-Year Reviews* (DON, 2013); and (5) the USEPA *Transmittal of the Five-Year Review Recommended Template* (USEPA, 2016).

Six NAVSTA TI Sites are evaluated for this review period: Sites 6, 12, 21, 24, 27, and 30. These Sites are at various stages in the CERCLA process ranging from RA implementation to long-term monitoring. This is the first Five-Year Review for Sites 6, 12, and 24, and the second for Sites 21, 27, and 30.

This Five-Year Review was completed in order to accomplish the following:

- Determine whether the remedies currently operating at Treasure Island are protective of human health and the environment
- Document the methods, findings, and conclusions of the review in a report
- Identify issues found during the review and make recommendations to address these issues

The Five-Year Review process consists of document reviews; interviews with DON personnel, contractors, and community members; site inspections; and review of the human health risk assessments (HHRA) and ecological risk assessments (ERA). Information from these processes was used to answer three technical assessment questions (USEPA, 2001):

- Is the remedy functioning as intended by the decision documents?
- Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAO) used at the time of the remedy selection still valid?
- Has any other information come to light that could call into question the protectiveness of the remedy?

Protectiveness statements were assigned to each Site included in this Five-Year Review in accordance with the USEPA guidance for *Clarifying the Use of Protectiveness Determinations for CERCLA Five-Year Reviews* (USEPA, 2012). As required by the USEPA guidance, based on the answers to these questions, the protectiveness of each Site was determined.

Protectiveness Statements

Based on the technical assessments, the protectiveness determinations for Sites 6, 12, 21, 24, 27, and 30 are presented in Table ES-1.

Table ES-1: Summary of Protectiveness Determination for Sites at Former Naval Station Treasure Island

Site	Site Description	Protectiveness Determination
6	Fire Training School	Protectiveness Deferred
12	Old Bunker Area - Groundwater	Protectiveness Deferred
21	Vessel Waste Oil Recovery Area	Protective
24	Former Dry Cleaning Facility	Protective in the Short-term
27	Clipper Cove Skeet Range	Protective
30	Daycare Center	Protective

The Five-Year Review Summary Forms are presented in Table ES-2.

Table ES-2: Summary Forms – Five-Year Review

SITE IDENTIFICATION		
Site Name: Former Naval Station Treasure Island Sites 6, 12, 21, 24, 27, and 30		
USEPA ID: CA7170023330		
Region: 9	**State:** CA	**City/County:** San Francisco/San Francisco
SITE STATUS		
NPL Status: Non NPL		
Multiple Sites? Yes	**Have the Sites Achieved Construction Completion?** Yes	
REVIEW STATUS		
Lead agency: Other Federal Agency If "Other Federal Agency" was selected above, enter Agency name: United States Department of the Navy (DON)		
Author name (Federal or State Project Manager): DON, Base Realignment and Closure (BRAC) Program Management Office (PMO) West		
Author affiliation: DON		
Review period: 2014 – 2019		
Date of site inspection: January 8, 10, and 17, 2019		
Type of review: Statutory for Sites 6, 21, 27, and 30; Policy for Sites 12 and 24		
Review number: First for Sites 6, 12, and 24; Second for Sites 21, 27, and 30		
Triggering action date: December 15, 2014 (First Five-Year Review)		
Due date (five years after triggering action date)**:** December 15, 2019		

Issues and Recommendations

Site 6 – The following issues, recommendations, and follow-up actions have been identified:

Site 6 Issue	Recommendation/Follow-Up Action
Consideration of newly promulgated state toxicity criteria contained in California Code of Regulations (Cal. Code Regs.) title (tit.) 22 Sections (§§) 69021 and 69022(c) (Appendix I, Tables A and B) and use of current California Environmental Protection Agency Department of Toxic Substances Control (DTSC) toxicity criteria results in a lower arsenic concentration in groundwater acceptable for construction worker exposure, indicating the remediation goal (RG) selected in the ROD/Final RAP is not protective.	Revise the groundwater RG for arsenic selected in ROD/Final RAP. The ROD/Final RAP selected institutional controls (IC) as the remedy for construction worker exposure to groundwater. Therefore, revising the groundwater RG and resuming monitoring for arsenic is necessary to ensure the ICs are enforceable and implemented when concentrations of arsenic in groundwater are not at protective levels.
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS), emerging contaminants not yet defined as CERCLA hazardous substances, were detected in Site 6 wells sampled in May and December 2017.	The nature and extent of PFAS will be investigated and evaluated in an expedited manner through the CERCLA process, followed by all necessary response actions for protection of human health and the environment.
Habitat development after Site 6 is transferred may be different than contemplated in the Screening Level Ecological Risk Assessment (SLERA) and the ROD/Final RAP.	Evaluate redevelopment plans in the next Five-Year Review to determine if the underlying assumptions for ecological receptors are still valid.

Site 12 – The following issue, recommendation, and follow-up action has been identified:

Site 12 Issue	Recommendation/Follow-Up Action
Due to recent changes in state toxicity criteria for arsenic, it cannot be determined at this time whether there may be an unacceptable risk to construction workers via dermal contact with groundwater.	Reevaluate potential risk to construction workers from dermal contact with groundwater to determine if the remedy remains protective. An ambient concentration of arsenic of 15 µg/L will be used as the screening level because the current DTSC screening criterion of 8.5 µg/L falls below the ambient concentration of arsenic at NAVSTA TI.

Site 21 – The following issue, recommendation, and follow-up action has been identified:

Site 21 Issue	Recommendation/Follow-Up Action
Soil gas concentrations at Site 21 exceed soil gas screening levels and are increasing in select wells.	Evaluate amount and frequency of soil gas data collection in support of the 2025 Five-Year Review under the Basewide Monitoring Program.

Site 24 – The following issues, recommendations, and follow-up actions have been identified:

Site 24 Issue	Recommendation/Follow-Up Action
Use of current default attenuation factors from USEPA, DTSC, and California Environmental Protection Agency Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) results in lower concentrations of cis-1,2-dichloroethene (DCE); trichloroethene (TCE), and vinyl chloride (VC) in soil gas that are acceptable for resident and commercial/industrial worker vapor intrusion (VI) exposures, indicating that the RGs selected in the ROD/Final RAP are not protective.	Revise soil gas RGs for cis-1,2-DCE, TCE, and VC selected in ROD/Final RAP. The ROD/Final RAP selected ICs as the remedy to address exposure to residual VI risk remaining after the groundwater treatment was complete and while concentrations of contaminants of concern (COC) in soil gas attenuate. Therefore, revising the soil gas RGs is necessary to ensure the ICs are enforceable and implemented when concentrations of COCs in soil gas are not at protective levels.
Consideration of newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) results in a lower concentration of VC in soil gas acceptable for resident and commercial/industrial worker VI exposures indicating the RGs selected in the ROD/Final RAP are not protective.	Revise the soil gas RG for VC that was selected in ROD/Final RAP. The ROD/Final RAP selected ICs as the remedy to address exposure to residual VI risk remaining after the groundwater treatment was complete and while concentrations of COCs in soil gas attenuate. Therefore, revising the RG is necessary to ensure the ICs are enforceable and implemented when VC concentrations in soil gas are not at protective levels.
Site inspection identified inaccessible monitoring wells.	Ensure wells are accessible prior to any monitoring event.
Soil gas concentrations are not fully delineated based on the current USEPA, DTSC, and Regional Water Board default attenuation factors.	Perform additional sampling to delineate the soil gas plume.

Site 27 – The following issues, recommendations, and follow-up actions have been identified:

Site 27 Issue	Recommendation/Follow-Up Action
Site inspection indicated a lack of signage for the “No Wake Zone” and the “No Mooring Zone”.	Erect necessary signage and revise the IC compliance checklist to verify the presence of signage and to evaluate the condition of the signage.
Information indicates boats violating “No Wake Zone” speed limit requirements.	Identify specific enforcement provisions for speed limits in a revised Clipper Cove Site Management Plan (SMP) and improve enforcement of speed limits.

Site 30 – No issues have been identified for this site that would affect current or future protectiveness of the remedy. No recommendations or follow-up actions have been identified for Site 30.

Protectiveness Statements

Site 6 – A protectiveness determination of the remedy for Site 6 cannot be made until the nature and extent of emerging contaminants, PFAS (specifically PFOA and PFOS), detected in groundwater at Site 6 after the ROD/Final RAP was signed, has been investigated in an RI, including an evaluation of risks to human health and ecological receptors, and any necessary response is implemented. The review of the remedy selected in the ROD/Final RAP indicates that RAOs have been met, the excavation and soil gas sampling for naphthalene are complete, the LUC RD has been finalized, and ICs are in place to prevent exposures to COCs in soil and groundwater. Annual inspections of the ICs will begin in 2020 to ensure the remedy will continue to be protective in the long-term. However, the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) and current toxicity criteria contained in DTSC screening values indicate that the RG for arsenic in groundwater identified in the ROD/Final RAP is not protective of construction worker exposure. In order to be protective in the long-term, the construction worker groundwater RG for arsenic will be revised to 15 µg/L.

Site 12 – A protectiveness determination of the remedy for Site 12 cannot be made at this time. Additional information must be obtained from ongoing groundwater monitoring under the basewide monitoring program and by consideration of the recent DTSC change in toxicity criteria for arsenic. This additional information will be considered in evaluating potential risk to construction workers from dermal contact with groundwater using 15 µg/L as the screening level to determine if the remedy remains protective. A protectiveness determination will be made upon evaluation completion.

Site 21 – The remedy for Site 21 is protective of human health and the environment. RAOs have been met, the LUC RD has been finalized, ICs are in place to prevent exposure to COCs in soil gas, annual LUC inspections are occurring, and the recent indoor air evaluation indicates that concentrations of tetrachloroethene (PCE) and TCE in indoor air do not exceed indoor air screening levels for current users. However, soil gas concentrations at Site 21 exceed soil gas screening levels and are increasing in select wells. To ensure ongoing protectiveness, soil gas monitoring locations and frequency will be evaluated under the Basewide Monitoring Program.

Site 24 – The remedy for Site 24 is protective in the short-term for human health and the environment because no unacceptable exposure is occurring. RAOs have been met, soil excavation and groundwater treatment are complete, and the LUC RD has been finalized with an expanded area requiring institutional controls (ARIC). In addition, the recent indoor air evaluation concluded that there was no immediate unacceptable risk to current users at Buildings 96 and 260 from VI. However, the current USEPA, DTSC, and Regional Water Board default attenuation factors and the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) indicate that the RGs selected in the ROD/Final RAP for cis-1,2-DCE, TCE, and VC in soil gas are not protective of VI exposure for the resident and commercial/industrial worker. In order to be protective in the long-term, the RGs selected in the ROD/Final RAP will be reevaluated and revised, if necessary, and any potential soil gas plume outside the current ARIC for Site 24 will be delineated.

Protectiveness Statements (Continued)

Site 27 – The remedy for Site 27 is protective of human health and the environment. RAOs have been met, focused dredging is complete, the 1.5-foot thick engineered backfill was installed within 75-feet of the shoreline, is in place, and is functioning as intended to prevent exposure. There have been no decreases in sediment elevation in the area outside the backfilled area, indicating that the required two feet of coverage remains in place above the lead-impacted sediment. In addition, the LUC RD has been finalized, the ICs and the SMP are in place to restrict disturbance of the engineered backfill area and the sediment, annual LUC inspections are occurring, and bathymetric surveys are being completed every five years.

Site 30 – The remedy for Site 30 is protective of human health and the environment. RAOs have been met, the LUC RD has been finalized, LUCs are in place to prevent exposure to potentially contaminated soil, and annual LUC inspections are occurring.

1.0 INTRODUCTION

This report documents the results of the second Five-Year Review conducted for the Former Naval Station Treasure Island (NAVSTA TI) in San Francisco, California. The purpose of the Five-Year Review is to evaluate whether the remedial actions (RA) implemented are protective of human health and the environment. The Five-Year Review report presents the methods, findings, and conclusions of the review and documents a protectiveness determination. In addition, the Five-Year Review report identifies issues found during the review and makes recommendations to address them.

This second Five-Year Review for NAVSTA TI summarizes the significant work conducted by the United States Department of the Navy (DON) in collaboration with regulatory agencies including the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC), the Cal/EPA Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), and, in a limited capacity, the United States Environmental Protection Agency (USEPA). This review is triggered by the first Five-Year Review signed on December 15, 2014.

This Five-Year Review includes six Sites [Site 6—Former Fire Training School, Site 12—Old Bunker Area; Site 21—Vessel Waste Oil Recovery Area; Site 24—Former Dry Cleaning Facility; Site 27—Clipper Cove Skeet Range; and Site 30—Daycare Center] where a Record of Decision/Final Remedial Action Plan (ROD/Final RAP) has been signed and hazardous substances remain on site at levels that do not allow for unlimited use and unrestricted exposure (UU/UE).

Five-Year Reviews are required for NAVSTA TI because (1) ongoing and completed RAs have left contaminants in place above concentrations that would allow for UU/UE, and (2) the decision documents were signed on or after October 17, 1986 (the effective date of the Superfund Amendments and Reauthorization Act [SARA]).

Consistent with Executive Order 12580, the Secretary of Defense is responsible for ensuring that Five-Year Reviews are conducted at all qualifying U.S. Department of Defense cleanup sites. The DON is authorized to conduct the Five-Year Review for NAVSTA TI in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section (§) 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This Five-Year Review was conducted in accordance with the following guidance documents: (1) USEPA Office of Solid Waste and Emergency Response Directive 9355.7-03B-P, Comprehensive *Five-Year Review Guidance* (USEPA, 2001); (2) the USEPA *Recommended Evaluation of Institutional Controls: Supplement to the Comprehensive Five-Year Review Guidance* (USEPA, 2011); (3) the DON *Navy/Marine Corps Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Reviews"* (DON, 2011); (4) the Naval Facilities Engineering Command (NAVFAC) *Toolkit for Preparing Five-Year Reviews* (DON, 2013) and (5) the USEPA *Transmittal of the Five-Year Review Recommended Template* (USEPA, 2016).

1.1 REVIEW PURPOSE

CERCLA § 121(c) and the NCP at 40 Code of Federal Regulations [CFR], § 300.430(f)(4)(ii) call for Five-Year Reviews of certain CERCLA RAs when the remedy selected does not result in UU/UE (statutory reviews). The USEPA also conducts Five-Year Reviews of RAs that will result in UU/UE, but require more than five years to reach UU/UE as a matter of policy (policy reviews). The USEPA classifies each Five-Year Review as either statutory or policy, depending

on whether it is required by statute or conducted as a matter of policy. This Five-Year Review is a statutory review for Sites 6, 21, 27, and 30, and a policy review for Sites 12 and 24.

As specified by CERCLA and the NCP, statutory reviews are required for sites where, after RAs are complete, hazardous substances, pollutants, or contaminants remain on site at levels that will not allow for UU/UE. Statutory reviews are required at such sites if the ROD/Final RAP was signed on or after the effective date of SARA. CERCLA §121(c), as amended, 42 USC § 9621(c), states the following:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented."*

Additionally, the NCP, Title 40 of CFR 300.430(f)(4)(ii) states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminant remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."*

The methods, findings, and conclusions of the review are documented in this Five-Year Review report. In addition, this report will document any issues identified during the review and recommend specific follow-up actions to address them. The Five-Year Review Summary Form is shown in Table ES-2.

1.2 SITE DESCRIPTION AND BACKGROUND

Former NAVSTA TI is in the San Francisco Bay in the City and County of San Francisco (CCSF), midway between San Francisco and Oakland, California (Figure 1-1). The former naval station consists of two contiguous islands connected by a causeway: the northern island (Treasure Island [TI]) encompasses approximately 403-acres and the southern island (Yerba Buena Island [YBI]) encompasses approximately 147-acres. The approximate area of each site is as follows:

- Site 6 – 4.5-acres
- Site 12 – 93.2-acres
- Site 21 – 2.0-acres
- Site 24 – 20.3-acres
- Site 27 – 18.8-acres
- Site 30 – 1.5-acres

Since 1987, the CERCLA program at NAVSTA TI has evolved to include 24 sites (Table 1-1). Sites that have been combined under the CERCLA program are discussed under the combined site number. For example, the CERCLA contaminants at Sites 5 (Old Boiler Plant) and 17 (Tanks 103 and 104) were combined into Site 24, and information about Sites 5 and 17 is included in the Site 24 discussion. Sites 1 through 26 were identified during the 1987 Preliminary Assessment/Site Inspection (PA/SI) (Dames and Moore, 1988). Other sites were added later, as discussed in the following sections. The current program status for each CERCLA site is included in Table 1-1.

Table 1-1: CERCLA Sites

Site	Name/Description	Basis for Action	CERCLA Program Status	Five-Year Review
1	Medical Clinic	Silver in soil	Closed in 2002	Not included
2	Radiation Training Area	Radionuclides in soil	No further action recommended in 1988; contaminants merged with Site 12	Not included
3	PCB Equipment Storage Area	PCBs in soil	Closed in 2002	Not included
5	Old Boiler Plant	Fuels in soil and groundwater	Closed; CERCLA contaminants merged into Site 24 in 2001	Not included
6	Former Fire Training School	VOCs, PAHs, fuels, dioxins, and furans in soil and groundwater	RIP (LTM and LUCs) ROD signed in December 2014; RACR signed in February 2018	Included in this report
7	Pesticide Storage Area	Metals, pesticides, and herbicides in soil	Closed in 2005	Not included
8*	Army Point Sludge Disposal Area	SVOCs and metals in soil	RI in 2009; Caltrans working with regulatory agencies to close site	Not included; may be included in future reports
9	Foundry	Iron and PAHs in soil	Closed; no-action ROD signed in 2007	Not included
10	Bus Painting Shop	Irons and PAHs in soil	Closed; no-action ROD signed in 2007	Not included
11*	YBI Landfill	Waste in place, VOCs, PAHs, fuels and metals in soil	Interim RI in 2010; Caltrans working with regulatory agencies to close site	Not included; may be included in future reports

Site	Name/Description	Basis for Action	CERCLA Program Status	Five-Year Review
12	Old Bunker Area	Waste in place, PCBs, PAHs, dioxins, metals and radionuclides in soil; arsenic and fuels in groundwater	First of two expected RODs signed in 2017; RA ongoing. The carve out within Site 12, is Petroleum Site 20 (not a CERCLA site).	Included in this report (excluding second expected ROD for radiological isotopes and non-SWDA portions of Site 12)
13	Storm Water Outfalls/Offshore Sediments	Metals, PCBs, PAHs, and pesticides in sediment	Closed; no-action ROD signed in 2005	Not included
17	Tanks 103/104	Fuels, oils, and lubricants in soil and groundwater	Closed; CERCLA contamination merged into Site 24 in 2001	Not included
18*	Possible Asbestos-Containing Material on YBI	Asbestos in soil	No further action recommended in 1988	Not included
21	Vessel Waste Oil Recovery Area	VOCs in soil and groundwater	RIP (LTM and LUCs)	Included in this report
23*	YBI Fuel Line Rupture/Landslide	Fuels in soil	No further action recommended in 1988	Not included
24	Former Dry Cleaning Facility	Chlorinated VOCs in soil and groundwater	Final Interim RACR submitted in 2017. RA ongoing; LUC-RD submitted in 2019	Included in this report
27	Clipper Cove Skeet Range	Lead shot in sediment	RIP (LTM and LUCs)	Included in this report
28*	West Side On/Off Ramps	Lead in soil	Closed; no-action ROD signed in 2010	Not included
29*	East Side On/Off Ramp	Lead and SVOCs in soil	RI in 2009; Caltrans working with regulatory agencies to close site	Not included; may be included in future report
30	Daycare Center	Dioxins in soil	RIP (LUCs)	Included in this report

Site	Name/Description	Basis for Action	CERCLA Program Status	Five-Year Review
31	Former South Storage Yard	Lead, PAHs and dioxins in soil	Remedy completed in accordance with ROD/Final RAP signed in 2009	Not included
32	Former Training and Storage Area	PCBs, dioxins, pesticides, arsenic, and radionuclides in soil	No-action ROD submitted in 2016	Not included
33	Water Line Replacement Area	Lead in soil	Closed; remedy completed and RACR signed in 2014	Not included

Notes:

* Site is located on YBI.

1. Sites not listed in this table are not part of the CERCLA program.
2. Blue shading indicates sites that are the focus of this Five-Year Review.
3. Yellow shading indicates sites that do not yet have a ROD/Final RAP and may be included in a future Five-Year Review if hazardous substances remain on site at levels that do not allow for unlimited use and unrestricted exposure.
4. Sites with no shading are closed and a Five-Year Review is not necessary; these sites are included on the table for overall context.

ACM	Asbestos-containing material	RA	Remedial action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	RACR	Remedial action completion report
		RAP	Remedial action plan
Dioxins	Polychlorinated dibenzo-p-dioxins	RI	Remedial investigation
ESD	Explanation of significant differences	RIP	Remedy in place
FS	Feasibility study	ROD	Record of decision
LTM	Long-term monitoring	SVOC	Semivolatile organic compound
LUC	Land use control	SWDA	Solid waste disposal area
PAH	Polycyclic aromatic hydrocarbon	VOC	Volatile organic compound
PCB	Polychlorinated biphenyl	YBI	Yerba Buena Island

1.2.1 Geography

The DON divided NAVSTA TI into investigation sites based on similar historical activities to facilitate investigation and remediation. These areas are investigated under CERCLA. Figure 1-1 shows the CERCLA site locations on TI. No sites on YBI required evaluation in this second Five-Year Review; thus, Sites 8, 11, 18, 23, 28, 29 are not included on Figure 1-1.

Currently, residents are located on TI within Site 12, also known as the Old Bunker Area. The residents live in former DON housing through a lease agreement with Treasure Island Development Authority (TIDA). In addition, numerous buildings on TI owned by TIDA are subleased to commercial tenants, such as those at Sites 21 and 24.

1.2.2 Topography

TI is a man-made island constructed of materials dredged from the bay. The topography of TI is characterized by flat, relatively level lowlands ranging in elevation from approximately 6- to 14-feet above mean sea level (msl) and sloping down to sea level at the bay. The perimeter berm around TI generally ranges from 10- to 14-feet above msl. Landscaped areas on TI include mature ornamental trees, shrubs, and grasses. The shoreline at TI consists of riprap (CCSF, 2011).

YBI is a natural island. The existing ground elevations on YBI range from sea level at the shoreline to 340-feet above msl near the middle of the island and include slopes ranging from 5 to 75 percent. YBI contains landscaped areas, non-native eucalyptus stands, and several types of native habitat. The native vegetation communities are mainly on the western and northern edges of the island (CCSF, 2011). The shoreline at YBI consists of natural rocky shores and a narrow sandy beach along Clipper Cove.

1.2.3 Geology

TI is a relatively flat man-made island, consisting primarily of sand dredged from the bay and retained by a perimeter of rock and sand dikes. Dredging and construction of TI, directed by the U.S. Army Corps of Engineers (USACE), began in 1936 and was completed in 1937. TI was constructed on the Yerba Buena Shoals, a 735-acre sand spit extending north and northwest of YBI. To build the island, USACE constructed a perimeter of rock and filled it with millions of tons of silt dredged from the bay and delta (Lee, 1969). Subsurface materials at TI can be divided into the following five units, listed from youngest to oldest:

- Fill (Dredged Sand Fill)
- Shoal Sands (Yerba Buena Shoal Sands)
- Younger Bay Mud
- Older Bay Mud
- Franciscan Assemblage

These units exist in a simple layer-cake stratigraphy at TI. The dredged fill and shoal sands act as an unconfined aquifer at TI.

1.2.4 Hydrogeology

Groundwater at TI is unconfined with an average depth to the water table of approximately 6.5-feet below ground surface (bgs). Groundwater recharge occurs primarily from infiltration of precipitation with some contribution from landscape irrigation. Perched groundwater conditions may exist locally above the shallow water table because of the presence of relatively impermeable silt and clay lenses. Likewise, the overall aquifer is subdivided at some sites based on local, low-permeability horizons within the fill and shoal sands. For example, groundwater is divided into two water-bearing zones at Site 21. The shallow A zone, located between 3.5- and 13.5-feet bgs, is composed of dredged fill. The intermediate B zone, located between 16.5- and 28-feet bgs, is composed of shoal deposits (SulTech, 2009).

Groundwater flow is radial from the center of TI toward the shoreline. Groundwater flow gradients are low, ranging from 0.001 to 0.002 (PRC Environmental Management, Inc. [PRC], 1995). Tidal fluctuations influence the hydraulic gradient at locations within 200- to 250-feet from the shoreline. Temporary tidal effects on groundwater produce a steeper groundwater gradient after low tide and a decline of, and reversal in, the groundwater gradient after high tide (PRC, 1995; Tetra Tech EM Inc., 2002). Measurements made in December 2017 indicated the hydraulic gradient at Site 6 ranged from 0.002- to 0.003-feet per foot (NOREAS, 2019a).

Tidal mixing also affects groundwater at TI. Based on the results of a tidal mixing zone study in 2001 (Tetra Tech, 2002), it was estimated that physical mixing of surface water and groundwater takes place over distances that ranged from 60- to 150-feet inland from the shoreline. Estimates of the degree of tidal mixing of surface water and groundwater for TI ranged from 10 to 17 percent at wells positioned approximately 50-feet from the shoreline, except at a transect at Site 21 in the southeastern portion of TI. Tidal mixing at one transect in Site 21 was conservatively estimated at 43 percent; however, conditions encountered in this

transect are considered unusual and representative only of the area immediately surrounding that transect (Tetra Tech EM Inc., 2002). Groundwater at TI is not suitable as a potential source of drinking water pursuant to California State Water Resources Control Board (SWRCB) Resolution 88-63 and Regional Water Board Resolution 89-39 (Regional Water Board, 2001).

1.2.4.1 Rising Sea Levels

The California Ocean Protection Council and the California Natural Resources Agency recently updated statewide guidance for sea level rise to reflect recent advances in scientific projections (California Ocean Protection Council and California Natural Resources Agency, 2017). Using the methodology of Kopp et al., the guidance estimated future sea level rise at the Golden Gate tide gauge in San Francisco (Kopp et al., 2014). The estimated sea level rise in San Francisco under three future scenarios (referred to as representative concentration pathways [RCP]) is summarized below.

- RCP 8.5 is consistent with a future in which there are no significant global efforts to limit or reduce emissions. In 2100, the likely sea level rise associated with this scenario ranges from 1.6- to 3.4-feet.
- RCP 4.5 is a moderate emissions reduction scenario and assumes that global greenhouse gas emissions will be curtailed. In 2100, the likely sea level rise associated with this scenario ranges from 1.2- to 2.7-feet.
- RCP 2.6 is a stringent emissions reduction scenario and assumes that global greenhouse gas emissions will be significantly curtailed. In 2100, the likely sea level rise associated with this scenario ranges from 1.0- to 2.4-feet.

Based on the information summarized above, a contingency to account for up to a 3-foot increase in sea level provides a reasonable level of protection in designing the crest elevation for the shoreline protection structures. The shoreline protection structures can be adapted to increase the crest elevation if deemed necessary on future evaluations.

1.2.5 Land and Resource Use

1.2.5.1 Current Land Uses

Current land uses at former NAVSTA TI include residential housing, educational and training facilities, public services (police, fire station, post office, and wastewater treatment), offices, commercial and industrial uses (wineries and film and television production), and open space and recreational uses including the marina at Clipper Cove. The Job Corps campus, which is owned and operated by the U.S. Department of Labor, occupies approximately 37-acres in the central portion of NAVSTA TI. This facility was formerly used to screen military personnel. Job Corps is a residential, live-in program that offers career planning, on-the-job training, job placement, housing, food service, and childcare programs.

Various historical industrial activities at NAVSTA TI—including degreasing, painting, foundry operations, equipment storage, dry cleaning, other industrial operations, as well as fire and radiological decontamination training—have resulted in a broad distribution of chemicals in soil and groundwater. These chemicals include volatile organic compounds (VOC); semivolatile organic compounds (SVOC) including polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), dioxins, and pesticides; total petroleum hydrocarbons (TPH); metals; and radionuclides.

1.2.5.2 Future Land Use

Planning for the future use of NAVSTA TI began in 1994 when the City of San Francisco and a Citizen's Reuse Committee developed the draft reuse plan. This reuse plan was further refined in compliance with the California Environmental Quality Act (CEQA). The refined plan presented in the Final Environmental Impact Report (EIR) was certified by the San Francisco Planning Commission in 2011. The final EIR for the TI and YBI redevelopment project (CCSF, 2011) considered a variety of reuse options. Planned land uses include residential, retail, commercial offices, hotels, and open space and recreational uses such as parks, public plazas, cultural areas, athletic fields, and greenways (Figure 1-2).

1.2.5.3 Surface Water and Groundwater Use

No permanent surface water features exist at TI. Surface water runoff flows to nearby San Francisco Bay or percolates through the soil. Groundwater beneath TI is not suitable for drinking water and is not used for irrigation or industrial supply. Drinking water is supplied to TI by CCSF through its municipal supply from the Hetch Hetchy watershed in the Sierra Nevada.

Under the San Francisco Bay Basin Water Quality Control Plan (Regional Water Board, 2011), all groundwater within the Bay Basin that meets the criteria in SWRCB Resolution 88-63 has a potential beneficial use for municipal or domestic supply. However, the Regional Water Board conducted the Pilot Beneficial Use Designation Project for several groundwater basins in San Francisco and northern San Mateo County, including TI (Regional Water Board, 1996). Results of the Regional Water Board's report indicated the use of groundwater for municipal and domestic supply at TI would be limited by (1) the small volume of fresh groundwater available, (2) the likelihood of saltwater intrusion, and (3) the potential future ground improvements for stability (such as stone columns and dynamic compaction). Consequently, the report recommended that the Bay Basin Water Quality Control Plan be revised to no longer designate groundwater at TI as a potential municipal or domestic water supply, but to retain its designation for potential agricultural, process, and industrial supply (Regional Water Board, 2001). The Regional Water Board has concurred with the DON that groundwater at TI is not a potential source of drinking water pursuant to SWRCB Resolution 88-63 and Regional Water Board Resolution 89-39. Future drinking water is expected to continue to be supplied by the city's municipal system.

1.2.5.4 Ecologically Sensitive Areas at NAVSTA TI

TI is not a natural ecosystem; rather, it is a man-made island built from dredge material from the bay. TI has never supported a natural ecosystem or provided habitat for ecologically relevant receptors. The DON completed a screening-level ecological risk assessment (SLERA) for Sites 6, 12, 21, 24, 30, 31, 32, and 33 (SulTech, 2007). The SLERA did not identify any ecological resources or processes at these sites that needed to be protected or sustained and did not recommend further ecological risk evaluation.

The ERA for Site 27 concluded there was a potential current and future risk to diving ducks from ingestion of lead shot in sediment near the shoreline. This risk was the driver for the RA at Site 27. The remaining offshore area at NAVSTA TI is included in Site 13.

1.2.5.5 Ecologically Sensitive Areas at YBI

The DON conducted a SLERA for Sites 8, 11, 28, and 29 at YBI as part of the Draft Final Onshore Operable Unit (OU) RI Report (PRC, 1997). The SLERA evaluated three representative species: deer mouse (*Peromyscus maniculatus*), American kestrel (*Falco sparverius*), and American peregrine falcon (*Falco peregrinus anatum*). The results of the SLERA indicated potential risk to the peregrine falcon under conservative exposure and effects

conditions at Sites 8, 11, 28, and 29. The regulatory agencies recommended a validation study using chemical concentrations in bird tissue collected at the site to further evaluate potential risk to the peregrine falcon. The validation study concluded that Sites 8, 11, 28, and 29 posed minimal risk to the peregrine falcon, and no further ecological investigations were recommended (Tetra Tech EM Inc., 2001).

1.2.6 Site Chronology

Activities at NAVSTA TI included a variety of industrial operations. Wastes from these operations were disposed of in an industrial landfill (now Site 11) as well as released at other locations across the base, including solid waste disposal areas (SWDA) at Site 12 and transformer and other equipment storage areas. From 1941 through 1997, contaminant releases occurred during site operations by the DON; however, specific release dates are not known. Contaminant releases have been evidenced by a variety of organic and inorganic chemicals discovered in soil, sediment, soil gas, and groundwater at levels exceeding cleanup goals in the various ROD/Final RAPs.

Exposures to chemicals in soil, sediment, soil gas, and groundwater are associated with significant potential risk to human health. Human health risk assessments (HHRA) for the various sites evaluated exposures to industrial and construction workers as well as potential future residents and recreational users. VOCs, PAHs, PCBs, dioxins, and metals were associated with the highest levels of potential risk. Likewise, contaminants in offshore sediment have the potential to affect ecological receptors in San Francisco Bay; lead shot was associated with the potential risk for diving ducks. These potentially unacceptable risks were the basis for taking action to remediate the contaminated media (soil, sediment, soil gas, and groundwater) at NAVSTA TI. Initial activities at NAVSTA TI occurred across the base and included:

- **Mid-1980s:** Initial discovery of problem or contamination
- **1987:** Basewide PA/SI (Dames and Moore, 1988)
- **1992:** Federal Facility Site Remediation Agreement (FFSRA) signed (DON, 1992)
- **1992 through 1997:** Remedial investigation, Phases I, IIA, and IIB (PRC, 1997)
- **1993:** Designated for closure under the Base Realignment and Closure (BRAC) Program
- **1995:** Environmental baseline survey (ERM-West, 1995)

RAs completed after their respective ROD/Final RAPs are described in more detail in their respective sections within Section 2.0. This section summarizes basewide information for NAVSTA TI to provide overall context. The history of contaminant detection, characterization, and remediation at Sites 6, 12, 21, 24, 27, and 30 is discussed in the individual subsection for each site.

Table 1-2: Chronology

Event	Date
U.S. Government takes possession of YBI; U.S. Army operations begin	1867
DON operations begin	1898
Naval training activities at YBI	1898 to 1923
TI constructed by USACE	1936 to 1937
Golden Gate International Exposition held at TI	1939 to 1940
CCSF leases TI to DON for wartime operations	1941
DON acquires TI in land exchange with CCSF	1942

Event	Date
NAVSTA TI operations (training, administration, housing and other support to the U.S. Pacific Fleet)	1941 to 1997
Basewide preliminary assessment and site inspection	1987
FFSRA signed	September 1992
Closure recommended under the BRAC Program	1993
Basewide EBS	1995
Formal closure at NAVSTA TI	September 1997
Supplemental EBS	July 2005
HRA	February 2006
FOST for approximately 169-acres at TI	February 2006
FOST for approximately 77-acres of YBI	March 2006
Agreement on terms of transfer from DON to TIDA	August 2010
FOST for approximately 12-acres at YBI	January 2012
Final HRASTM	July 2014
Economic development conveyance memorandum of agreement	July 2014
FOST for approximately 561-acres of TI and YBI uplands and submerged lands	October 2014
FOST for approximately 159-acres at TI	January 2015
First conveyance of property to TIDA	May 2015
FOST for approximately 25-acres at TI	August 2016
Second conveyance of property to TIDA	September 2016
FOST for approximately 10-acres at TI	May 2017
Third conveyance of property to TIDA	August 2017
FOST for approximately 10-acres at TI	July 2018
Fourth conveyance of property to TIDA	September 2018
Fifth conveyance of property to TIDA	October 2019

Notes:

BRAC	Base realignment and closure	HRASTM	Historical radiological assessment supplemental technical memorandum
CCSF	City and County of San Francisco	NAVSTA TI	Naval Station Treasure Island
DON	United States Department of the Navy	TI	Treasure Island
EBS	Environmental baseline survey	TIDA	Treasure Island Development Authority
FFSRA	Federal facility site remediation agreement	USACE	U.S. Army Corps of Engineers
FOST	Finding of suitability to transfer	YBI	Yerba Buena Island
HRA	Historical radiological assessment		

1.3 FIVE-YEAR REVIEW AUTHORITY AND GENERAL APPROACH

Pursuant to CERCLA § 121(c) and the NCP, this second Five-Year Review has been conducted at NAVSTA TI Sites 6, 12, 21, 24, 27, and 30. The Five-Year Review was conducted to determine if remedies currently operating at NAVSTA TI are or will be protective of human health and the environment. In accordance with the *Navy/Marine Corps Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Reviews* (DON, 2011), the first site at an installation that requires a Five-Year Review triggers the Five-Year Review clock for the entire installation. The trigger date for the first Five-Year Review is the date of the ROD/Final RAP for Site 30: August 5, 2009. The trigger date for the second Five-Year Review is the signed date of the first Five-Year Review: December 14, 2014. This approach is consistent with USEPA's *Comprehensive Five-Year Review Guidance* (USEPA, 2001).

1.3.1 Community Notification and Involvement Including Interviews

A public notice was published in the *San Francisco Examiner* on May 26, 2019 announcing the beginning of the Five-Year Review process for NAVSTA TI's second Five-Year Review. Community involvement was initiated with a presentation of the Five-Year Review process at a community meeting held June 18, 2019. Community members were interviewed from June 5 through June 25, 2019 as part of the Five-Year Review process. Appendix C contains interview summaries.

The final second Five-Year Review report will be made available to the public in the information repository at the San Francisco Main Public Library located at 100 Larkin Street. A public notice announcing the completion of the Five-Year Review and the availability of the final report will be published in the *San Francisco Examiner* within two weeks of the date of the final report. A fact sheet summarizing the results of the Five-Year Review will be distributed to the public within two months of the final report date.

1.3.2 Document Review

As part of this Five-Year Review, documents related to remedy implementation for each site were reviewed. These reviews primarily focused on documents that provide information on the technical and regulatory considerations that led to remedy selection and implementation. The types of documents reviewed included the following:

- Documents providing the basis for the response action, including remedy decision documents such as RODs and explanations of significant difference (ESD), Remedial Investigation (RI)/Feasibility Study (FS) reports, toxicological and chemical characteristics databases, and federal and state statutory and regulatory requirements identified as applicable or relevant and appropriate requirements (ARAR) in remedy decision documents.
- Documents containing information about the design and implementation of remedies, including remedial design (RD)/remedial action work plans (RAWP), Remedial Action Completion Reports (RACR), and as-built drawings.
- Operational summaries, yearly inspection reports, and other documentation associated with LUCs.

Section 3.0 lists all documents referenced in this Five-Year Review report.

1.3.3 Institutional Controls

Sites with institutional controls (IC) require annual physical inspections to confirm continued compliance with all IC performance objectives and land-use restrictions in place. These annual inspections are documented in an annual IC Compliance Monitoring Report and IC Compliance Certificate that address whether the use restrictions and controls were communicated in the deed(s), whether the owners and state and local agencies were notified of the use restrictions and controls affecting the property, whether use of the property has conformed with such restrictions and controls, and to evaluate the status of the ICs. If any deficiencies are found during the annual inspection, corrective action is taken to correct these deficiencies.

1.3.4 Site Inspections

Site inspections were conducted for Five-Year Review sites at NAVSTA TI to provide information about the status of these sites and to allow visual confirmation and documentation

of the conditions of the remedies, sites, and surrounding areas. The inspection event was conducted January 8, 10, and 17, 2019. The inspection event was conducted by a team consisting of a representative from the DON and the Five-Year Review contractor, Adanta, Inc.

During the inspection, representative features of the implemented remedy or IC at each site were inspected. Appendix A presents checklists that document the results of the site inspections, and Appendix B provides the site inspection photographs.

1.3.5 Interviews

Various NAVSTA TI stakeholders were interviewed, including TI residents and local community members and representatives from DTSC, California Department of Public Health (CDPH) Emergency Management Branch (EMB), and the Regional Water Board. Table 1-3 lists the interviewees and Appendix C contains the interview records. In general, interviewed individuals stated they were well-informed of site activities and were generally satisfied with the overall cleanup progress. In addition, interviewed individuals typically stated that they were satisfied with the current protectiveness of the various remedies contained in the ROD/Final RAPs. Primary concerns raised during the interviews included:

- Whether dredging to be conducted within Clipper Cove, including Site 27, will potentially compromise the protectiveness of the rock armor layer remedy.
- Whether future property owners will be as diligent as the DON has been about maintaining the protectiveness of the remedies once all properties are transferred.
- Whether emerging contaminants, particularly perfluorooctane sulfonic acid (PFOS), and changes in regulatory framework would affect the protectiveness of the remedies.

Table 1-3: Interviewee List – All Treasure Island Sites

Interviewee	Title	Affiliation
Restoration Advisory Board Members		
Alice Pilram	RAB Co-Chair, TI Resident	RAB
Dale Smith	RAB Member	RAB
Nathan Brennan	RAB Member	RAB
John Gee	RAB Member	RAB
Regulatory Agency Personnel		
Matthew Wright	Associate Health Physicist	CDPH EMB
Dr. Sheetal Singh	Senior Health Physicist	CDPH EMB
Kimberly Walsh	Project Manager	DTSC
Katrina Kaiser	Engineering Geologist	Regional Water Board
Community Members		
Carol Harvey	Journalist	General Public
Anonymous	TI Resident	General Public

Notes:

CDPH EMB	California Department of Public Health Environmental Management Branch
DTSC	California Department of Toxic Substances and Control
RAB	Restoration Advisory Board
Regional Water Board	Regional Water Quality Control Board, San Francisco Bay Region

Appendix C provides detailed interview documentation associated with this Five-Year Review. The documentation includes a list of interviewees; the date and time of each interview; contact information; and the interview questions and responses. No major regulatory or community concerns related to the remedies were identified during the interviews.

After this introduction, this Five-Year Review report is organized into the following sections:

- Section 2.0, Site-Specific Five-Year Reviews
  - Section 2.1, Site 6
  - Section 2.2, Site 12
  - Section 2.3, Site 21
  - Section 2.4, Site 24
  - Section 2.5, Site 27
  - Section 2.6, Site 30
- Section 3.0, References
- Appendix A – Site Inspection Checklists
- Appendix B – Site Inspection Photographs
- Appendix C – Interview Record and Interview Documentation Forms
- Appendix D – Data Tables
- Appendix E – Response to Comments.

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SECTION 1.0 FIGURES

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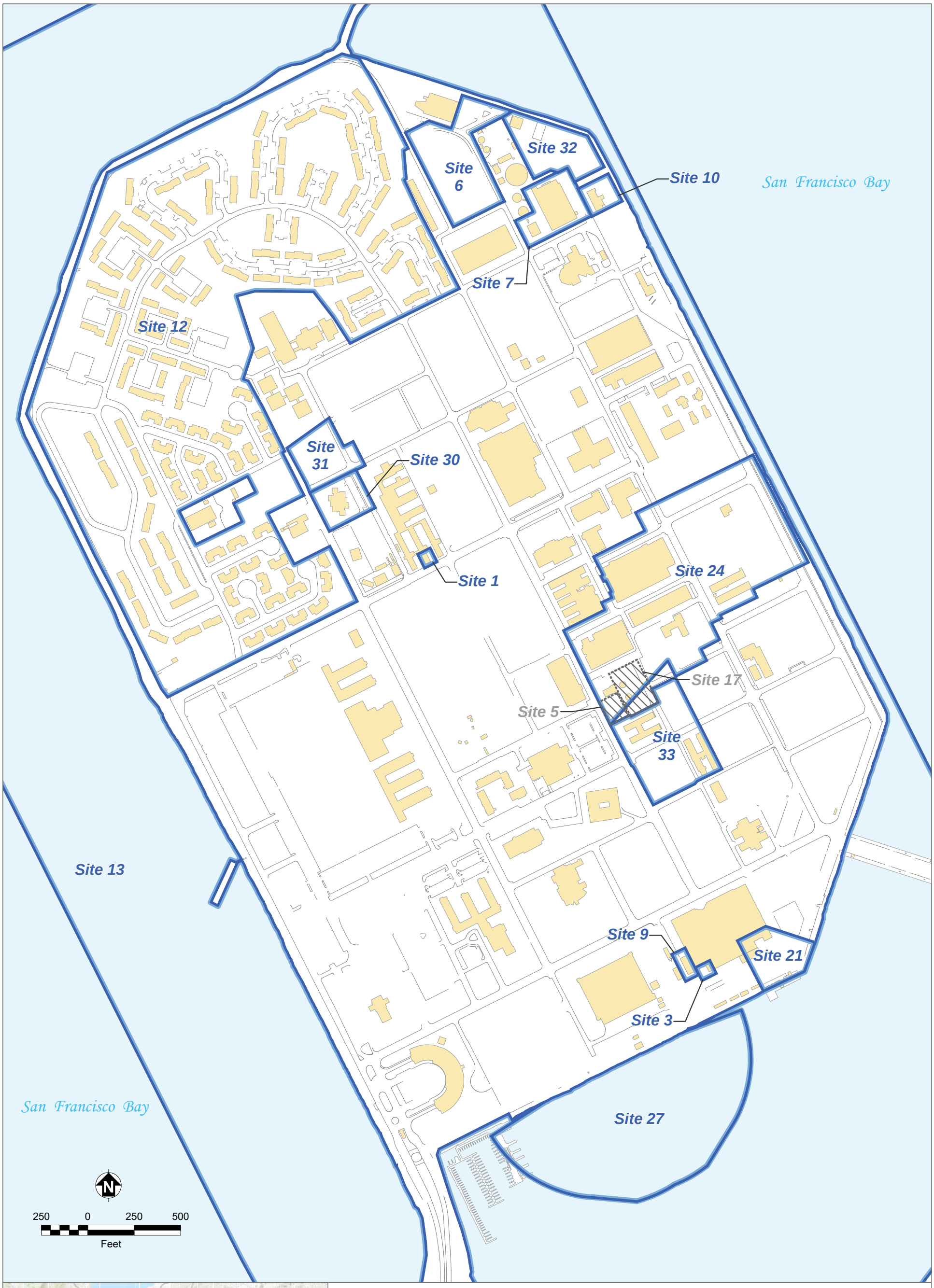

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

Figure 1-1

SITE LOCATION MAP

Second Five-Year Review

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CERCLA Site Boundary

Notes:
1. Image source from Treasure Island Development Authority

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 1-2

FUTURE LAND USE

Second Five-Year Review

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2.0 SITE-SPECIFIC FIVE-YEAR REVIEWS

This section discusses the site-specific Five-Year Reviews for Sites 6, 12, 21, 24, 27 and 30 at NAVSTA TI. For each site, the following topics are addressed:

- Site description and background, including land and resource use, current and potential groundwater use, site history and chronology, initial response, and the basis for taking action;
- RA, including remedy selection and remedy implementation;
- Progress since the last Five-Year Review;
- Five-Year Review process, including site inspection and interviews;
- Technical assessment, including the answers to the following questions that appear in USEPA's *Comprehensive Five-Year Review Guidance* (USEPA, 2001):
  - Question A: Is the remedy functioning as intended by the decision documents?
  - Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAO) used at the time of the remedy selection still valid?
  - Question C: Has any other information come to light that could call into question the protectiveness of the remedy?
- Issues (if any), recommendations, and follow-up actions associated with each site; and
- Protectiveness statement.

2.1 SITE 6 – FORMER FIRE TRAINING SCHOOL

2.1.1 Site Description and Background

Site 6 is the Former Fire Training School and covers approximately 4.5-acres of open space in the northeastern portion of NAVSTA TI (Figure 2-1). It consists of a larger rectangular area where the Former Fire Training School was located and a smaller, wedge-shaped area of the northeastern portion of the site that was used for parking and storage. Most of Site 6 was used for fire training between 1944 and 1992. During the fire training exercises performed at Site 6, petroleum-, magnesium-, and wood-fueled fires were set to simulate real fires and then extinguished using a mixture of water and biodegradable emulsifiers. Based on the westerly prevailing wind direction, dioxins and furans (a natural byproduct of burning materials) were deposited primarily at the eastern and northeastern portions of the site.

Site 6 was divided into three subareas (Figure 2-2):

- Subarea 1 consists of the western portion of the site, including the Underground Storage Tank (UST) 240 Area.
- Subarea 2 consists of the eastern portion of the site, including the UST/Aboveground Storage Tank (AST) 248 Area.
- Subarea 3 consists of the Former Parking and Storage Area, located at the northeastern portion of the site. Subarea 3 was partially located in an area where scrap metal was recycled during World War II and was a parking and storage area associated with a Damage Control School complex from the 1960s until closure in the mid-1990s. The Damage Control School complex included Buildings 461 and 463, the training ship mockup (USS Pandemonium), and the fire training school. The fire training was organized as a separate school under the Damage Control School.

The Former Fire Training School consisted of 10 buildings, six USTs, one AST, and a central training yard known as the central training area (Figure 2-3). The central training area included an L-shaped concrete training yard with a concrete pad. Liquid fuels used for fire training were stored in two USTs located in the northern portion of the site, designated as 240A and 240B, and in the east-central portion of the site, designated as UST 248A through 248D. The UST/AST 248 Area also contained an oil-water separator system, AST 248, and several sumps. Wastewater runoff from training exercises was collected in the trenches and conveyed to sumps and surge pits along the eastern side of Site 6.

Some of the 10 buildings formerly on Site 6 in the central training yard were used to simulate shipboard fires as mockups for boiler rooms, forecastles, engine rooms, and flight decks. The other buildings were used as classrooms and support spaces. Although the former parking and storage area of Site 6 was not associated with the Former Fire Training School, this area was added to Site 6 to account for dioxins and furans detected in soil in this parking and storage area. All 10 buildings associated with the Former Fire Training School were demolished in 1993.

2.1.1.1 Land and Resource Use

Site 6 is currently secured with chain link fencing and used for mixed purposes, such as a staging area for clean backfill to support environmental field work.

The EIR (CCSF, 2011) and the 2011 TIDA Design for Development (TIDA, 2011) lists the proposed future uses of Site 6 as public open space for public services, and for civic and institutional uses (Figure 1-2). The area surrounding Site 6 is planned for open space, parklands, and institutional uses. Also planned is a new wastewater treatment and recycled water plant, and also includes a 4- to 6-acre parcel that the San Francisco Public Utilities Commission would use for renewable energy projects, and above- and below-ground public infrastructure and utility systems.

Improvements to the open space that surrounds and includes Site 6 could include new roads, hiking and walking trails, picnic areas, playgrounds, sports fields, a café and snack bar, and other public park outdoor areas and recreational spaces. There are no perennial surface water bodies located at Site 6 (or anywhere on NAVSTA TI). Future plans for lands adjacent to Site 6 may include wetland development.

As discussed in Section 1.2.5.3, groundwater is not currently used as a source of drinking water and is not planned to be in the future.

2.1.2 Response Action Summary

The contamination at Site 6 is believed to have resulted from fire training activities by the DON and spills or leaks from USTs, ASTs, and associated piping and structures. Although the Former Parking and Storage Area was not used for fire training, it is included in Site 6 to address dioxins and furans originating from the fire training activities transported by prevailing winds and deposited on surface soil (DON, 2014). Identified contamination is associated with dioxins and furans, TPH and petroleum constituents, VOCs, SVOCs, PCBs, methylchlorophenoxypropionic acid (MCPP), and metals.

2.1.2.1 Basis for Taking Action

The RI/FS report identified dioxins and furans, benzene, and manganese as contaminants of concern (COC) in soil and MCPP, petroleum constituents, TPH, and metals as COCs in groundwater (ERRG, 2012). The SLERA for Site 6 identified petroleum and ethylbenzene as contaminants of ecological concern (COEC) for aquatic receptors and no COECs were identified for terrestrial receptors. After the SLERA and the RI/FS were completed, a revised

reuse plan identified the possibility of future wildlife habitat construction at Site 6, thus necessitating the inclusion of an IC to address that possibility (Figure 2-4). In addition to the RI/FS, there have also been several cleanup actions including UST removals and soil removal. Between May and December 2016, the DON excavated approximately 6,530 cubic yards (yd^3) of soil, including pavement demolished and removed from various areas, to address the presence of chemicals in soil at unacceptable levels (CE2-Kleinfelder, 2018).

2.1.2.2 Previous Investigations

Table 2-1: Previous Investigations Summary – Site 6

Previous Study/ Investigation*	Date	Purpose/Investigation Summary
Tank Testing	1986	Evaluate tank integrity
Initial UST Investigation	1987	Evaluate possible contamination from leaking USTs
Initial Hazardous Material Investigation	1987	Evaluate the nature and extent of hazardous substances
Floating Product Removal Study	1991	Evaluate the viability of using wells for floating product recovery and removal; evaluate permeability of soils on site
Hazardous Waste Testing of Building Materials	1992	Evaluate potential presence of hazardous metals prior to building demolition
UST 240A and 240B Removal	1992	Remove USTs and collect additional data through soil and groundwater sampling
Phase I RI	1992	Further define the extent of chemicals in soil near wells 06-MW05 and 06-MW08
Phase IIA RI	1996	Conduct quarterly sampling to monitor impacts from floating product on site
AST 248 and UST 248A and 248B Removal	1995	Evaluate impacts from leaking AST and USTs; remove AST 248 and USTs 248A and 248B
Phase IIB RI	1996	Collect samples to define the limits of chemical releases and identify the type of fuel contamination present; assess the presence of VOCs in the vadose zone; install upgradient, cross-gradient, and downgradient wells to characterize groundwater contamination
Environmental Baseline Survey Sampling	1997	Evaluate potential contaminant pathways present on site
Groundwater Monitoring	1998	Perform further groundwater monitoring and sampling in support of ongoing remedial activities
Bioventing and Biosparging Pilot Test	2000	Evaluate biosparging/bioventing as potential remedial alternatives
Focused Site Characterization Sampling	2000	Further characterize the extent of petroleum contamination in soil and groundwater
PAH Sampling	2001	Evaluate the association between TPH and PAHs at the site
Petroleum Remedial Excavation Program	2002 – 2003	Remove two 1,000-gallon USTs (248C and 248D) previously used to store waste fuel. Petroleum remedial activities conducted at Site 6 between May 2002 and January 2003. Excavate approximately 5,700 tons of soil (4,317 tons of TPH-contaminated soil and 1,390 tons of dioxin- and furan-contaminated soil).

Previous Study/ Investigation*	Date	Purpose/Investigation Summary
Environmental Baseline Survey Data Gaps Investigation	2003	Further define the extent of dioxin- and furan-contaminated soil within Site 6 and area east of Site 6
Soil Gas Sampling	2004	Evaluate the presence and distribution of BTEX in the vadose zone within the UST 240 Area
Phase II PCB Investigation	2006	A basewide PCB investigation was conducted to evaluate the presence of PCBs at various transformers, capacitors, and switch locations. The investigation consisted of collecting samples from concrete pads and vaults, asphalt, and wood associated with pole-mounted transformers and soil, where present. At Transformer TX-152(2), trenching and sampling were conducted to remove PCB contaminated soil. Analytical results indicated that PCB concentrations were lower than the high occupancy screening level of 1 mg/kg in all samples.
PCB Removal Action	2007	Trenching was performed to remove PCB-contaminated soil
Data Gaps Investigation	2010	Further define the nature and extent of contaminants of concern on site in soil, groundwater, and soil gas, including dioxins and furans, naphthalene, and VOCs.
RI/FS	2012	Summarize and evaluate the nature and extent of contamination at Site 6. Identify RAOs and develop remedial alternatives.
PCSR for UST and AST 240 Area	2013	In 2013, after the final RI/FS, the DON completed a petroleum corrective action in the UST 240 Area. Approximately 800 yd^3 of petroleum-impacted soil was excavated and approximately 525 gallons of residual product mixed with groundwater was removed. In addition, ISB amendments were applied as an incidental treatment measure to the excavation as part of the backfilling process. While this removal action was focused on petroleum and petroleum-related compounds, MCPP-contaminated soil was also removed, allowing MCPP to be removed as a COC in soil. MCPP remains a COC for groundwater in Subarea 1.
Proposed Plan/Draft RAP	2014	Summarizes remedial alternatives and identifies the DON's preferred alternative
ROD/Final RAP	2014	Documented the selected remedy for soil at Site 6 which includes soil excavation and off-site disposal, and ICs to prevent certain land uses and restrict certain activities. The selected remedy for groundwater is ICs with groundwater monitoring. The selected remedy for soil gas involves additional soil gas data collection for naphthalene, and ICs.
LUC RD	2016	Documented the LUC RD for Site 6. More details are included in Section 2.1.2.5.

Previous Study/ Investigation*	Date	Purpose/Investigation Summary
PFAS sampling	2017	Sampling of PFOA, PFOS, and PFBS by Modified USEPA Method 537 was conducted at select wells in May 2017 (three wells) and December 2017 (nine wells). PFOA and PFOS were detected in all wells sampled in May 2017 and December 2017 above the USEPA health advisory level. None of the PFBS results exceeded the USEPA RSL.
Groundwater and soil gas monitoring	2014 – 2018	Documents the results and findings of groundwater and soil gas monitoring activities performed at Site 6.
Final RACR	2018	The Final RACR summarizes the results of the soil excavation, groundwater sampling, and soil gas sampling. Based on confirmation soil sampling results, the excavation has been effective in removing contaminated soil in the unsaturated zone at concentrations above the soil RGs. Based on groundwater sampling results, concentrations of COCs in groundwater were below their respective RGs. Concentrations of TPH at monitoring well 06-MW32 exceed its RG; however residual TPH contamination will be addressed as part of the petroleum program. Thus, no issues or recommendations for TPH are identified in this Five-Year Review and residual petroleum contamination was not considered in the DON's protectiveness determination for Site 6. Based on the soil gas sampling results for naphthalene, the data indicate that naphthalene concentrations, if present, have attenuated.

Notes:

* The documents listed are available in the Administrative Record and provide detailed information used to support remedy selection at Site 6.

AST	Aboveground storage tank
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylenes
COC	Contaminant of concern
COEC	Contaminant of ecological concern
DON	United States Department of the Navy
IC	Institutional control
ISB	In situ bioremediation
LUC	Land use control
MCPP	Methylchlorophenoxypropionic acid
mg/kg	Milligram per kilogram
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCSR	Post-Construction Summary Report
PFBS	Perfluorobutane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
RACR	Remedial action completion report
RAO	Remedial action objective
RD	Remedial design
RG	Remediation goal
RI/FS	Remedial Investigation/Feasibility Study
RSL	Regional screening level
TPH	Total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
UST	Underground storage tank
VOC	Volatile organic compounds
yd^3	Cubic yard

2.1.2.3 Remedial Action Objectives

The DON developed the following RAOs (DON, 2014) to address exposures to future commercial/industrial and construction workers under the reasonably anticipated future use of the property:

Soil RAOs:

- Prevent or minimize ingestion of, dermal exposure to, and outdoor inhalation of chemicals at concentrations exceeding remediation goals (RG) in soil from zero to 2-feet bgs by future recreational users and future occupational workers.
- Prevent or minimize ingestion of, dermal exposure to, and outdoor inhalation of chemicals at concentrations exceeding RGs in soil from zero to 8-feet bgs by construction workers and future occupational workers.

Groundwater RAOs:

- Prevent or minimize dermal exposure to chemicals in groundwater at concentrations exceeding RGs by construction workers.
- Prevent or minimize aquatic receptor exposure to chemicals in groundwater that may discharge to surface water in the San Francisco Bay at concentrations exceeding RGs.

The DON developed RGs for receptors exposed to contaminants in soil and groundwater. No RGs were developed for soil gas. COCs in soil gas at the UST 240 Area have already been addressed by a cleanup action for petroleum that occurred in 2012 after the RI/FS was finalized. Table 2-2 summarizes the RGs for Site 6.

Table 2-2: RGs for Site 6

Site 6 Subarea	COC	RG
Soil (mg/kg)		
Subarea 1	Dioxin TEQ	1.2×10^{-5}
Subarea 2	Dioxin TEQ	
Subarea 3	Dioxin TEQ	
	Manganese	550
Groundwater (µg/L)		
Subarea 1	1,1,2-Trichloroethane (1,1,2-TCA)	17
	Benzene	94
	Ethylbenzene	540
	Manganese	5,200
	MCPP	300
	Naphthalene	180
Subarea 2	Arsenic	250
	Manganese	5,200
COECs – San Francisco Bay (Aquatic Receptors) (µg/L)		
Not applicable	**Ethylbenzene**	
	San Francisco Bay (Point of Compliance)	43
	Source Area (UST 240 Area)	1,393
	Total Petroleum Hydrocarbons	
	San Francisco Bay (Point of Compliance)	1,400
	Source Area (UST 240 Area)	45,500

Notes:

1. Site 6 was divided into three subareas (Subareas 1, 2, and 3) for the purposes of conducting the human health risk assessment (HHRA).
2. Source: CE2-Kleinfelder, 2018.

COC	Contaminant of concern	mg/kg	Milligrams per kilogram
COEC	Contaminant of ecological concern	RG	Remediation goal
MCPP	Methylchlorophenoxypropionic acid	TEQ	Toxicity equivalent
µg/L	Micrograms per liter	UST	Underground storage tank

2.1.2.4 Selected Remedy

The RA selected in the ROD/Final RAP is necessary to protect human health and the environment from actual or potential releases of hazardous substances. The DON, in partnership with DTSC and the Regional Water Board, considered all pertinent factors in accordance with CERCLA and NCP remedy selection criteria and concluded that RA is necessary to address contaminated soil and groundwater at Site 6. This determination was made because of the potential for receptors to be exposed to contaminated soil, groundwater in a trench, and indoor air (via vapor intrusion [VI] of soil gas).

The remedy for soil as set forth in the ROD/Final RAP (DON, 2014) consists of:

- Excavation of unsaturated zone soil (assumed to include soil to a maximum depth of 5.5-feet bgs) in Subareas 1, 2, and 3 with concentrations of COCs above RGs and off-site disposal at a permitted disposal facility. The depth and lateral extent of excavations was based on existing data as further refined by pre-design sampling and confirmed by sampling after the excavations are complete.
- Possible addition of oxygen release material (ORM) to excavations in select areas where groundwater contamination could re-contaminate the clean backfill. ORM will only be added if there is evidence in the open excavation of significant residual hydrocarbons based on visual inspection and/or photoionization detector (PID) readings. If PID readings are observed in excess of 100 parts per million by volume and appear to reflect a wider hydrocarbon distribution (not a discrete point), then ORM will be applied to that portion of the excavation.

The soil ICs are:

- Prohibit the residential use of Site 6 (residential uses include constructing a residence, hospital for humans, or daycare facility for children and growing produce for human consumption).
- Require the implementation of an approved contaminated soil management plan for any future excavations at Site 6.
- Require the transferee to complete an evaluation of potential risk to aquatic receptors if wetland habitat is constructed at Site 6.
- Prohibit the alternation, disturbance, or removal of any component of the remedial action.

The remedy for groundwater includes:

- Monitor the groundwater to provide information on the size and behavior of the plumes at Site 6 and to verify that COECs do not discharge to San Francisco Bay at concentrations that pose potential risks to aquatic receptors. Termination of groundwater monitoring will be based on either groundwater COC or COEC concentrations achieving RGs or a risk evaluation which demonstrates the remaining COC and COEC concentrations are protective of human health and the environment.

The groundwater ICs are:

- Prohibit the residential use of Site 6 (residential uses include constructing a residence, hospital for humans, or daycare facility for children and growing produce for human consumption);
- Prevent construction worker exposure to COCs in groundwater at Subareas 1 and 2 encountered in trenching activities by requiring the implementation of an approved contaminated groundwater management plan when excavation is conducted; and
- Prohibit the alteration, disturbance, or removal of any component of the remedial action.

The remedy for soil gas consists of:

- Confirmation testing and ICs that will ensure that future occupational workers are not exposed to chemicals in soil gas.

The soil gas ICs are:

- Require that any construction of enclosed structures in the northern portion of Subarea 1 include vapor mitigation measures or the completion of a VI evaluation demonstrating potential VI risks are acceptable.

2.1.2.5 Implementation Status

The DON finalized the LUC RD as an appendix to the RD/RAWP report in April 2016 (CE2-Kleinfelder, 2016). No LUC inspections have been conducted as of December 2018 because the site is still being used to support RAs; the first LUC inspection is scheduled to be conducted in 2020.

During remedial excavation for petroleum in 2002 at the UST/AST 248 area, results from soil confirmation samples included dioxins and furans above screening levels, causing Site 6 to be transferred to the CERCLA program in 2003. Each RAO and how RAs have been implemented to address them is listed in Table 2-3.

Table 2-3: Demonstration of Completion – Site 6

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Prevent or minimize ingestion of, dermal exposure to, and outdoor inhalation of chemicals at concentrations exceeding RGs in soil from zero to 2-feet bgs by future recreational users and future occupational workers.	Excavation has been completed and confirmation soil samples meet RGs, with two exceptions. These exceptions are described in Section 2.1.4.1.1 and do not prevent the achievement of overall project goals. The LUC RD was completed in 2016. The RACR was completed in 2018 to demonstrate that RAOs have been met. Naphthalene was not detected in five soil gas samples analyzed (See Section 2.1.4.1.3).	Yes

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Prevent or minimize ingestion of, dermal exposure to, and outdoor inhalation of chemicals at concentrations exceeding RGs in soil from zero to 8-feet bgs by construction workers and future occupational workers.	Excavation has been completed and confirmation soil samples meet RGs, with two exceptions. These exceptions are described in Section 2.1.4.1.1 and do not prevent the achievement of overall project goals. The LUC RD was completed in 2016. The RACR was completed in 2018 to demonstrate that RAOs have been met.	Yes
Prevent or minimize aquatic receptor exposure to chemicals in groundwater that may discharge to surface water in the San Francisco Bay at concentrations exceeding RGs.	Based on a review of groundwater sample results from 2013 – 2017, there have been no exceedances of the source area RGs for ethylbenzene or TPH (CE2-Kleinfelder, 2018).	Yes
Prevent or minimize dermal exposure to chemicals in groundwater at concentrations exceeding RGs by construction workers.	Groundwater sampling results meet the RGs. LUC RD submitted 2016 (CE2-Kleinfelder, 2016b).	Yes

Notes:

bgs	Below ground surface	RD	Remedial design
LUC	Land use control	RG	Remediation goal
RACR	Remedial action completion report	TPH	Total petroleum hydrocarbons
RAO	Remedial action objective		

2.1.2.6 Systems Operations/Operation & Maintenance

No significant operation and maintenance (O&M) costs have been incurred for Site 6. Minor costs are expected for maintenance of the monitoring network and administrative ICs.

2.1.3 Site 6 Progress Since Last Review

This is the first Five-Year Review for Site 6.

2.1.4 Site 6 Five-Year Review Process

This section discusses the activities performed during the Five-Year Review process for Site 6. Section 1.3 outlines the general Five-Year Review process, which was applied to each site evaluated in this Five-Year Review.

2.1.4.1 Data Review

The remedy for Site 6 included soil excavation, groundwater monitoring, and soil gas investigation components. Data collected from these components were reviewed in the following subsections. The groundwater monitoring well network for Site 6 is shown on Figure 2-5. A remedy summary is included in Table 2-4.

Table 2-4: Site 6 Remedy Summary

Medium	Risk Basis for Action/COCs	RAOs	Remedy	Performance Metric
Soil	Human Health Exposure – <u>Subareas 1, 2, 3:</u> Dioxin TEQ	Prevent exposure in soil from 0- to 2-feet bgs for future recreational users and future occupational workers	Excavation; Active Remediation; ICs	Site-specific screening levels are detailed in Table 2-2
	Human Health Exposure – <u>Subareas 1, 2, 3:</u> Dioxin TEQ (exception: Dioxin TEQ is not a COC for the construction worker in Subarea 3) <u>Subarea 3:</u> manganese (COC for construction worker only)	Prevent exposure in soil from 0- to 8-feet bgs for future recreational users, construction workers, and future occupational workers		
Groundwater	Human Health Exposure – <u>Subarea 1:</u> 1,1,2-TCA; benzene; ethylbenzene; manganese; MCPP; naphthalene <u>Subarea 2</u>: arsenic; manganese	Prevent exposure for construction workers	Monitoring; ICs	Site-specific screening levels are detailed in Table 2-2
	Aquatic Receptor Exposure – TPH; ethylbenzene	Prevent or minimize aquatic receptor exposure to chemicals in groundwater that may discharge to surface water in the San Francisco Bay at concentrations exceeding RGs		

Notes:

µg/m^3	Micrograms per cubic meter	RAO	Remedial action objective
COC	Contaminant of concern	TEQ	Toxicity equivalent
IC	Institutional control	TPH	Total petroleum hydrocarbons
MCPP	Methylchlorophenoxypropionic acid		

2.1.4.1.1 Soil

After three rounds of excavation during the RA, confirmation soil sample results were below the RGs (with two exceptions). Figure 2-6 shows the confirmation sample results. The first exception is a dioxin toxicity equivalent (TEQ) result of 0.013 micrograms per kilogram (µg/kg), which is above the RG for dioxin TEQ of 0.012 µg/kg. The sample was collected from 1.5-feet beneath an overhanging portion of the concrete seawall. This detection does not represent an unacceptable risk and does not prevent achievement of overall project goals because it is a discrete, isolated detection generally consistent with ambient concentrations; is below the overhanging concrete seawall structure that acts as a barrier; and is in an area where redevelopment land use is designated as open space (CE2-Kleinfelder, 2018). The second exception is a dioxin TEQ result of 0.018 µg/kg, which is above the RG of 0.012 µg/kg. The sample was a floor confirmation soil sample collected at 5.5-feet bgs. Groundwater was encountered at this depth, so the excavation did not proceed into saturated soil consistent with the selected remedy (CE2-Kleinfelder, 2018). In Appendix D, Table D-1, Table D-2, and Table D-3 contain the confirmation soil sample results.

2.1.4.1.2 Groundwater

Results from groundwater sampling conducted during the Five-Year Review period (from 2014 – 2018) are evaluated in this section and shown on Figure 2-7.

Groundwater was sampled quarterly at Site 6 as part of the basewide groundwater monitoring program and most recently in June 2018. Concentrations of COCs have been consistently lower than their respective RGs, except TPH. TPH concentrations are below the RG in most Site 6 wells. However, TPH levels in groundwater at well 06-MW32 are above the RG in samples collected in March and June 2018. TPH concentrations at Site 6 will continue to be evaluated as part of the petroleum program.

2.1.4.1.3 Soil Gas

As stated in the ROD/Final RAP (DON, 2014), additional soil gas data for naphthalene was needed at the location of soil gas sample 06-SG08, where, based on analytical data, the concentration of the naphthalene was estimated to be 34 µg/m^3, exceeding the screening level of 31.9 µg/m^3. Additional soil gas data were collected at soil gas location 06-SG08 and at four other locations during the pre-design sampling conducted in 2015. Soil gas analytical results from the pre-design sampling indicated naphthalene was neither present at or above laboratory reporting limits nor above the screening level of 31.9 µg/m^3. Based on the data, past source removal actions were verified to have reduced the level of naphthalene in soil gas to acceptable levels (CE2-Kleinfelder, 2018).

2.1.4.2 Site Inspection

The DON and Adanta, Inc. conducted a site inspection at Site 6 for this Five-Year Review on January 10, 2019. The purpose of the site inspection was to review and document current site conditions and evaluate visual evidence on the protectiveness of the remedial systems. Site access and general site conditions were also evaluated during the inspection. Appendix A contains the site inspection checklist, and Appendix B contains the photographic log, which documents observations made during the inspection.

Observations made during the site inspection indicated that the remedy monitoring network and security measures were mostly in place. The site inspection identified an uncapped structure resembling a well (see photograph 15 for Site 6 in Appendix B) and two well covers in need of repair. However, the two well covers in need of repair at wells MW-31 and MW-26 have been repaired and the uncapped structure was not a well but a sanitary sewer access point. The wastewater treatment plant personnel fabricated a cover and placed it over the opening.

2.1.5 Site 6 Technical Assessment

Based on monitoring events, groundwater COCs are below RGs except TPH. As stated in the RACR for Site 6, residual petroleum contamination at Site 6 will be addressed in the petroleum program. A UST Closure Report for the former UST/AST 240 Area was submitted to the Regional Water Board in August 2018 (TriEco-Tt, 2018). The Regional Water Board provided a No Further Action (NFA) concurrence letter on July 24, 2019 based on current use of the site as commercial/industrial (Regional Water Board, 2019b). While no RG exists for PFAS, concentrations of PFOA and PFOS in groundwater exceed USEPA health advisory levels and Regional Water Board Environmental Screening Levels (ESLs) published in May 2020. Figure 2-8 shows concentrations of PFOA, PFOS, and PFBS at Site 6 wells.

Based on soil gas sampling at five locations, naphthalene was reported to be below detection limits in each of the five soil gas monitoring wells. Figure 2-9 shows the soil gas sample results. The data indicate that naphthalene concentrations, if present, have attenuated (CE2-Kleinfelder, 2018). Further soil gas sampling is not needed; the remedy is protective of soil gas exposures.

2.1.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Table 2-5: Technical Evaluation – Question A (Site 6)

Question	Summary
RA Performance	**Yes.** The remedy is functioning as intended by the decision document. Review of documents, data collected within this Five-Year Review period, site inspection, and interviews indicate that the remedy implemented for soil, groundwater and soil gas at Site 6 is working as intended by the ROD/Final RAP. The documents that detail the remedial decisions for Site 6 are the ROD/Final RAP (DON, 2014) and RACR (CE2-Kleinfelder, 2018). RAOs have been met based on the soil confirmation sample results, groundwater sample results, soil gas sample results and, upon the implementation of ICs for soil, groundwater, and soil gas (CE2-Kleinfelder, 2018).
System Operations/O&M	**Yes.** No significant O&M issues were identified. Site inspection identified an uncapped structure resembling a well and two well covers in need of repair. The wells were repaired and the uncapped structure was determined to be a sanitary sewer access point that was corrected with a fabricated a cover placed over the opening.
Implementation of ICs	**Yes.** The ICs for soil, groundwater, and soil gas are implemented as described in the ROD/Final RAP (DON, 2014) and as documented in the LUC RD (CE2-Kleinfelder, 2016). No LUC inspections have been conducted as of December 2018; the first annual LUC inspection is scheduled to be conducted in 2020.

Notes:

IC	Institutional control	RAO	Remedial action objective
LUC	Land use control	RAP	Remedial action plan
O&M	Operation and maintenance	RD	Remedial design
RA	Remedial action	ROD	Record of decision
RACR	Remedial action completion report		

2.1.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of Remedy Selection Still Valid?

The USEPA guidance document for Five-Year Reviews identifies several areas for consideration in evaluating whether the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid (USEPA, 2001). Areas of consideration include changes in standards identified as ARARs and to be considered (TBC) criteria in the ROD/Final RAP, changes in exposure pathways, changes in toxicity and other contaminant characteristics, changes in risk assessment methods, and expected progress toward meeting RAOs.

The DON reviewed the ARARs, exposure assumptions, toxicity data, and derivation of the cleanup levels used to develop the RAOs for Site 6. The DON evaluated the protectiveness of the RG that was selected in the ROD/Final RAP. This was done by dividing the RG by a current risk-based screening level and either multiplying by 1E-06 to estimate the cancer risk or by 1 to estimate the noncancer hazard for a given chemical. The results of this evaluation were compared with standard risk thresholds in the following table for Question B to determine whether the RG is still protective.

The response to Question B is No. A newly promulgated state regulation that identifies state toxicity criteria and current toxicity criteria have been identified that indicate that the cleanup goal for exposure to arsenic in groundwater by the construction worker is not protective.

Table 2-6: Technical Evaluation – Question B (Site 6)

Question	Summary
Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria	In September 2018, the State of California promulgated a regulation at Cal. Code Regs. tit. 22, Division 4.5, Chapter 51, Article 2, §§ 69020, 69021, and 69022. These provisions are applicable to cleanups done under the authority of California Health and Safety Code, Division 20, Chapters 6.8 and 6.82. The purposes of these provisions include the use of the toxicity criteria identified in Appendix I, Tables A and B for human health risk assessments, human health risk-based screening levels, and human health risk-based remediation goals. None of these regulations were selected as an ARAR in the ROD/Final RAP because the regulations had not been promulgated at the time the ROD/Final RAP was finalized. The regulations were evaluated to determine if they call into question the protectiveness of the remedies selected in the ROD/Final RAP. The regulations at Cal. Code Regs. tit. 22 §§ 69020, 69021, and 69022 are not applicable to the RAs at Site 6 because Site 6 is being addressed under CERCLA and these regulations are applicable to sites being addressed under the authority of the California Health and Safety Code. The following regulations are relevant and appropriate because the regulations address the same chemicals that were released at the site and the regulations prescribe a method by which remediation goals are determined: Cal. Code Regs. tit. 22 §§ 69021 and 69022(c). These sections use Appendix I, Tables A and B as the primary source of toxicity criteria when determining risk-based remediation goals. Appendix I, Tables A and B contain toxicity criteria for COCs identified for construction worker exposure to groundwater at Site 6. How these toxicity criteria would affect the RGs selected in the ROD/Final RAP is presented in Table 2-8.

Question	Summary
	Consideration of current DTSC regulatory criteria indicates the arsenic RG selected in the ROD/Final RAP results in a noncancer hazard of 30, which is greater than the noncancer threshold of 1, and a cancer risk of 1E-05, which is within the risk management range for carcinogens. Therefore, the newly promulgated toxicity criteria affect the arsenic RG protectiveness. Applying the current DTSC regulatory criteria, the RG selected in the ROD/Final RAP for benzene results in a cancer risk of 2E-06, which is in the risk management range for carcinogens, and a noncancer hazard of 0.9, which is below the noncancer threshold of 1. In addition, the maximum concentration of benzene detected during the Five-Year Review period was 26 µg/L, detected in 06-MW25 in March 2014, which is less than the concentration of 53 µg/L developed using the regulatory criteria. Therefore, the newly promulgated toxicity criteria ultimately do not affect the protectiveness of the benzene RG. There were no changes to other ARARs selected in the ROD/Final RAP that affect the protectiveness of the remedy.
Changes in Toxicity and Other Contaminant Characteristics	***Groundwater:*** The groundwater RGs for the protection of human health are based on the future construction worker scenario and prevention or minimization of dermal exposures. Application of current USEPA and DTSC toxicity criteria affects all COCs identified for future construction worker exposure to groundwater. Table 2-8 shows the groundwater RGs identified in the ROD/Final RAP compared with the current USEPA and DTSC toxicity criteria, which are derived based on a target cancer risk of 1E-06 and target noncancer hazard of 1. All groundwater RGs are affected with either an increase or decrease in concentration using the current USEPA and DTSC criteria. None of the changes result in a cancer risk over 1E-04; cancer risks range between 1E-07 and 1E-05. Current USEPA and DTSC criteria indicate that the MCPP RG selected in the ROD/Final RAP would result in a noncancer hazard of 2, which is over 1. DTSC criteria indicate that the arsenic RG selected in the ROD/Final RAP would result in a noncancer hazard of 30, which is over the threshold of 1; USEPA criteria for arsenic indicates the RG would result in a noncancer hazard of 0.3, which is less than the threshold of 1. For arsenic, the concentration representing an HI equal to 1 would be 8.5 µg/L if applying current DTSC criteria. This concentration is below the naturally occurring concentration of arsenic in groundwater at TI of 15 µg/L. CERCLA does not require cleanup to below background concentrations. As a result, the arsenic RG would be 15 µg/L. For MCPP, using the current USEPA and DTSC toxicity criteria the concentration representing an HI equal to 1 is 134 µg/L. Concentrations of MCPP at Site 6 are below 134 µg/L as MCPP was not detected above its method detection limit in any of the Site 6 wells from 2014 through 2018. Thus, the current USEPA and DTSC toxicity criteria do not ultimately affect the protectiveness of MCPP at the site. ***Soil:*** The dioxin TEQ RG of 1.2E-05 mg/kg for soil is based upon the NAVSTA TI ambient level. Current risk-based soil cleanup levels are shown on Table 2-7. Soils containing dioxins and furans have been excavated and replaced with clean fill. The maximum detected concentration left in place is 1.8E-05 mg/kg in an excavation floor sample.

Question	Summary
	***Groundwater to Surface Water*:** The ecological saltwater goal for the San Francisco Bay of 43 µg/L for ethylbenzene is consistent with the July 2019 Regional Water Board ESL (Regional Water Board, 2019a). In 2019, the Regional Water Board established an ESL for groundwater discharge to surface water of 640 µg/L for TPH-d (measured as the sum of TPH-d and TPH-mo), which is less than the aquatic receptor goal of 1,400 µg/L for TPH for the San Francisco Bay that was selected in the ROD/Final RAP for groundwater to surface water discharge. Table 2-9 presents the surface water goals selected in the ROD/Final RAP with the current Regional Water Board ESLs for ethylbenzene and TPH-d (measured as the sum of TPH-d and TPH-mo). However, as stated in the RACR for Site 6, residual petroleum contamination at Site 6 will be addressed in the petroleum program. Thus, no issues or recommendations for TPH are identified in this Five-Year Review and residual petroleum contamination was not considered in the Navy's protectiveness determination for Site 6.
Changes in Risk Assessment Methods	Two fundamental changes in exposure assumptions for the construction worker include an increase in the assumed body weight (from 70 kg to 80 kg) and an increase in the skin surface area exposed to groundwater (from 2,375 cm^2 to 6,032 cm^2). The two changes in exposure parameters do not impact the inhalation exposure scenario but do impact dermal exposure. A revised RG for arsenic in groundwater, using OEHHA toxicity criteria (DTSC, 2019), would be 8.5 µg/L, which is less than the RG of 250 µg/L shown in the ROD/Final RAP. However, the ambient concentration of arsenic for TI is 15 µg/L (Tetra Tech EMI, 2001).
Changes in Exposure Pathways	Physical site conditions or the understanding of these conditions have not changed in a way that could affect the protectiveness of the remedies. Land use at Site 6 has not changed since the ROD/Final RAP was signed; however, land use is expected to change at TI as parcels are transferred and the land is redeveloped. Exposure assumptions developed in the HHRA considered the potential future exposures based on the expected reuses. The future redevelopment plan (CCSF, 2011) did not introduce any new exposure scenarios that were not already taken into account by the HHRA and ROD/Final RAP (Figure 1-2). No new ecological exposure routes that could affect the protectiveness of the remedies have occurred at the site. The transferee may construct wetland habitat in the future at the site. As documented in the ROD/Final RAP, this constructed wetland habitat was not considered and evaluated at the time of the SLERA. As a result, the remedy requires the transferee to complete an ecological risk assessment should it decide to pursue wetland habitat creation at Site 6. No changes to site conditions that could result in increased exposure have been identified. No significant changes to the risk assessment methodology have occurred that would affect the protectiveness of the remedy. PFAS are considered emerging contaminants and have only recently established screening levels for human or ecological receptors. The advisory level from USEPA and drinking water notification levels from OEHHA are specific to drinking water. Because the groundwater at TI is not used as drinking water, this exposure pathway is not considered complete. However, for other non-drinking water exposure pathways that may arise in the future, the fate and transport information, analytical accuracy, and toxicity of these

Question	Summary
	compounds is being developed. Information on the USEPA advisory, OEHHA and State Water Board notification levels, and Regional Water Board ESLs are presented below: • In May 2016, the USEPA issued a LHA for PFAS in drinking water, advising municipalities that they should notify their customers of the presence of levels over 70 nanograms per liter (or ppt) in community water supplies. The LHA is the level or amount calculated to offer a margin of protection against adverse health effects to the most sensitive populations. The LHA level is 70 ppt for PFOA and PFOS individually or combined. Currently, the USEPA has not set health advisory levels for the other PFAS chemicals. • In June 2018, OEHHA recommended interim notification levels of 14 ppt for PFOA (based on liver toxicity, as well as cancer risks) and 13 ppt for PFOS (based on immunotoxicity). OEHHA made these recommendations following its review of currently available health-based advisories and standards and supporting documentation. • On February 6, 2020, the California State Water Resources Control Board's Division of Drinking Water issued updated drinking water response levels of 10 ppt for PFOA and 40 ppt for PFOS based on a running four-quarter average. • In May 2020, the Regional Water Board published interim final ESLs, including groundwater ESLs for human health seafood ingestion for PFOS (0.0047 ppt) and PFOA (0.022 ppt); saltwater direct exposure ecotoxicity for PFOS (2,600 ppt) and PFOA (540,000 ppt); and saltwater secondary poisoning from PFOS (75 ppt) and PFOA (4,400 ppt). Due to concerns about emerging contaminants, groundwater samples from wells 06-MW25, 06-MW26, and 06-MW30 were analyzed for PFAS during the May 2017 event, and all Site 6 wells were analyzed for PFAS during the December 2017 event. PFOA was detected in all wells sampled during the May and December 2017 sampling events, with a maximum concentration of 7,300 ppt reported during the May 2017 event and 4,100 ppt during the December 2017 event. PFOS was detected in all wells sampled during the May and December 2017 sampling events, with a maximum concentration of 10 µg/L during the May 2017 event and 19 µg/L during the December 2017 event. All PFOS results exceeded the USEPA health advisory level of 0.07 µg/L and the California interim notification level of 0.013 µg/L. PFBS was detected in all wells sampled during the May 2017 sampling event, with a maximum concentration of 120 ppt. PFBSs were detected in all wells except 06-MW30 during the December 2017 event, with a maximum concentration of 130 ppt. Screening levels for PFOA and PFOS protective of groundwater dermal and inhalation exposures to the construction worker are not available. No unanticipated toxic byproducts have been generated as a result of remedy implementation.

Question	Summary
Expected Progress Towards Meeting RAOs	The remedies are progressing as expected. Current exposures are controlled; however, newly promulgated state toxicity criteria and current DTSC toxicity criteria indicate that the RG selected for construction worker exposure to arsenic in groundwater are not be protective. In addition, PFOA and PFOS were detected in all wells sampled in May and December 2017. Investigation and evaluation of PFOA and PFOS will continue.

Notes:

§	Section
µg/L	Micrograms per liter
ARAR	Applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Responsibility, Compensation, and Liability Act
cm^2	Centimeters squared
Cal. Code Regs.	California Code of Regulations
COC	Contaminant of concern
DTSC	California Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
IC	Institutional control
LHA	Lifetime health advisory
MCPP	Methylchlorophenoxypropionic acid
mg/kg	Milligrams per kilogram
NAVSTA TI	Former Naval Station Treasure Island
OEHHA	California Office of Environmental Health Hazards Assessment
PFAS	Per- and Polyfluoroalkyl substances
PFBS	Perfluorobutane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
ppt	Part per trillion
RAO	Remedial action objective
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
RSL	Regional screening level
TEQ	Toxicity equivalent
TPH	Total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
UST	Underground storage tank

2.1.5.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No new human health or ecological risks have been identified. No other information has been identified to suggest that the remedy may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have occurred that affect the protectiveness of the remedies.

2.1.6 Site 6 Issues, Recommendations, and Follow-up Actions

Issue	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
Consideration of newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) and use of current DTSC toxicity criteria results in a lower arsenic concentration in groundwater that is	No	Yes	Revise the groundwater RG for arsenic that was selected in ROD/Final RAP. The ROD/Final RAP selected ICs as the remedy for construction worker exposure to groundwater. Therefore, revising the groundwater RG and resuming	DON	DTSC	May 2023

Issue	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
acceptable for construction worker exposure, indicating that the RG selected in the ROD/Final RAP is not protective.			monitoring for arsenic is necessary to ensure that the ICs are enforceable and implemented when concentrations of arsenic in groundwater are not at protective levels.			
PFOA and PFOS, emerging contaminants not yet defined as CERCLA hazardous substances, were detected in Site 6 wells sampled in May and December 2017.	No	Yes	The nature and extent of PFAS will be investigated and evaluated in an expedited manner through the CERCLA process[1], followed by all necessary response actions for protection of human health and the environment.	DON	DTSC	May 2021[2]
Habitat development after Site 6 is transferred may be different than contemplated in the SLERA and the ROD/Final RAP.	No	No	Evaluate redevelopment plans in the next Five-Year Review to determine if the underlying assumptions for ecological receptors are still valid.	DON	DTSC	May 2025

Notes:

1 The schedule for PFAS investigation and evaluation at Site 6 is as follows:

- July 2020 – Develop Field Change Request for the Basewide Groundwater and Soil Gas Monitoring Work Plan
- September 2020 – Hydropunch sampling to delineate plume
- November 2020 – BRAC Cleanup Team (BCT) Site 6 groundwater data review meeting
- May 2021 – Final RI workplan
- June to September 2021 – RI field work
- November 2021 – BCT Site 6 RI data review meeting
- May 2022 – Final RI report
- December 2022 – Final Feasibility Study report
- June 2023 – Final Proposed Plan and Public Meeting
- December 2023 – Final Record of Decision

2 Milestone date refers to submittal of the 2020 Five Year Review Addendum due to the Protectiveness Deferred determination for this site

2.1.7 Site 6 Protectiveness Statement

Site(s): Site 6	**Protectiveness Determination:** Protectiveness Deferred
Protectiveness Statement: A protectiveness determination of the remedy for Site 6 cannot be made until the nature and extent of emerging contaminants, PFAS (specifically PFOA and PFOS), detected in groundwater at Site 6 after the ROD/Final RAP was signed, has been investigated in an RI, including an evaluation of risks to human health and ecological receptors, and any necessary response is implemented. The review of the remedy selected in the ROD/Final RAP indicates that RAOs have been met, the excavation and soil gas sampling for naphthalene are complete, the LUC RD has been finalized, and ICs are in place to prevent exposures to COCs in soil and groundwater. Annual inspections of the ICs will begin in 2020 to ensure the remedy will continue to be protective in the long-term. However, the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) and current toxicity criteria contained in DTSC screening values indicate that the RG for arsenic in groundwater identified in the ROD/Final RAP is not protective of construction worker exposure. In order to be protective in the long-term, the construction worker groundwater RG for arsenic will be revised to 15 µg/L.	

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SITE 6 FIGURES

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Figure 2-1
SITE 6
GENERAL LOCATION MAP

Second Five-Year Review

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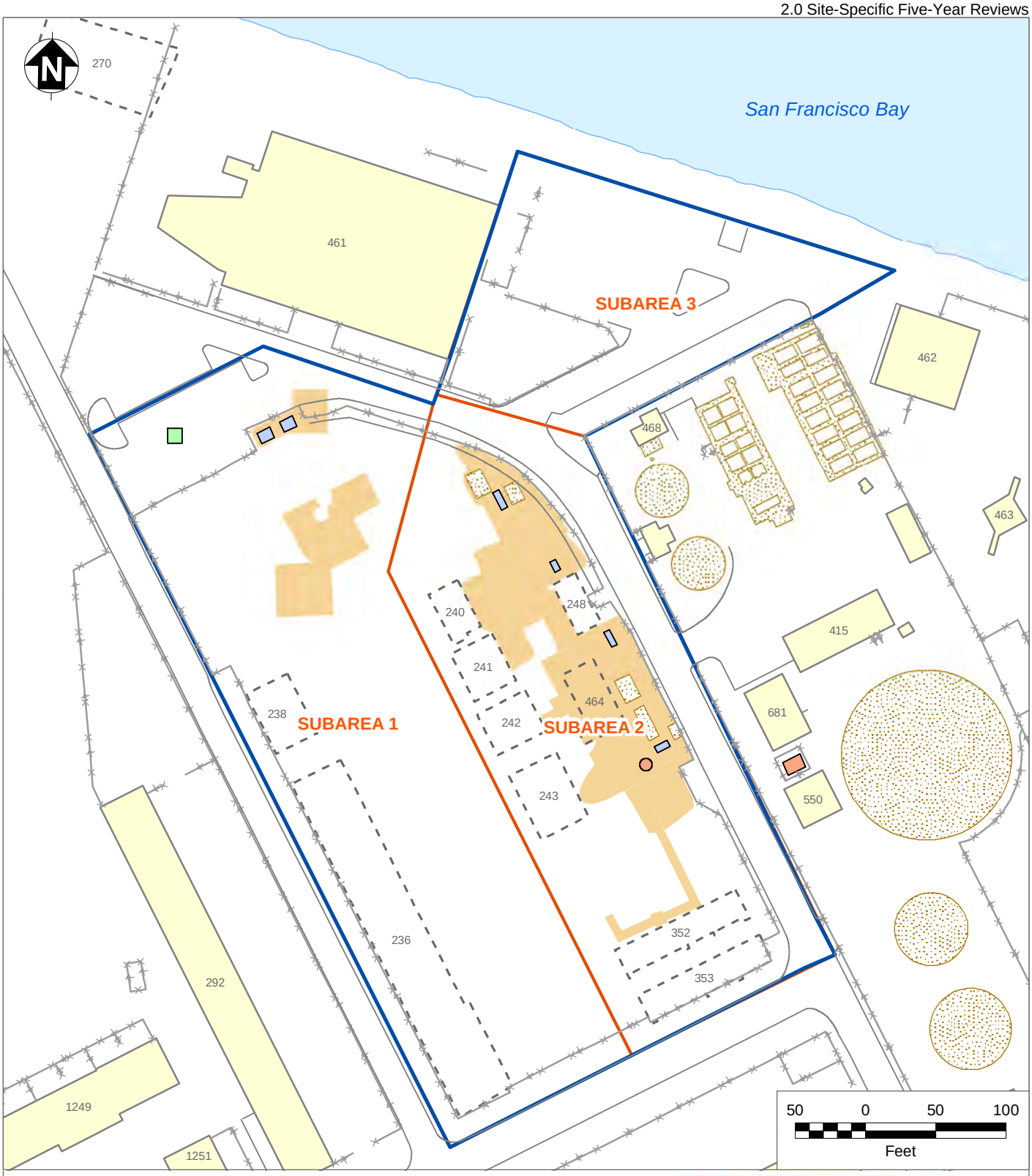

LEGEND:

- Site 6 Boundary
- Site 6 Subarea Boundary
- Excavation Area
- Suspected Former AST
- Former AST
- Former UST
- 62 Building
- 243 Former Building
- Appurtenance
- Road/Curbline
- Fence

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Figure 2-2

SITE 6 SUBAREAS

Second Five-Year Review

2019-07-08 W:\2018\20180120_Adanta_Support\Treasure_Island\05_IR06_5YR\2.1-2_SubareasMap.mxd Adanta brodrigues

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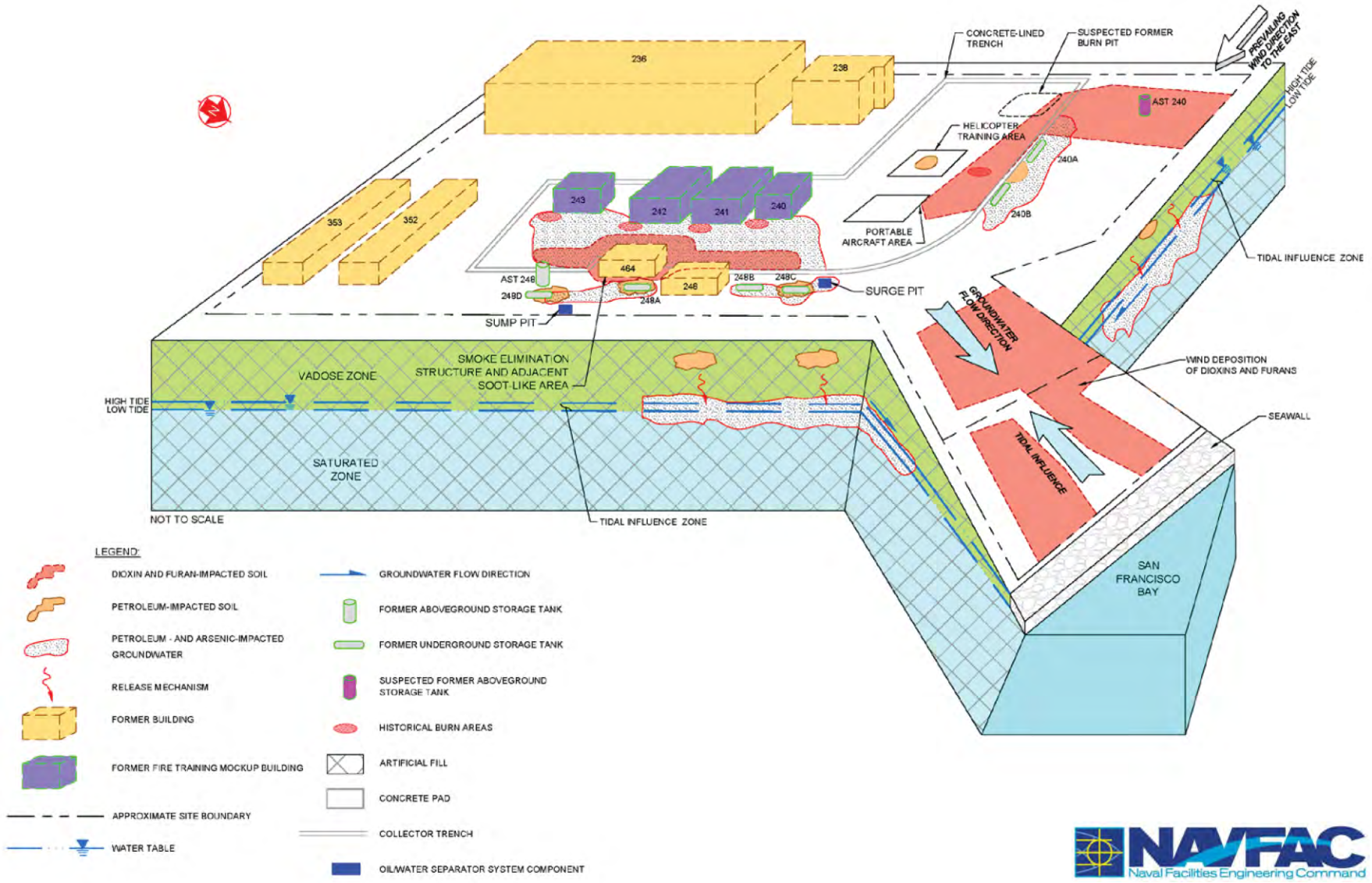

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Figure 2-3

SITE 6
CONCEPTUAL SITE MODEL

Second Five-Year Review

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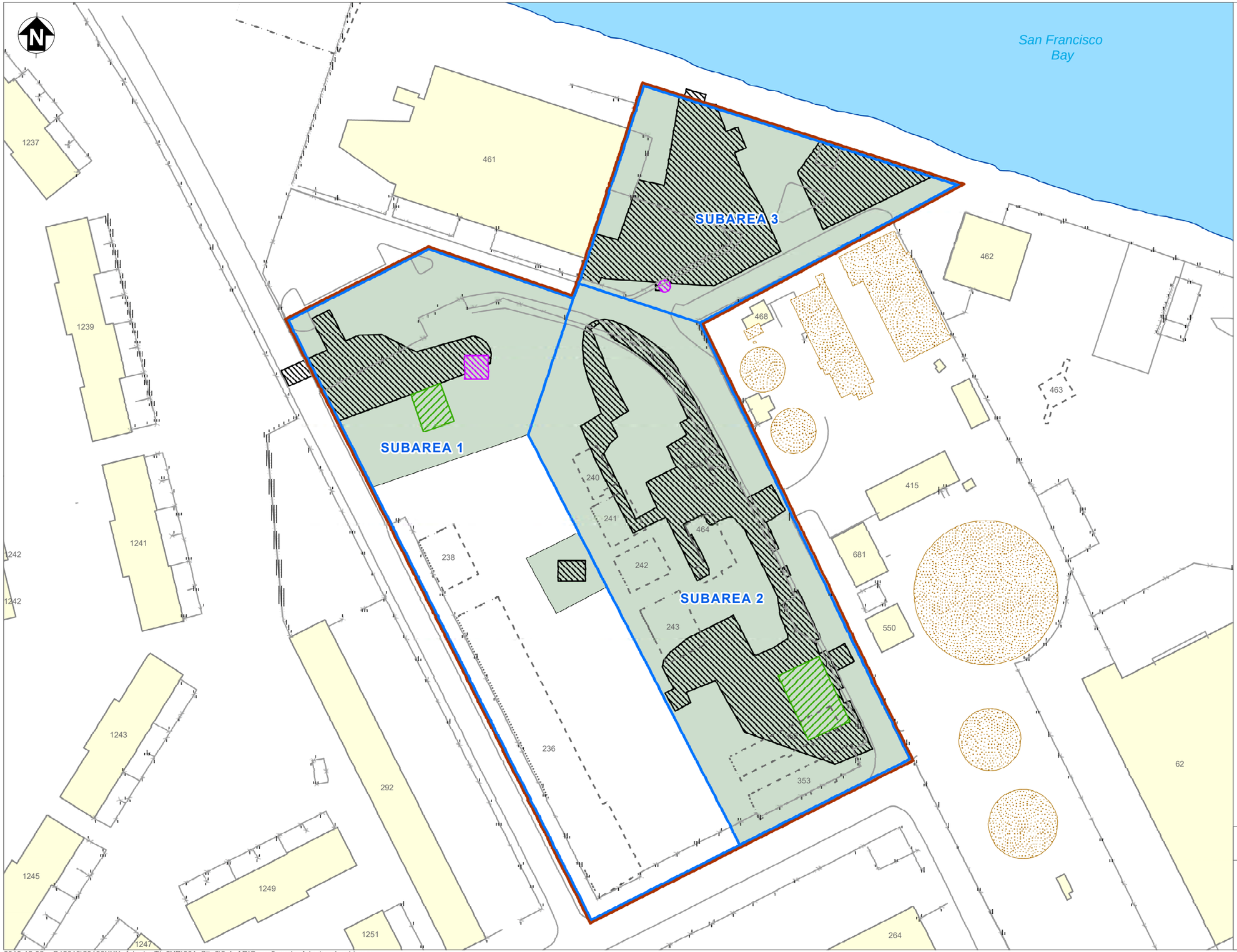

Notes:

1. Partial site institutional controls include contaminated soil management plan, contaminated groundwater management plan in Subareas 1 and 2, and construction of enclosed structures in Subarea 1.
2. Site wide institutional controls include the prohibition of the alteration of response action components, the alteration of security features, construction of residences and other sensitive land uses, growing produce, and the construction of wildlife habitat.
3. Locations of features are approximate.

IC Institutional Control

40 0 40 80
Feet

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FIGURE 2-4
SITE 6
AREA REQUIRING
INSTITUTIONAL CONTROL
Second Five-Year Review

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Monitoring Well
Suspected Former AST
Former AST
Former UST
Wastewater Treatment Plant
Building
Demolished Building
Fence
Groundwater Flow Direction
Road Curb
Site 6 Boundary

Notes:
AST Aboveground Storage Tank
UST Underground Storage Tank

30 0 30 60
Feet

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FIGURE 2-5
SITE 6
MONITORING WELL NETWORK

Second Five-Year Review

2020-01-15 W:\2018\20180120_Adanta_Support\Treasure_Island\05_IR06_5YR\2-5_MonWellLoc.mxd Adanta brodrigues

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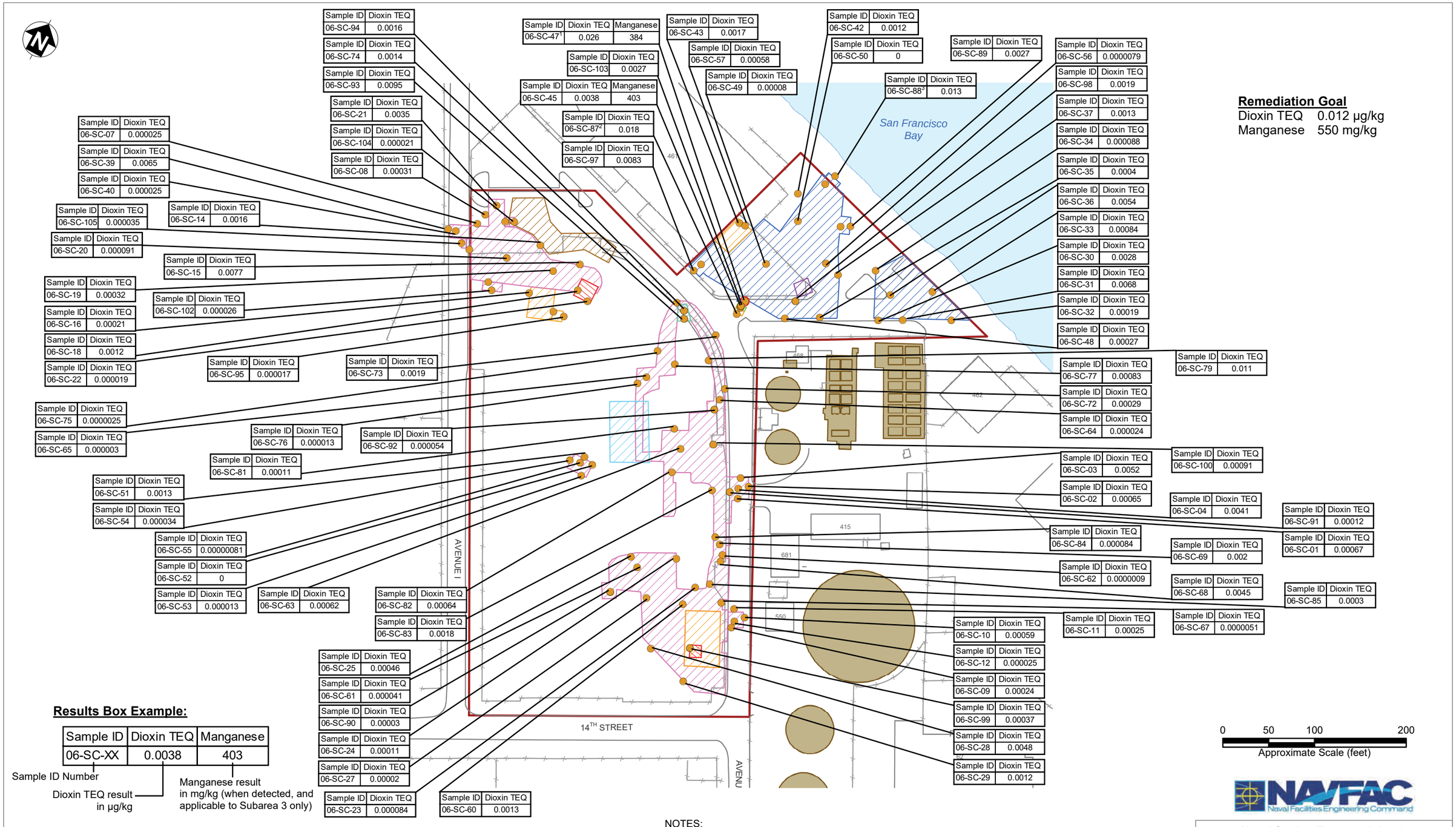

Sample ID	Dioxin TEQ
06-SC-94	0.0016
06-SC-74	0.0014
06-SC-93	0.0095
06-SC-21	0.0035
06-SC-104	0.000021
06-SC-08	0.00031
06-SC-07	0.000025
06-SC-39	0.0065
06-SC-40	0.000025
06-SC-105	0.000035
06-SC-20	0.000091
06-SC-14	0.0016
06-SC-15	0.0077
06-SC-19	0.00032
06-SC-102	0.000026
06-SC-16	0.00021
06-SC-18	0.0012
06-SC-22	0.000019
06-SC-95	0.000017
06-SC-73	0.0019
06-SC-75	0.0000025
06-SC-65	0.000003
06-SC-76	0.000013
06-SC-92	0.000054
06-SC-81	0.00011
06-SC-51	0.0013
06-SC-54	0.000034
06-SC-55	0.00000081
06-SC-52	0
06-SC-53	0.000013
06-SC-63	0.00062
06-SC-82	0.00064
06-SC-83	0.0018
06-SC-25	0.00046
06-SC-61	0.000041
06-SC-90	0.00003
06-SC-24	0.00011
06-SC-27	0.00002
06-SC-23	0.000084
06-SC-60	0.0013

Sample ID	Dioxin TEQ	Manganese
06-SC-47[1]	0.026	384
06-SC-103	0.0027	
06-SC-45	0.0038	403
06-SC-87[2]	0.018	
06-SC-97	0.0083	

Sample ID	Dioxin TEQ
06-SC-43	0.0017
06-SC-57	0.00058
06-SC-49	0.00008
06-SC-42	0.0012
06-SC-50	0
06-SC-88[3]	0.013
06-SC-89	0.0027
06-SC-56	0.0000079
06-SC-98	0.0019
06-SC-37	0.0013
06-SC-34	0.000088
06-SC-35	0.0004
06-SC-36	0.0054
06-SC-33	0.00084
06-SC-30	0.0028
06-SC-31	0.0068
06-SC-32	0.00019
06-SC-48	0.00027
06-SC-79	0.011
06-SC-77	0.00083
06-SC-72	0.00029
06-SC-64	0.000024
06-SC-03	0.0052
06-SC-02	0.00065
06-SC-100	0.00091
06-SC-04	0.0041
06-SC-91	0.00012
06-SC-01	0.00067
06-SC-84	0.000084
06-SC-69	0.002
06-SC-62	0.0000009
06-SC-68	0.0045
06-SC-85	0.0003
06-SC-11	0.00025
06-SC-67	0.0000051
06-SC-10	0.00059
06-SC-12	0.000025
06-SC-09	0.00024
06-SC-99	0.00037
06-SC-28	0.0048
06-SC-29	0.0012

NOTES:
Dioxin Toxic Equivalent (TEQ) result units are µg/kg (micrograms per kilogram).
Manganese result units are mg/kg (milligrams per kilogram).
Confirmation soil sample results represent the chemical of concern concentration in the sidewall or floor of the excavation after three rounds of excavation.
[1] In accordance with the work plan, maximum excavation depth is at groundwater. Groundwater was encountered at appoximately 6.5 feet on 6/23/16. Groundwater was encountered at 5.5 ft below ground surface on 8/23/16.
[2] In accordance with the work plan, maximum excavation depth is at groundwater. Groundwater was encountered at appoximately 5.5 feet on 8/23/16. Groundwater was encountered at 5 ft below ground surface on 10/19/16.
[3] Excavated to seawall.

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FIGURE 2-6
SITE 6
EXTENT OF EXCAVATION AND CONFIRMATION SAMPLE RESULTS

Second Five-Year Review

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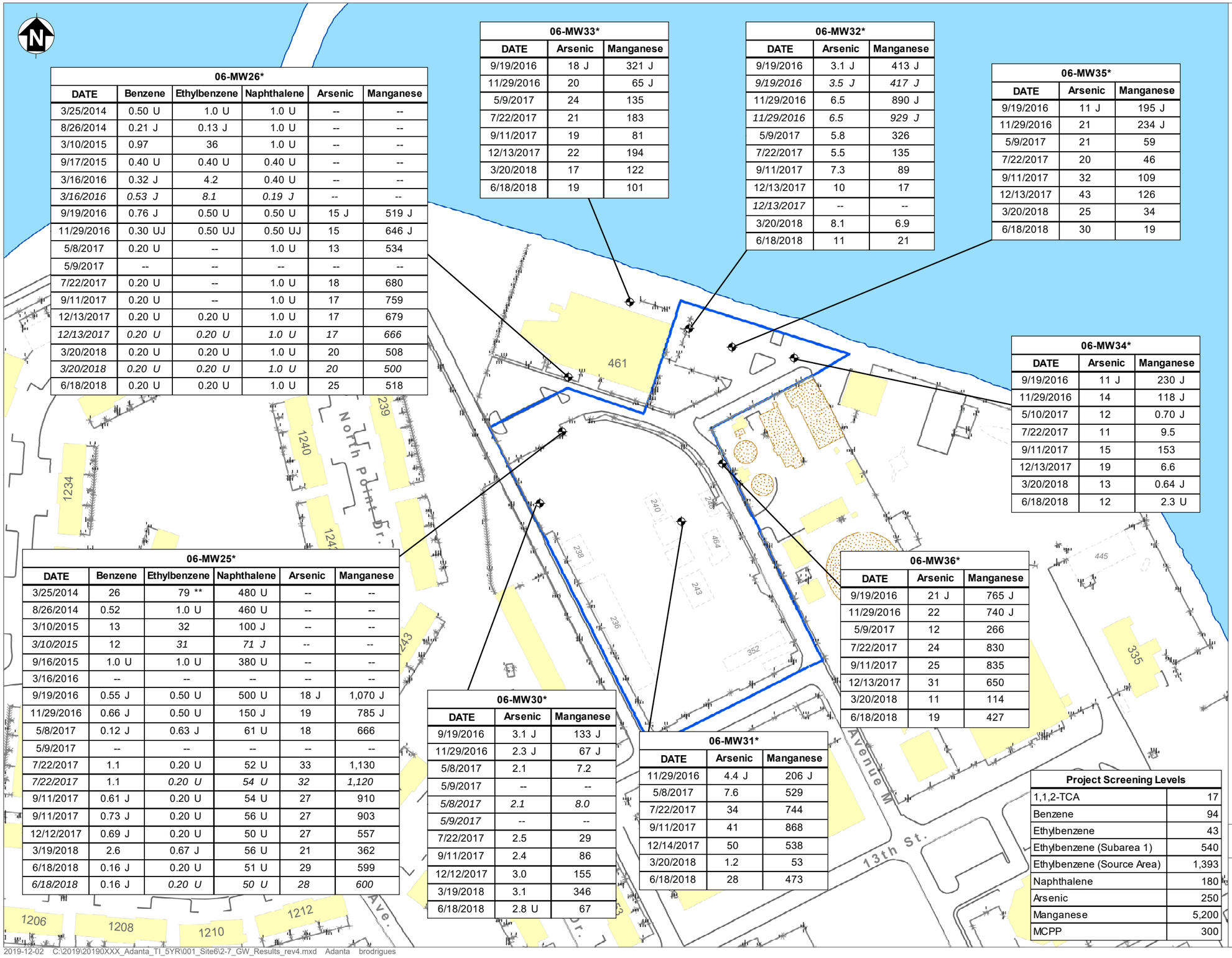

06-MW26*

DATE	Benzene	Ethylbenzene	Naphthalene	Arsenic	Manganese
3/25/2014	0.50 U	1.0 U	1.0 U	--	--
8/26/2014	0.21 J	0.13 J	1.0 U	--	--
3/10/2015	0.97	36	1.0 U	--	--
9/17/2015	0.40 U	0.40 U	0.40 U	--	--
3/16/2016	0.32 J	4.2	0.40 U	--	--
3/16/2016	*0.53 J*	*8.1*	*0.19 J*	--	--
9/19/2016	0.76 J	0.50 U	0.50 U	15 J	519 J
11/29/2016	0.30 UJ	0.50 UJ	0.50 UJ	15	646 J
5/8/2017	0.20 U	--	1.0 U	13	534
5/9/2017	--	--	--	--	--
7/22/2017	0.20 U	--	1.0 U	18	680
9/11/2017	0.20 U	--	1.0 U	17	759
12/13/2017	0.20 U	0.20 U	1.0 U	17	679
12/13/2017	*0.20 U*	*0.20 U*	*1.0 U*	*17*	*666*
3/20/2018	0.20 U	0.20 U	1.0 U	20	508
3/20/2018	*0.20 U*	*0.20 U*	*1.0 U*	*20*	*500*
6/18/2018	0.20 U	0.20 U	1.0 U	25	518

06-MW33*

DATE	Arsenic	Manganese
9/19/2016	18 J	321 J
11/29/2016	20	65 J
5/9/2017	24	135
7/22/2017	21	183
9/11/2017	19	81
12/13/2017	22	194
3/20/2018	17	122
6/18/2018	19	101

06-MW32*

DATE	Arsenic	Manganese
9/19/2016	3.1 J	413 J
9/19/2016	*3.5 J*	*417 J*
11/29/2016	6.5	890 J
11/29/2016	*6.5*	*929 J*
5/9/2017	5.8	326
7/22/2017	5.5	135
9/11/2017	7.3	89
12/13/2017	10	17
12/13/2017	--	--
3/20/2018	8.1	6.9
6/18/2018	11	21

06-MW35*

DATE	Arsenic	Manganese
9/19/2016	11 J	195 J
11/29/2016	21	234 J
5/9/2017	21	59
7/22/2017	20	46
9/11/2017	32	109
12/13/2017	43	126
3/20/2018	25	34
6/18/2018	30	19

06-MW34*

DATE	Arsenic	Manganese
9/19/2016	11 J	230 J
11/29/2016	14	118 J
5/10/2017	12	0.70 J
7/22/2017	11	9.5
9/11/2017	15	153
12/13/2017	19	6.6
3/20/2018	13	0.64 J
6/18/2018	12	2.3 U

06-MW25*

DATE	Benzene	Ethylbenzene	Naphthalene	Arsenic	Manganese
3/25/2014	26	79 **	480 U	--	--
8/26/2014	0.52	1.0 U	460 U	--	--
3/10/2015	13	32	100 J	--	--
3/10/2015	12	*31*	*71 J*	--	--
9/16/2015	1.0 U	1.0 U	380 U	--	--
3/16/2016	--	--	--	--	--
9/19/2016	0.55 J	0.50 U	500 U	18 J	1,070 J
11/29/2016	0.66 J	0.50 U	150 J	19	785 J
5/8/2017	0.12 J	0.63 J	61 U	18	666
5/9/2017	--	--	--	--	--
7/22/2017	1.1	0.20 U	52 U	33	1,130
7/22/2017	1.1	*0.20 U*	*54 U*	*32*	*1,120*
9/11/2017	0.61 J	0.20 U	54 U	27	910
9/11/2017	0.73 J	0.20 U	56 U	27	903
12/12/2017	0.69 J	0.20 U	50 U	27	557
3/19/2018	2.6	0.67 J	56 U	21	362
6/18/2018	0.16 J	0.20 U	51 U	29	599
6/18/2018	0.16 J	*0.20 U*	*50 U*	*28*	*600*

06-MW30*

DATE	Arsenic	Manganese
9/19/2016	3.1 J	133 J
11/29/2016	2.3 J	67 J
5/8/2017	2.1	7.2
5/9/2017	--	--
5/8/2017	*2.1*	*8.0*
5/9/2017	--	--
7/22/2017	2.5	29
9/11/2017	2.4	86
12/12/2017	3.0	155
3/19/2018	3.1	346
6/18/2018	2.8 U	67

06-MW31*

DATE	Arsenic	Manganese
11/29/2016	4.4 J	206 J
5/8/2017	7.6	529
7/22/2017	34	744
9/11/2017	41	868
12/14/2017	50	538
3/20/2018	1.2	53
6/18/2018	28	473

06-MW36*

DATE	Arsenic	Manganese
9/19/2016	21 J	765 J
11/29/2016	22	740 J
5/9/2017	12	266
7/22/2017	24	830
9/11/2017	25	835
12/13/2017	31	650
3/20/2018	11	114
6/18/2018	19	427

Project Screening Levels

1,1,2-TCA	17
Benzene	94
Ethylbenzene	43
Ethylbenzene (Subarea 1)	540
Ethylbenzene (Source Area)	1,393
Naphthalene	180
Arsenic	250
Manganese	5,200
MCPP	300

- Monitoring Well Location
- Wastewater Treatment Plant
- Building
- Demolished Building
- Fence
- Road Curb
- Site 6 Boundary

Notes:
1. All concentrations measured in µg/L.
2. Groundwater remedial goals based on future recreational or construction worker exposure presented in the Final Record of Decision/Remedial Action Plan for IR Site 6, Naval Station Treasure Island, San Francisco, California (DON 2014).
3. Duplicate sample are *italicized*.
4. Reporting sample data between 2014 through 2018.

* 1,1,2-TCA and MCPP were below their method detection limits for all wells from 2014 through 2018. Naphthalene was below its method detection limit in well 06-MW26 from 2014 through 2018. Naphthalene, ethylbenzene, and benzene were below their method detection limits from 2016 through 2018 in wells 06-MW30 through 06-MW36.

** Remediation goal for ethylbenzene in this source area is 1,393 ug/L.

1,1,2-TCA	1,1,2-Trichloroethane
IR	Installation Restoration
J	validation flag signifying analyte reported between the reporting limit and method detection limit
MCPP	methylchlorophenoxypropionic acid
µg/L	micrograms per liter
U	analyte not reported at or above the method detection limit

75 0 75 150
Feet

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FIGURE 2-7
SITE 6
GROUNDWATER RESULTS

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06-MW33			
Date	PFBS	PFOA	PFOS
12/13/17	64	**1,300**	**6,100**

06-MW32			
Date	PFBS	PFOA	PFOS
12/13/17	130	**1,200**	**19,000**
12/13/17	*150*	***1,100***	***18,000***

06-MW35			
Date	PFBS	PFOA	PFOS
12/13/17	48	**250**	**3,800**

06-MW26			
Date	PFBS	PFOA	PFOS
5/9/17	38	**750**	**10,000**
12/13/17	28	**960**	**3,800**

06-MW34			
Date	PFBS	PFOA	PFOS
12/13/17	65	**380**	**3,100**

06-MW25			
Date	PFBS	PFOA	PFOS
5/9/17	120	**7,300**	**7,100**
12/13/17	84	**4,100**	**18,000**

06-MW36			
Date	PFBS	PFOA	PFOS
12/13/17	76	**350**	**1,400**

06-MW30			
Date	PFBS	PFOA	PFOS
5/9/17	6.0	**32**	**130**
5/9/17	*6.5*	***33***	***170***
12/12/17	15	**27**	**97**

06-MW31			
Date	PFBS	PFOA	PFOS
12/13/17	61	**270**	**1,200**

Monitoring Well Location
Wastewater Treatment Plant
Building
Demolished Building
Fence
Groundwater Flow Direction
Road Curb
Site 6 Boundary

Notes:
1. All concentrations measured in ppt.
2. USEPA drinking water Regional Screening Level for PFBS is 400,000 ppt.

   Regulatory action limits have not been formally established for PFOA and PFOS. Comparison criteria for PFOA and PFOS are based on current health advisory levels, as established by the United States Environmental Protection Agency (USEPA 2016, 2017).

   USEPA PFOA HAL = 70 ppt
   USEPA PFOS HAL = 70 ppt

   California Notification Level PFOA = 5.1 ppt
   California Notification Level PFOS = 6.5 ppt
3. Duplicate sample are *italicized*.
4. Bolded highlighted **RED** values exceed the regulatory action limit or health advisory level. Bolded highlighted **BLUE** values exceeds the California Notification Level.

HAL	Health advisory level
PFBS	Perfluorobutane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
ppt	Parts per trillion
USEPA	United States Environmental Protection Agency

30 0 30 60
Feet

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-8
SITE 6
PFBS, PFOA AND PFOA SAMPLE RESULTS
Second Five-Year Review

2019-12-02 C:\2019\20190XXX_Adanta_TI_5YR\001_Site6\2-8_PFBS_PFOA_PFOS_Results_rev2.mxd Adanta brodrigues

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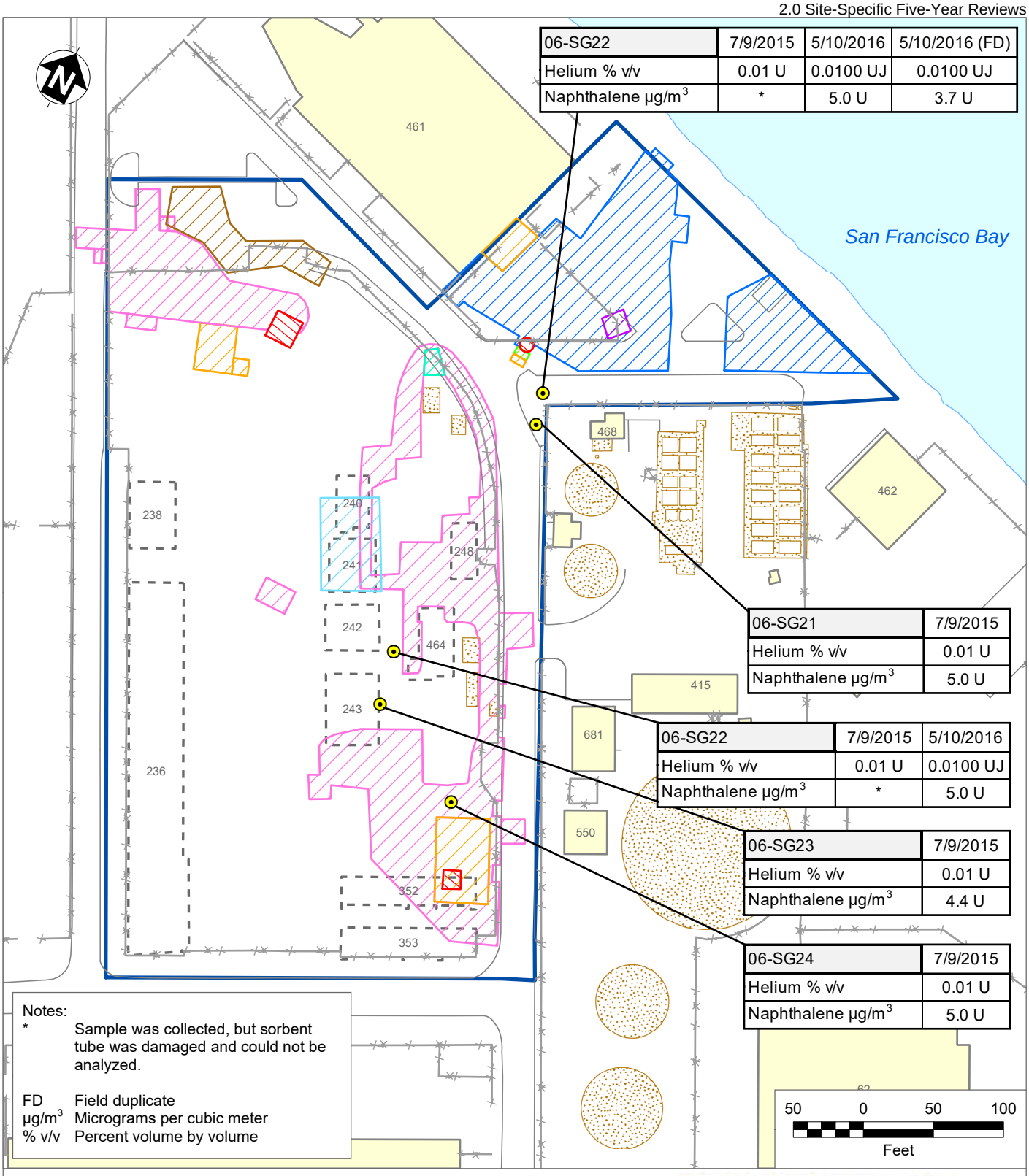

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-9

SITE 6
SOIL GAS SAMPLE RESULTS

Second Five-Year Review

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SITE 6 TABLES

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Table 2-7: Site 6 Soil Cleanup Goals

Primary COC in Soil	ROD/ Final RAP RG	Current USEPA RSL [1]		Current Regional Water Board ESL [2]			Current DTSC SL [3]		DTSC Regulation Based Criteria - Toxicity Criteria for HHRA [4]
		Resident	Comm/ Ind Worker	Resident	Comm/ Ind Worker	Construct Worker	Resident	Comm/ Ind Worker	
Dioxin TEQ	1.2E-05 (Ambient)	4.8E-06	2.2E-05	4.8E-06	2.2E-05	1.5E-04	4.8E-06	1.8E-05	Not Applicable
Manganese	550 (Ambient)	1.8E+03	2.6E+04	NA	NA	NA	NA	NA	Not Applicable

Notes:

All criteria are based on a cancer risk of 1E-06 and noncancer hazard of 1, unless otherwise noted as a NAVSTA TI ambient concentration. All values shown in units of milligram per kilogram (mg/kg).

1. USEPA RSLs. Dated November 2019. Available online at: https://www.epa.gov/risk/regional-screening-levels-rsls
2. San Francisco Bay Regional Water Quality Control Board ESLs. Dated July 2019. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html
3. Cal/EPA DTSC-SLs presented in "HHRA Note: HERO Note Number 3, DTSC-Modified Screening Levels (DTSC-SLs)." Dated April 2019. Available online at: https://dtsc.ca.gov/human-health-risk-hero/
4. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.

Cal/EPA	California Environmental Protection Agency
COC	Contaminant of concern
Comm/Ind	Commercial/industrial
Construct	Construction
DTSC	Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
NA	Not available
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
RSL	Regional screening level
SL	Screening level
TEQ	Toxicity equivalent
USEPA	U.S. Environmental Protection Agency

Table 2-8: Site 6 Groundwater Cleanup Goals

Primary COC in Groundwater	ROD/ Final RAP RG	Ambient Level [1]	Current USEPA Criteria [2]	Current DTSC Criteria [3]	DTSC Regulation Based Criteria - Toxicity Criteria for HHRA [7]
			Construction Worker [4,5,6]	Construction Worker [4,5,6]	
Arsenic	250	15	113	8.5	8.5
Benzene	94	NA	131	53	53
Ethylbenzene	540	NA	263	263	Not Applicable
Manganese	5,200	900	58,090	58,090	Not Applicable
MCPP	300	NA	134	134	Not Applicable
Naphthalene	180	NA	123	24	Not Applicable
1,1,2-Trichloroethane	17	NA	12	12	Not Applicable

Notes:

All criteria are based on cancer risk of 1E-06 and noncancer hazard of 1. All values shown in units of microgram per liter (µg/L).

1. Ambient level shown is the 95th percentile value taken from Final Technical Memorandum Estimation of Ambient Concentrations of Metals in Groundwater (Tetra Tech EMI, 2001).
2. USEPA RSLs. Dated November 2019. Available online at: https://www.epa.gov/risk/regional-screening-levels-rsls
3. OEHHA toxicity criteria taken from Cal/EPA HERO Note Number 10, Toxicity Criteria. Dated February 2019. Available online at: https://dtsc.ca.gov/human-health-risk-hero/
4. Revised construction worker cleanup goals based on body weight = 80 kilograms, skin surface area = 6,032 square centimeters.
5. Trench volatilization factors based on trench dimensions from Site 24 ROD/Final RAP (trench is 10-feet long, 8-feet wide, 4-feet deep; 360 air exchanges per hour).
6. Construction worker includes dermal and inhalation exposures to groundwater in a construction trench.
7. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.

COC	Contaminant of concern
DTSC	Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
MCPP	Methylchlorophenoxypropionic acid
NA	Not available
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
RSL	Regional screening level
SL	Screening level
USEPA	U.S. Environmental Protection Agency

Table 2-9: Site 6 Surface Water Cleanup Goals

Primary COEC in Groundwater [1]	ROD/Final RAP RG	Current Regional Water Board ESL [2]
		San Francisco Bay – Aquatic Receptors
San Francisco Bay (Point of Compliance)		
Ethylbenzene	43	43
TPH	1,400	640
Source Area (UST 240 Area) [3]		
Ethylbenzene	1,393	NA
TPH	45,500	NA

Notes:

All values shown in units of microgram per liter (µg/L).

1. The primary COECs in groundwater are petroleum related. As described in the RACR for Site 6, petroleum at Site 6 will be closed out in the petroleum program. No issues or recommendations are identified in this Five-Year Review and residual petroleum contamination was not considered in the Navy's protectiveness determination for Site 6.
2. San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs). Dated July 2019. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html
3. The source area goals apply to groundwater at the UST 240 Area; however, they were developed to be protective of groundwater discharge to surface water in the San Francisco Bay and so are included in this table.

COEC Contaminant of ecological concern
ESL Environmental screening level
NA Not available
RAP Remedial action plan
RG Remediation goal
ROD Record of decision
TPH Total petroleum hydrocarbons

2.2 SITE 12 – OLD BUNKER AREA

2.2.1 Site Description and Background

Site 12, commonly known as the Old Bunker Area, is located on the northwestern portion of TI and occupies approximately 93-acres of the island (Figure 2-10). Site 12 has been expanded from the original footprint to include the TI housing area in its entirety. Site 12 is flat, consisting of landscaping, paved roads, and residential housing units with backyards. Site 20, a petroleum program site, encompasses 1.6-acres that is fully encircled by Site 12. Site 20 was closed in June 2004. Site 12 was originally given its name based on ammunition bunkers located within the original footprint. Although originally used as a parking lot during the Golden Gate International Exposition of 1939 and 1940, by 1945 nine large ammunition bunkers and 12 smaller bunkers were visible along the northern end of TI. These bunkers were constructed in 1944 as reinforced concrete structures covered by sand with a chert rock and clay surface. In the early 1960s, plans were developed to build housing at the northern end of TI. Observations documented during soil trenching and boring before the 1965 housing construction indicated that discrete areas between and around the bunkers showed evidence of incineration and solid waste disposal. Items recovered from these discrete disposal areas included loose rubbish, bottles, wire rope, paper, and steel. Low-level radiological waste disposal was reported at the end of the completed historic runway. Evidence of chemical contamination along with this debris warranted further investigation of the site.

Currently, Site 12 contains residential buildings with approximately 700 housing units. The buildings are two-story structures constructed with slab-on-grade foundations with four, six, or eight residential units per building. Site 12 is flat, consisting of open grassy areas between buildings, paved roads, and parking areas (CE2-Kleinfelder, 2018).

For the purposes of this Five-Year Review, only the remedy selected for groundwater in the Gateview Arsenic/TPH Area is subject to review. The soil remedy selected in the ROD/Final RAP for non-SWDA, non-radiological soil contamination is not subject to five-year review requirements as determined in the ROD/Final RAP (DON 2017). The remedy for soil will achieve UU/UE and, therefore, will not be subject to a statutory five-year review. The remedy also will be completed within five years and will not be subject to a policy five-year review. Other investigations and evaluations occurring at Site 12 for contamination associated with the SWDAs or radiological impacts are not at the remedy implementation phase.

2.2.1.1 Gateview Arsenic/TPH Area

The Gateview Arsenic/TPH Area is located along the western shoreline of TI in the southern portion of Site 12 and was identified based on previous results from soil and groundwater samples collected at Site 12. An abandoned, buried oil tank was referenced in this area in a 1971 geotechnical engineering report for housing unit construction on the site (TriEco-Tt, 2012). The engineering report indicated that the former UST was planned for removal as part of site grading; however, there is no documentation of removal or closure of the UST.

An automobile service station was located directly east of the current Gateview Arsenic/TPH Area during the 1939 and 1940 Golden Gate International Exposition. Fuel tanks associated with the service station were removed around 1944. A former petroleum tank may be the source of TPH contamination for the Gateview Arsenic/TPH Area. However, diesel is the predominant fuel detected in groundwater, and the service station apparently stored and dispensed gasoline. No further historical information is available regarding the types of fuels that may have been used at the former service station.

2.2.1.2 Land and Resource Use

Site 12 is currently used for residential housing. The future reuse of Site 12 is identified in the 2011 Final EIR (CCSF, 2011) and the 2011 TIDA Design for Development (TIDA, 2011) as residential and open space/recreational. The open space/recreational uses include the Northern Shoreline Park, the Wilds, and stormwater wetlands.

There are no perennial surface water bodies located at Site 12. As discussed in Section 1.2.5.3, groundwater is not currently used as a source of drinking water and is not planned to be used as such in the future.

2.2.2 Response Action Summary

Investigations into the release of hazardous substances, hazardous waste, petroleum constituents, and other regulated substances began at Site 12 in 1988, and subsequent reports documented the releases of CERCLA hazardous substances.

2.2.2.1 Basis for Taking Action

Investigations at Site 12, including the RI in 2012, identified arsenic in groundwater as a COEC for off-site aquatic receptors in the Bay. Naturally occurring concentrations of arsenic were mobilized by the petroleum contamination in the area. The basis for taking action for groundwater is to address the potential risk to off-site aquatic receptors in San Francisco Bay from arsenic-contaminated groundwater.

2.2.2.2 Previous Investigations

Table 2-10: Previous Groundwater Investigations Summary – Site 12

Investigation	Date	Investigation Summary
Tidal Mixing Studies	1995 – 2002	In 1995, an initial study assessed the inland extent of tidal influence on nearshore groundwater levels at former NAVSTA TI. A follow-up study was performed between December 2001 and March 2002 to assess the degree of groundwater subsurface and surface water mixing immediately inland of the shore at TI. The findings estimated physical mixing of surface water and groundwater takes place over distances ranging from 60- to 150-feet inland of the TI mean lowest low water shoreline.
Ambient Metals Studies	1996 – 2001	Ambient concentrations were established for metals in soil and groundwater to assess whether the presence of any metal was the result of a site-specific release or from naturally occurring or regional anthropogenic sources.
Draft Final Onshore RI	1997	An RI was completed for all sites identified in the PA/SI to assess the nature and extent of potential petroleum and metals contamination and to evaluate whether the debris disposal areas, former ammunition bunker areas, and the former buried oil tank (in the Gateview Arsenic/TPH Area) were continuing sources of contamination. Results of the RI indicated that metals, PAHs, and TPH concentrations were detected throughout the site, and dioxins were detected in localized areas. PAHs, VOCs, pesticides,

Investigation	Date	Investigation Summary
		PCBs, explosives, metals, and TPH were detected in groundwater, with VOCs and TPH being detected most frequently in the southwestern corner of the site. After the RI, the Site 12 boundary was expanded to include a rubbish disposal area.
Draft Site 12 Operable Unit RI	1999	In early 1998, Site 12 was separated from the other onshore sites based on additional site-specific data and unexpected delays in completing the onshore RI report. In addition, the City of San Francisco had announced its plans to lease the former housing areas within the site as public rental units. The RI concluded that risks associated with SWDA Westside and the remainder of the site were within the risk management range of 10^{-4} to 10^{-6} for residential users, recreational users, commercial/industrial users, and construction workers. The noncancer hazard risk for all users was less than or equal to 1.
RI	2012	The DON completed an RI for Site 12 to: (1) characterize site conditions; (2) evaluate the nature and extent of contamination in soil, groundwater, and soil gas; and (3) assess the risk to human health and the environment. Site 12 was divided into two regional areas: Site 12 north and Site 12 south. Site 12 north and south were further subdivided into 19 EUs, six AOIs, seven groundwater exposure areas, and the four SWDAs. In addition, three petroleum areas were identified. Soil, groundwater, and soil gas samples collected during the RI were analyzed for TPH, VOCs, SVOCs, pesticides, PCBs, metal, explosives, and dioxins and furans. Sampling results were compared with screening criteria to identify chemicals that exceeded the screening criteria. Chemicals in soil exceeding the screening criteria included petroleum, PAHs, PCBs, pesticides, metals, and dioxins. Chemicals in groundwater exceeding the screening criteria included petroleum and metals. Chemicals in soil gas exceeding the screening criteria included benzene and chloroform. A baseline HHRA was also completed in the RI.
FS	2014	The DON completed an FS to: (1) supplement the site characterization information from the 2012 RI with a data gaps investigation; (2) identify ARARs; (3) identify RAOs and remediation goals; and (4) evaluate remedial alternatives. The DON completed a data gaps investigation and documented the results in the FS. The objective of the data gap investigation was to define the lateral and vertical extent of the COCs identified in the RI.

Investigation	Date	Investigation Summary
		The alternatives developed and evaluated in the FS were superseded by the alternatives developed and evaluated in the 2015 FS addendum.
FS Addendum	2015	Updated site characterization information, presented results from investigation of potential contamination in a rubbish area, and reevaluated the SLERA as described in the RI.
Proposed Plan/ Draft RAP	2016	Summarized the DON's preferred alternatives for cleaning up the contaminated soil and groundwater at Site 12.
ROD/Final RAP	2017	The remedy selected for Site 12, excluding the SWDAs and any radiological contamination sitewide, included a soil remedy and a groundwater remedy for the Gateview Arsenic/TPH Area. Only the groundwater remedy is reviewed in this report. The soil remedy is not subject to the Five-Year Review because it achieved UU/UE within 5 years. The selected groundwater remedy and RAO from the Site 12 ROD/Final RAP is detailed in Sections 2.2.2.3 and 2.2.2.4.
Groundwater Monitoring	1992 – Present	The DON has conducted groundwater monitoring at Site 12 since 1992. The groundwater monitoring identified elevated concentrations of arsenic in groundwater in the vicinity of Buildings 1311 and 1313 (now known as the Gateview Arsenic/TPH Area). Elevated petroleum concentrations in soil and groundwater were also reported in that area. The elevated concentrations were most likely the result of releases from a suspected former petroleum tank in the area.
TCRA for Soil and Groundwater at Site 12	2015 – present	In October 2015, the DON signed an action memorandum that documented its decision to undertake another TCRA for soil and groundwater at Site 12. The TCRA addressed petroleum contamination in the Gateview Arsenic/TPH Area and discrete locations of soil in the southern portion of Site 12 (see Figure 2-11). The DON excavated petroleum-contaminated soil in the Gateview Arsenic/TPH area and added a biostimulation compound to further treat the petroleum. The objective of this portion of the TCRA was to remove and treat the residual petroleum that creates conditions conducive to reducing (that is mobilizing) concentrations of arsenic that have leached from the soil into the groundwater. In addition, the DON excavated discrete locations of soil dispersed throughout the southern portion of Site 12. The DON removed soil contaminated with lead, PAHs, PCBs, and dioxins and furans. A PCSR was finalized in 2020 to summarize the work completed during the TCRA.

Notes:

AOI	Area of interest
ARAR	Applicable or relevant and appropriate requirement
bgs	Below ground surface
CERCLA	Comprehensive Environmental Responsibility, Compensation, and Liability Act
COC	Contaminant of concern
DON	United States Department of the Navy
EBS	Environmental baseline study
EU	Exposure unit
FS	Feasibility study
HHRA	Human health risk assessment
HRA	Historical radiological assessment
HRASTM	Historical radiological assessment supplemental technical memorandum
mg/kg	Milligrams per kilogram
NAVSTA TI	Naval Station Treasure Island
PA	Preliminary assessment
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCSR	Post-construction summary report
RAO	Remedial action objective
RAP	Remedial action plan
RI	Remedial investigation
ROD	Record of decision
SI	Site investigation
SLERA	Screening-level ecological risk assessment
SVOC	Semivolatile organic chemical
SWDA	Solid waste disposal area
TCRA	Time-critical removal action
TI	Treasure Island
TPH	Total petroleum hydrocarbons
VI	Vapor intrusion
VOC	Volatile organic chemical

2.2.2.3 Remedial Action Objectives

The DON developed the following RAO to address off-site aquatic receptors of Site 12:

- Reduce risk to the marine ecology through contact with groundwater containing arsenic by completing TPH source area removal.

2.2.2.4 Selected Remedy

The remedy selected for groundwater is necessary to protect public health, welfare, and the environment from actual or potential releases of hazardous substances. The DON, in partnership with the DTSC and the Regional Water Board, considered all pertinent factors in accordance with CERCLA and NCP remedy selection criteria and concluded that RA is necessary to address chemical contamination at the Gateview Arsenic/TPH Area at Site 12.

The remedy for groundwater at the Gateview Arsenic/TPH Area included:

- Excavate petroleum in soil, add ORM if necessary;
- Conduct in situ soil mixing with chemical oxidants, if necessary;
- Monitor the natural attenuation of arsenic concentrations in groundwater to confirm the reduction of arsenic concentrations.

The only COEC identified for groundwater was arsenic. The DON developed a numerical RG for arsenic in groundwater that is protective of off-site aquatic receptors. Because TPH is not a CERCLA COC, the numeric values provided for soil are not remediation goals for Site 12 (DON, 2017). These numeric values were used to target mass reduction of free and smeared product in the Gateview Arsenic/TPH Area.

Table 2-11: RGs for Site 12

Contaminant of Ecological Concern	Goal	Receptor	Basis
Groundwater			
Arsenic	36 µg/L	Off-site aquatic organisms along the shoreline	California Toxics Rule

Notes:
µg/L Microgram per liter

2.2.2.5 Implementation Status

Table 2-12: Demonstration of Completion – Site 12

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Reduce risk to the marine ecology through contact with groundwater containing arsenic by completing TPH source area removal.	Gateview Arsenic/TPH Area The RA in this area targeted removal of elevated TPH in soil because of the potential to contribute to the mobilization of naturally occurring arsenic in soil to groundwater. The TCRA included the removal of free product, when encountered; and the placement of ORM for the treatment of residual TPH. The TCRA soil excavation at the Gateview Arsenic/TPH Area was completed in 2017. Groundwater monitoring for arsenic was resumed after the TCRA was completed and will continue until the RG is met. The DON will develop a Monitored Natural Attenuation Plan that describes the details of this component of the groundwater remedy.	No

Source: CE2-Kleinfelder, 2018.

Notes:

ORM	Oxygen release material	RG	Remediation Goal
RA	Remedial action	TCRA	Time-critical removal action
RAO	Remedial action objective	TPH	Total petroleum hydrocarbons

2.2.2.6 Systems Operations/Operation & Maintenance

No significant O&M costs have been incurred for Site 12. Minor costs are expected for maintenance of the monitoring network.

2.2.3 Site 12 Progress Since Last Review

This is the first Five-Year Review for the remedy for groundwater at Site 12.

2.2.4 Site 12 Five-Year Review Process

This section discusses the activities performed during the Five-Year Review process for Site 12. Section 1.3 outlines the general Five-Year Review process, which was applied to each site evaluated in this Five-Year Review.

2.2.4.1 Data Review

The remedy for Site 12 included soil excavation to reduce arsenic concentrations in groundwater and groundwater monitoring. Results from groundwater samples collected during the Five-Year Review period (from 2014 through 2018) are evaluated in this section.

Table 2-13: Site 12 Remedy Summary

Medium	Risk Basis for Action/ COCs	RAOs	Remedy/ Cleanup Goal	Performance Metric
Groundwater	Marine Ecological Risk – Arsenic	Reduce risk to marine ecology near the shoreline through contact with groundwater containing arsenic, discharging to the bay as surface water, by completing TPH source area removal.	Excavation, in situ remediation, LTM	Site-specific screening level detailed in Table 2-11

Notes:
COC Contaminant of concern
LTM Long-term monitoring
RAO Remedial action objective
TPH Total petroleum hydrocarbons

2.2.4.1.1 Gateview Arsenic/TPH Area

The Gateview Arsenic/TPH Area was excavated to approximately 10.5 bgs to remove TPH found in the soil (Figure 2-12). The natural biodegradation of TPH results in geochemical conditions that contribute to the mobilization of naturally occurring arsenic in soil to groundwater. The TPH removal will reduce this mobilization and potential exposure of aquatic organisms to arsenic. The removal will also address potential pathways of exposure to future construction workers. Annual groundwater monitoring will be performed as part of the cleanup action until the concentrations of arsenic in groundwater have met the RG.

Some TPH-contaminated soil was left in place beneath Gateview Avenue and adjacent to high-voltage electrical lines. Following completion of the excavation but prior to backfilling, 150,000 pounds of ORM was applied to the floor and sidewalls of the excavation. The ORM serves to help breakdown residual hydrocarbons left in the soil. A TCRA post-construction summary report was finalized in 2020. Post-removal action groundwater monitoring will be performed to monitor the effects of source removal in this area.

Figure 2-13 shows the groundwater monitoring wells located in the Gateview Arsenic/TPH Area. Sampling results through December 2018 (NOREAS, 2019b) suggest decreasing or stable trends in total TPH concentrations in two monitoring wells (12-MW05 and 12-MW34). Total TPH concentrations were either not detected or below the screening level in all four shoreline wells (12-MW34 through 12-MW37) nearest the Bay. Figure 2-14 shows the total TPH concentrations in groundwater. Sampling results through December 2018 suggest an increasing trend in arsenic concentrations at one monitoring well (12-MW23) and stable trends at two other wells (12-MW05 and 12-MW34). Arsenic was identified as exceeding the remediation goal of 36 µg/L in wells 12-MW05 and 12-MW23. However, arsenic was not detected above the reporting limit at the four shoreline wells nearest the Bay in October and December 2018 indicating that arsenic is not discharging to the Bay at concentrations above 36 µg/L. Figure 2-15 shows the concentrations of arsenic in groundwater.

2.2.4.2 Site Inspection

The DON and Adanta, Inc. conducted a site inspection at Site 12 for this Five-Year Review on January 10, 2019. The purpose of the site inspection was to review and document current site conditions and evaluate visual evidence on the protectiveness of the remedial system. Site access and general site conditions were also evaluated during the inspection. Appendix A contains the site inspection checklist, and Appendix B contains the photographic log, which documents observations made during the inspection.

Observations made during the site inspection indicated that the monitoring network and security measures were in place. Missing bolts were noted in some of the monitoring wells. In addition, partially collapsed fencing was observed during the site inspection at the central portion of the radiologically controlled area along the western boundary of Site 12 SWDA Westside; the fencing was repaired by the DON in fall 2019. Well bolts were replaced by the Navy. No issues concerning the protectiveness of the remedies were noted.

2.2.5 Site 12 Technical Assessment

2.2.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Table 2-14: Technical Evaluation – Question A (Site 12)

Question	Summary
RA Performance	**Yes.** A review of documents, site inspections, and interviews with personnel knowledgeable about the site indicates that the remedy as outlined in the ROD/Final RAP is functioning as designed and is in progress. Groundwater monitoring will continue at Gateview Arsenic/TPH Area.
System Operations/O&M	**Yes.** No significant O&M issues were identified. Site inspection identified missing bolts in some of the monitoring wells, which were replaced by the Navy.
Implementation of ICs	**Not Applicable.** ICs were not selected as part of the remedy for Site 12.

Notes:

IC Institutional control
O&M Operation and maintenance
RAP Remedial action plan
ROD Record of decision
TPH Total petroleum hydrocarbons

2.2.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of Remedy Selection Still Valid?

USEPA's guidance document for Five-Year Reviews identifies several areas for consideration in evaluating whether the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid (USEPA, 2001). Areas of consideration include changes in standards identified as ARARs and TBC criteria in the ROD, changes in exposure pathways, changes in toxicity and other contaminant characteristics, changes in risk assessment methods, and expected progress toward meeting RAOs.

The DON reviewed the ARARs, exposure assumptions, toxicity data, and derivation of the cleanup level used to develop the RAO for groundwater at Site 12. The cleanup level for arsenic used in the ROD is an ARAR-based level protective of off-site aquatic receptors (the California Toxics Rule promulgated at 40 CFR § 131.38). There have not been any changes to this ARAR that was used as the cleanup level or other ARARs identified in the ROD/Final RAP that would affect the protectiveness of the remedy. However, the response to Question B is No, because current DTSC toxicity criteria for arsenic has changed and a protectiveness determination cannot be made at this time with respect to future construction worker exposure to arsenic in groundwater until risk is re-evaluated to determine if the remedy remains protective.

Table 2-15: Technical Evaluation – Question B (Site 12)

Question	Summary
Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria	There were no changes to groundwater ARARs selected in the ROD/Final RAP that affect the protectiveness of the remedy. There have been no changes to the California Toxics Rule, promulgated at 40 CFR § 131.38, which was selected as the cleanup level in the ROD/Final RAP.
Changes in Toxicity and Other Contaminant Characteristics	***Groundwater to Surface Water*:** The ecological saltwater RG of 36 µg/L for arsenic is consistent with the July 2019 Regional Water Board ESL (Regional Water Board, 2019). ***Groundwater*:** DTSC toxicity criteria for arsenic changed after the ROD/Final RAP was signed. The change in toxicity criteria indicates that future construction worker exposure to arsenic in groundwater should be re-evaluated to determine if the remedy remains protective.
Changes in Risk Assessment Methods	There have been no significant changes in methodology on which the RG was based.
Changes in Exposure Pathways	No new contaminants or contaminant sources originating from the site have been identified or detected during monitoring. No unanticipated toxic byproducts have been generated as a result of remedy implementation.
Expected Progress towards meeting RAOs	The remedy for groundwater is progressing as expected. Gateview Arsenic/TPH Area excavation and treatment have been completed. Groundwater monitoring is ongoing in order to determine the effectiveness of the excavation and ORM treatment and when the RAO for groundwater is met.

Notes:

§	Section
µg/L	Microgram per liter
ARAR	Applicable or relevant and appropriate requirement
CFR	Code of Federal Regulations
ESL	Environmental screening level
ORM	Oxygen release material
RAO	Remedial action objective
RAP	Remedial Action Plan
RG	Remediation goal
ROD	Record of decision
TBC	To be considered
TPH	Total petroleum hydrocarbons

2.2.5.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No new human health or ecological risks have been identified. No other information has been identified to suggest that the remedies may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have affected the protectiveness of the remedy.

2.2.6 Site 12 Issues, Recommendations, and Follow-up Actions

Issue	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
Due to recent changes in state toxicity criteria for arsenic, it cannot be determined at this time whether there may be an unacceptable risk to construction workers via dermal contact with groundwater.	No	Yes	Reevaluate potential risk to construction workers from dermal contact with groundwater to determine if the remedy remains protective. An ambient concentration of arsenic of 15 µg/L will be used as the screening level because the current DTSC screening criterion of 8.5 µg/L falls below the ambient concentration of arsenic at NAVSTA TI.	Navy	DTSC	May 2021

2.2.7 Site 12 Protectiveness Statement

Site(s): Site 12	**Protectiveness Determination:** Protectiveness Deferred
Protectiveness Statement: A protectiveness determination of the remedy for Site 12 cannot be made at this time. Additional information must be obtained from ongoing groundwater monitoring under the basewide monitoring program and by consideration of the recent DTSC change in toxicity criteria for arsenic. This additional information will be considered in evaluating potential risk to construction workers from dermal contact with groundwater using 15 µg/L as the screening level to determine if the remedy remains protective. A protectiveness determination will be made upon evaluation completion.	

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SITE 12 FIGURES

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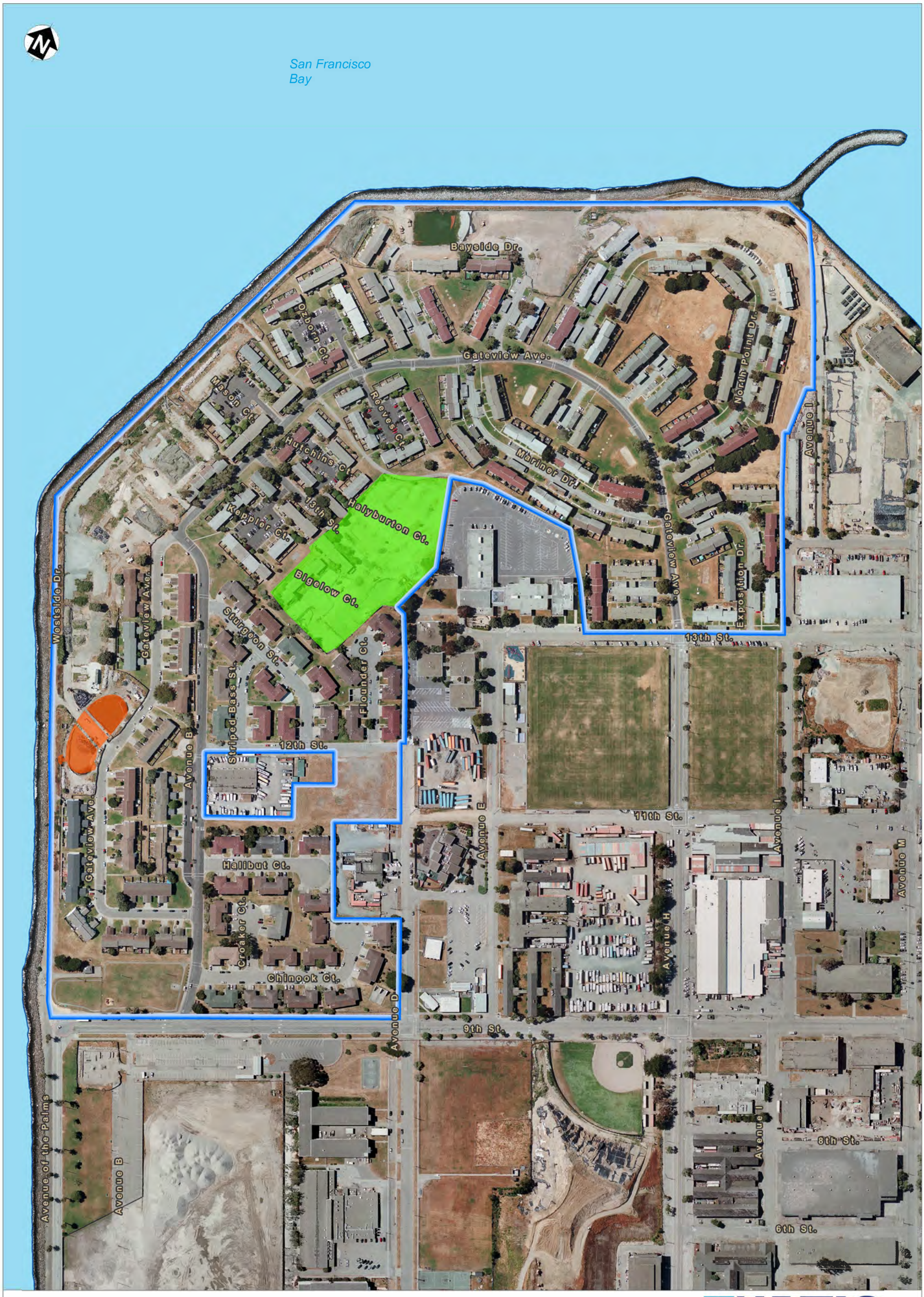

SWDA Halyburton/Bigelow Court
Gateview Arsenic/TPH Excavation Area
Site 12 Boundary

150 0 150 300
Feet

Notes:
1. Area boundaries are approximate and not based on legal descriptions

IR Installation Restoration
SWDA Solid Waste Disposal Area

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Figure 2-10

SITE 12
GENERAL LOCATION MAP

Second Five-Year Review

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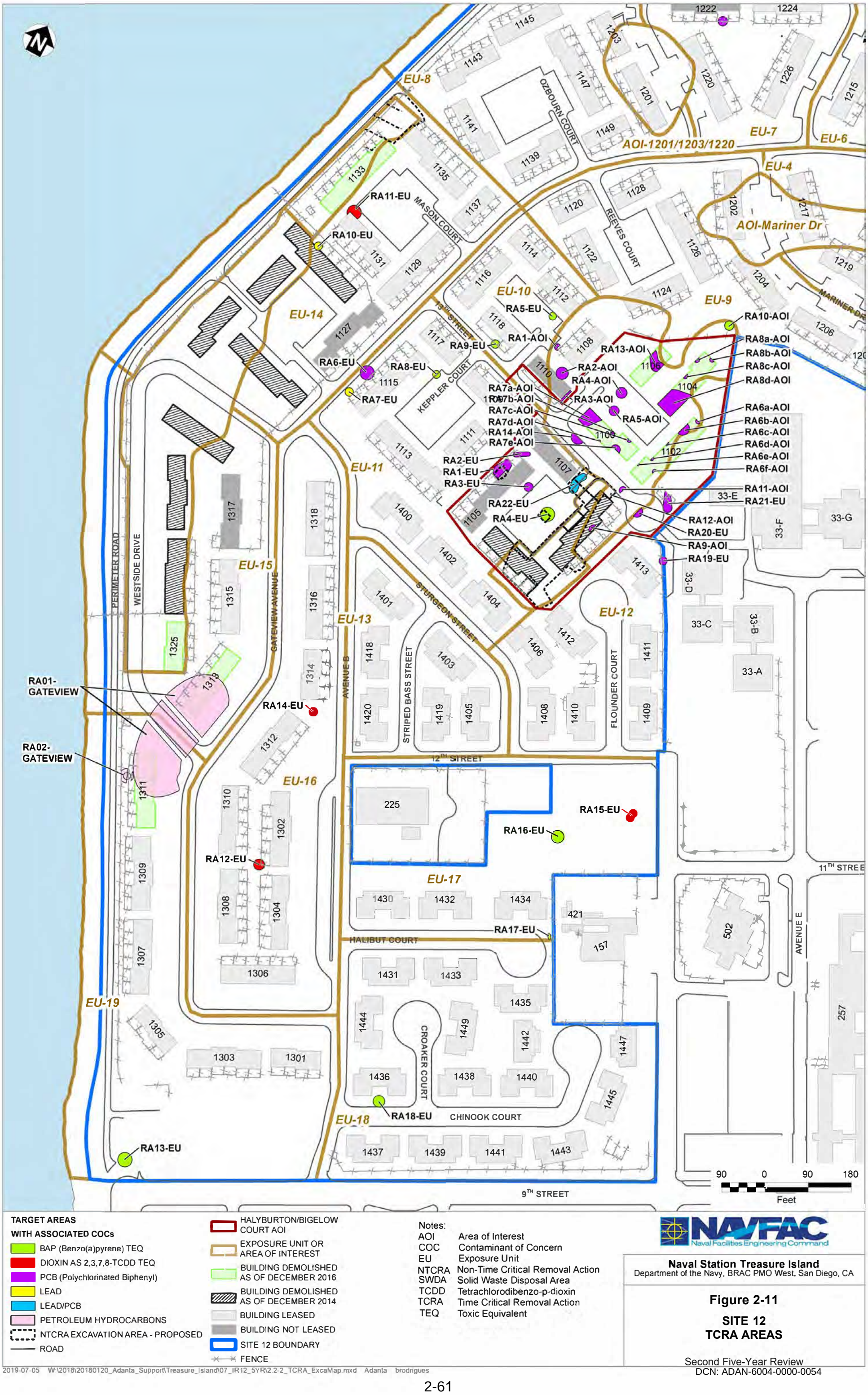
EU-8
EU-7
EU-6
EU-4
EU-10
EU-9
EU-14
EU-11
EU-15
EU-13
EU-12
EU-16
EU-17
EU-19
EU-18
AOI-1201/1203/1220
AOI-Mariner Dr
OZBOURN COURT
MASON COURT
REEVES COURT
KEPPLER COURT
13TH STREET
MARINER DR
PERIMETER ROAD
WESTSIDE DRIVE
GATEVIEW AVENUE
AVENUE B
STURGEON STREET
STRIPED BASS STREET
FLOUNDER COURT
12TH STREET
11TH STREET
9TH STREET
HALIBUT COURT
CROAKER COURT
CHINOOK COURT
AVENUE E
RA11-EU
RA10-EU
RA6-EU
RA8-EU
RA7-EU
RA9-EU
RA5-EU
RA1-AOI
RA10-AOI
RA8a-AOI
RA8b-AOI
RA8c-AOI
RA8d-AOI
RA13-AOI
RA2-AOI
RA4-AOI
RA3-AOI
RA7a-AOI
RA7b-AOI
RA7c-AOI
RA7d-AOI
RA14-AOI
RA7e-AOI
RA5-AOI
RA6a-AOI
RA6b-AOI
RA6c-AOI
RA6d-AOI
RA6e-AOI
RA6f-AOI
RA2-EU
RA1-EU
RA3-EU
RA22-EU
RA4-EU
RA11-AOI
RA21-EU
RA12-AOI
RA20-EU
RA9-AOI
RA19-EU
RA01-GATEVIEW
RA02-GATEVIEW
RA14-EU
RA12-EU
RA15-EU
RA16-EU
RA17-EU
RA18-EU
RA13-EU
33-A
33-B
33-C
33-D
33-E
33-F
33-G
225
421
157
502
257
90 0 90 180
Feet
TARGET AREAS
WITH ASSOCIATED COCs
BAP (Benzo(a)pyrene) TEQ
DIOXIN AS 2,3,7,8-TCDD TEQ
PCB (Polychlorinated Biphenyl)
LEAD
LEAD/PCB
PETROLEUM HYDROCARBONS
NTCRA EXCAVATION AREA - PROPOSED
ROAD
HALYBURTON/BIGELOW COURT AOI
EXPOSURE UNIT OR AREA OF INTEREST
BUILDING DEMOLISHED AS OF DECEMBER 2016
BUILDING DEMOLISHED AS OF DECEMBER 2014
BUILDING LEASED
BUILDING NOT LEASED
SITE 12 BOUNDARY
FENCE
Notes:
AOI Area of Interest
COC Contaminant of Concern
EU Exposure Unit
NTCRA Non-Time Critical Removal Action
SWDA Solid Waste Disposal Area
TCDD Tetrachlorodibenzo-p-dioxin
TCRA Time Critical Removal Action
TEQ Toxic Equivalent
NAVFAC
Naval Facilities Engineering Command
Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA
Figure 2-11
SITE 12
TCRA AREAS
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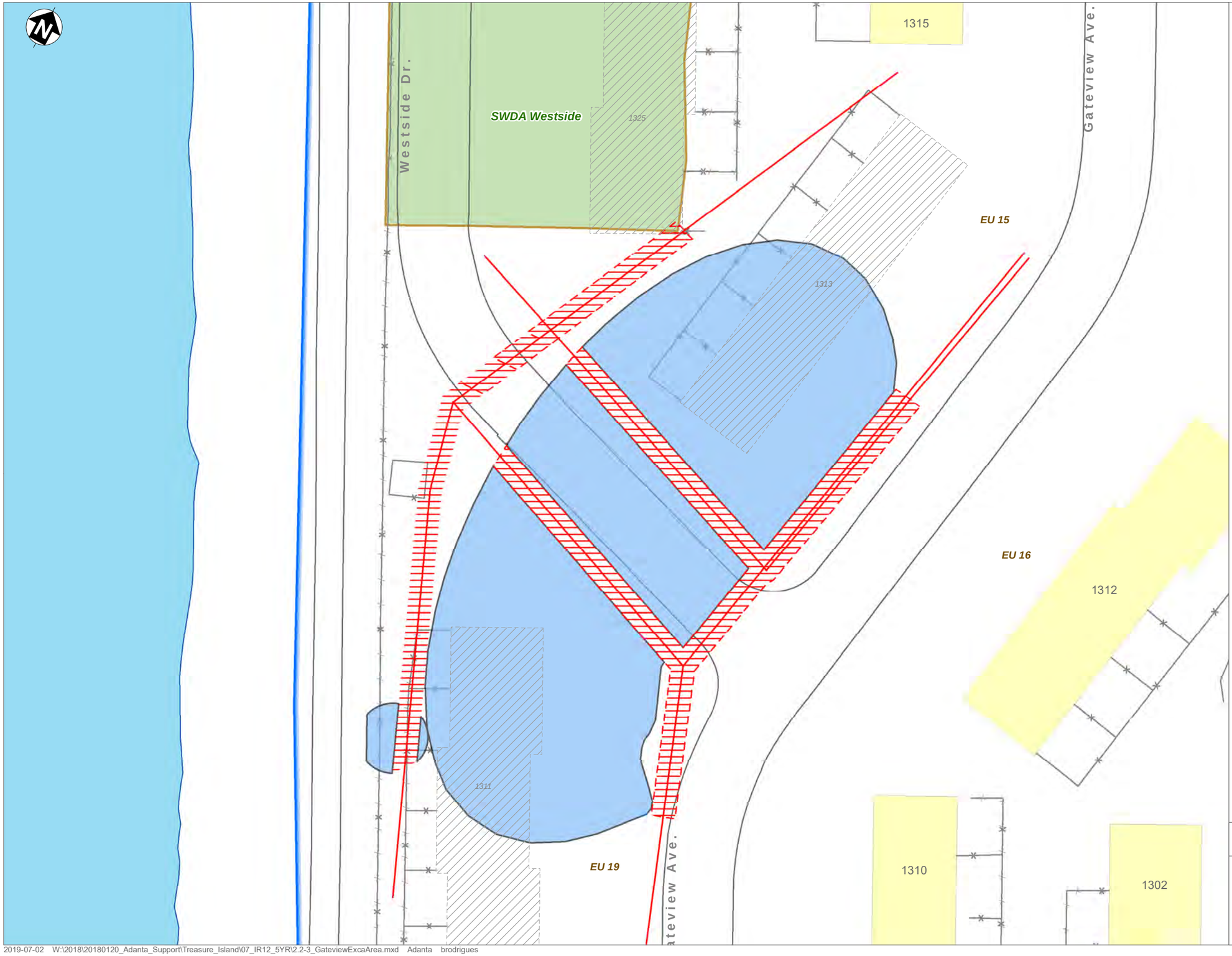

Notes:
IR Installation Restoration
SWDA Solid Waste Disposal Area

20 0 20 40
Feet

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Figure 2-12
SITE 12
GATEVIEW ARSENIC/TPH AREA EXCAVATION
Second Five-Year Review

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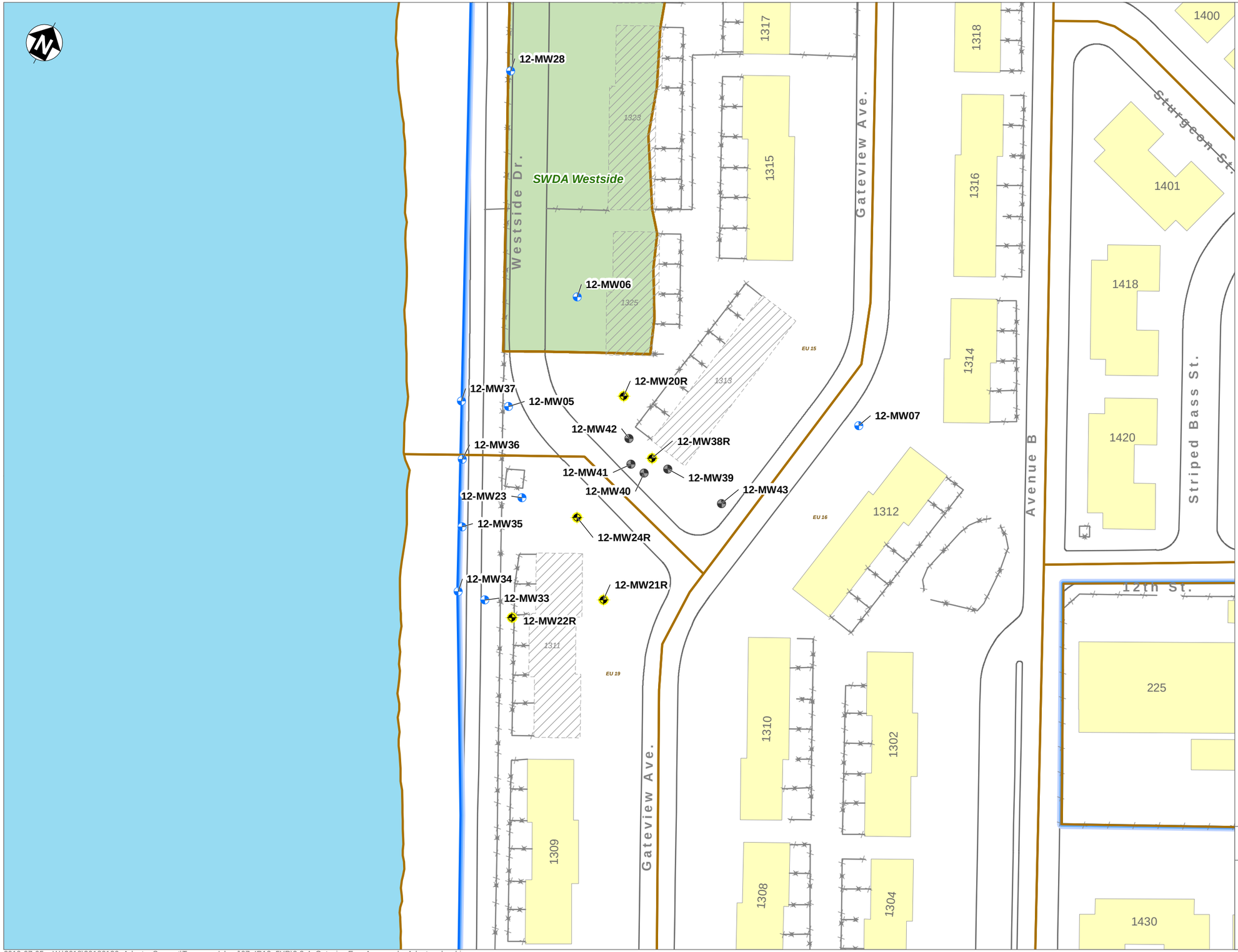

Notes:

SWDA	Solid Waste Disposal Area
TCRA	Time Critical Removal Action
TPH	Total Petroleum Hydrocarbons

40 0 40 80
Feet

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Figure 2-13

SITE 12
MONITORING WELL LOCATIONS IN GATEVIEW ARSENIC/TPH AREA

Second Five-Year Review

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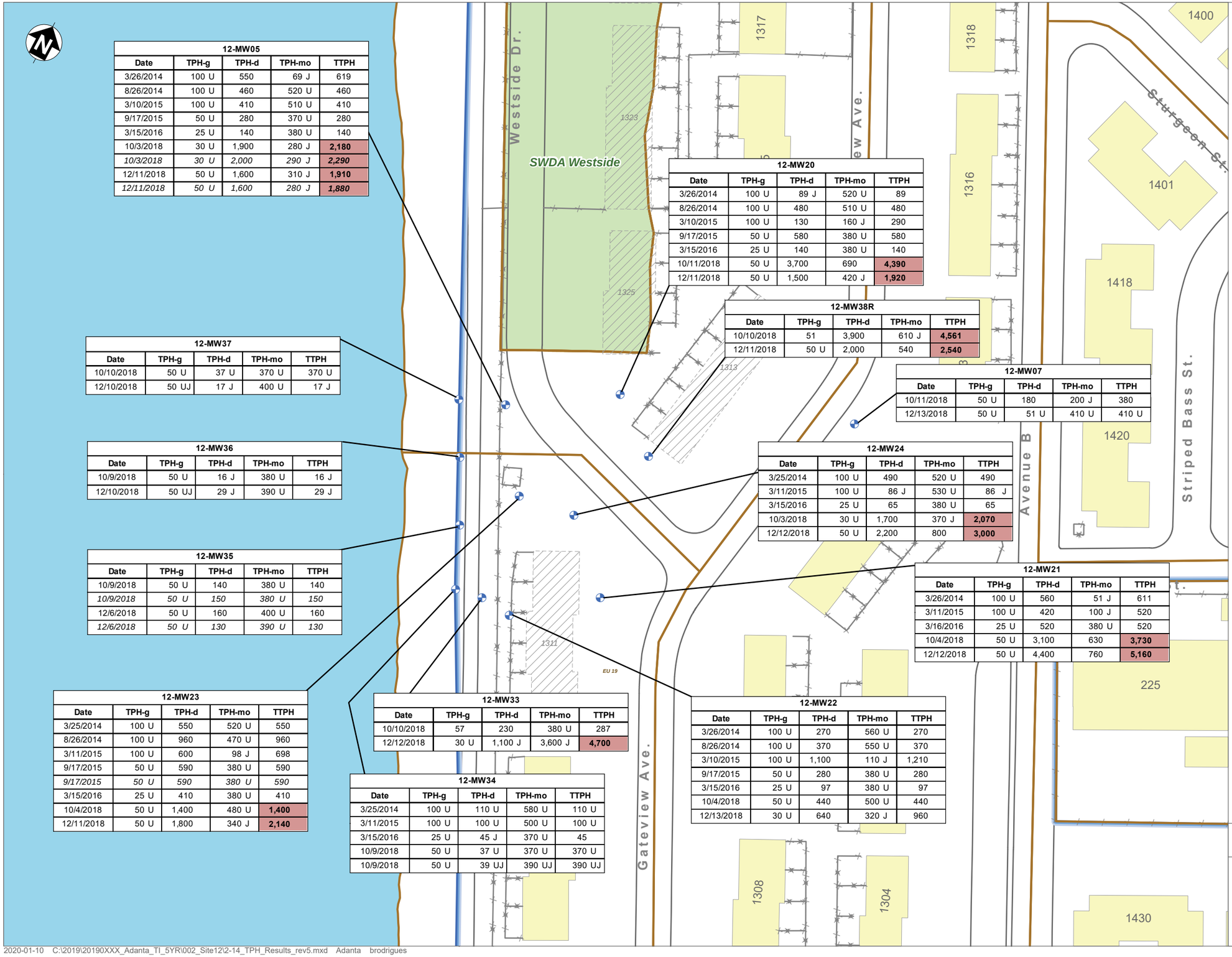

12-MW05

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/26/2014	100 U	550	69 J	619
8/26/2014	100 U	460	520 U	460
3/10/2015	100 U	410	510 U	410
9/17/2015	50 U	280	370 U	280
3/15/2016	25 U	140	380 U	140
10/3/2018	30 U	1,900	280 J	**2,180**
10/3/2018	*30 U*	*2,000*	*290 J*	***2,290***
12/11/2018	50 U	1,600	310 J	**1,910**
12/11/2018	*50 U*	*1,600*	*280 J*	***1,880***

12-MW20

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/26/2014	100 U	89 J	520 U	89
8/26/2014	100 U	480	510 U	480
3/10/2015	100 U	130	160 J	290
9/17/2015	50 U	580	380 U	580
3/15/2016	25 U	140	380 U	140
10/11/2018	50 U	3,700	690	**4,390**
12/11/2018	50 U	1,500	420 J	**1,920**

12-MW38R

Date	TPH-g	TPH-d	TPH-mo	TTPH
10/10/2018	51	3,900	610 J	**4,561**
12/11/2018	50 U	2,000	540	**2,540**

12-MW37

Date	TPH-g	TPH-d	TPH-mo	TTPH
10/10/2018	50 U	37 U	370 U	370 U
12/10/2018	50 UJ	17 J	400 U	17 J

12-MW07

Date	TPH-g	TPH-d	TPH-mo	TTPH
10/11/2018	50 U	180	200 J	380
12/13/2018	50 U	51 U	410 U	410 U

12-MW36

Date	TPH-g	TPH-d	TPH-mo	TTPH
10/9/2018	50 U	16 J	380 U	16 J
12/10/2018	50 UJ	29 J	390 U	29 J

12-MW24

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/25/2014	100 U	490	520 U	490
3/11/2015	100 U	86 J	530 U	86 J
3/15/2016	25 U	65	380 U	65
10/3/2018	30 U	1,700	370 J	**2,070**
12/12/2018	50 U	2,200	800	**3,000**

12-MW35

Date	TPH-g	TPH-d	TPH-mo	TTPH
10/9/2018	50 U	140	380 U	140
10/9/2018	*50 U*	*150*	*380 U*	*150*
12/6/2018	50 U	160	400 U	160
12/6/2018	*50 U*	*130*	*390 U*	*130*

12-MW21

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/26/2014	100 U	560	51 J	611
3/11/2015	100 U	420	100 J	520
3/16/2016	25 U	520	380 U	520
10/4/2018	50 U	3,100	630	**3,730**
12/12/2018	50 U	4,400	760	**5,160**

12-MW23

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/25/2014	100 U	550	520 U	550
8/26/2014	100 U	960	470 U	960
3/11/2015	100 U	600	98 J	698
9/17/2015	50 U	590	380 U	590
9/17/2015	*50 U*	*590*	*380 U*	*590*
3/15/2016	25 U	410	380 U	410
10/4/2018	50 U	1,400	480 U	**1,400**
12/11/2018	50 U	1,800	340 J	**2,140**

12-MW33

Date	TPH-g	TPH-d	TPH-mo	TTPH
10/10/2018	57	230	380 U	287
12/12/2018	30 U	1,100 J	3,600 J	**4,700**

12-MW22

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/26/2014	100 U	270	560 U	270
8/26/2014	100 U	370	550 U	370
3/10/2015	100 U	1,100	110 J	1,210
9/17/2015	50 U	280	380 U	280
3/15/2016	25 U	97	380 U	97
10/4/2018	50 U	440	500 U	440
12/13/2018	30 U	640	320 J	960

12-MW34

Date	TPH-g	TPH-d	TPH-mo	TTPH
3/25/2014	100 U	110 U	580 U	110 U
3/11/2015	100 U	100 U	500 U	100 U
3/15/2016	25 U	45 J	370 U	45
10/9/2018	50 U	37 U	370 U	370 U
10/9/2018	50 U	39 UJ	390 UJ	390 UJ

- Monitoring Well Location
- Exposure Unit or Area of Interest
- SWDA Boundary
- Building
- Demolished Building
- Fence
- Road Curb
- Site 12 Boundary

Notes:
1. All concentrations shown in µg/L.
2. TTPH was calculated based on the sum of reportable concentrations of TPH-g, TPH-d, and TPH-mo. The TTPH concentration is a project screening level based on a San Francisco Bay point of compliance value of 1,400 ug/L from Table 4 of the Record of Decision/Final Remedial Action Plan for IR Site 6 (DON 2014).
3. Bold highlighted **value** exceeds the project screening level for TTPH. Results from 2014 through 2018.
4. Duplicate samples shown in *italics*.

-- Not analyzed
J Analyte reported between the reporting limit and method detection limit
µg/L Micrograms per liter
SWDA Solid Waste Disposal Area
TPH Total Petroleum Hydrocarbons
-d TPH in the diesel range (C10 to C24)
-g TPH in the purgeable (gasoline) range (C6 to C10)
-mo TPH in the motor oil range (C24 to C34)
TTPH Total TPH (C6 to C34)
U Analyte not reported at or above the method detection limit

40 0 40 80
Feet

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FIGURE 2-14

SITE 12
TPH RESULTS IN
GATEVIEW ARSENIC/TPH AREA

Second Five-Year Review

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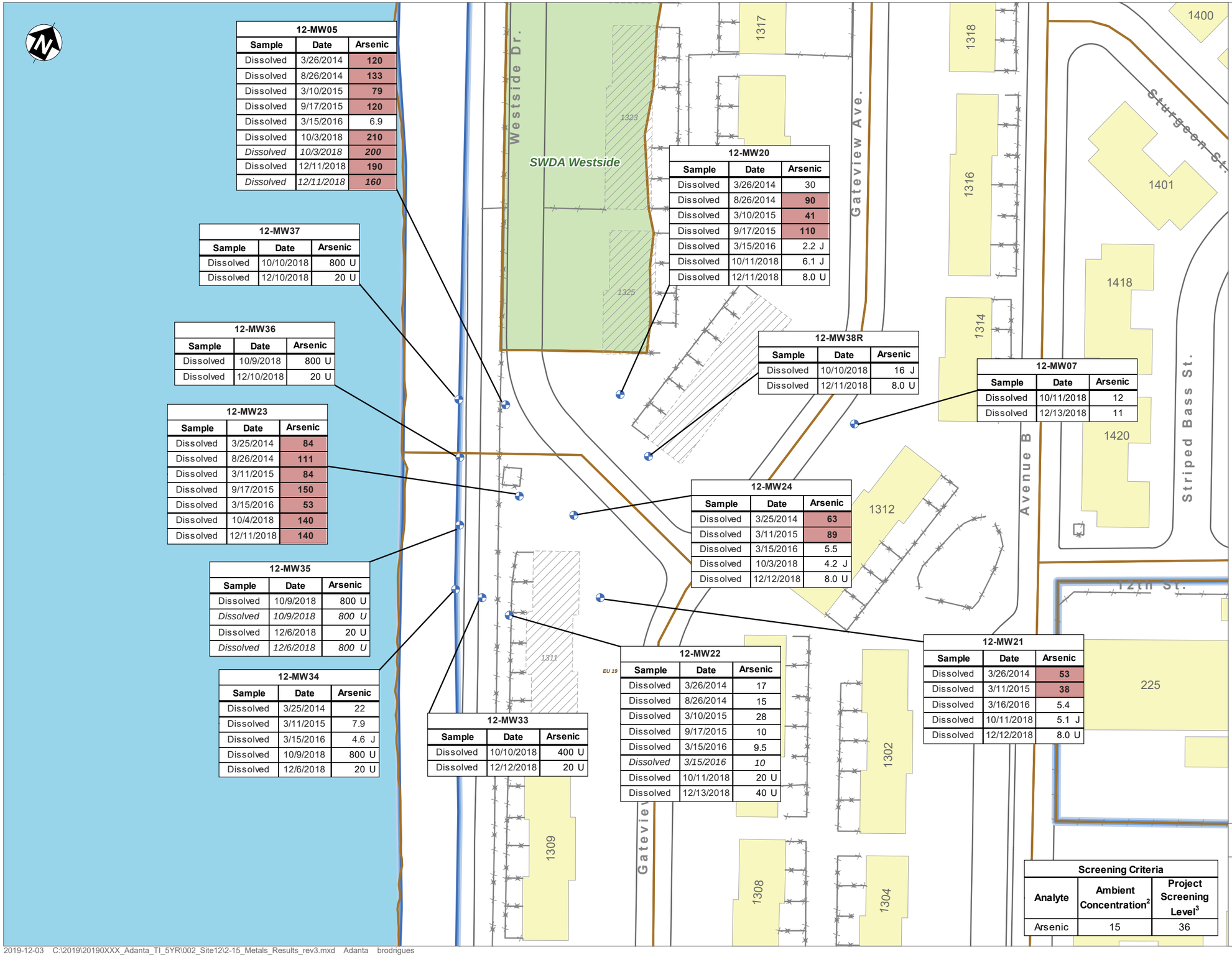

12-MW05

Sample	Date	Arsenic
Dissolved	3/26/2014	**120**
Dissolved	8/26/2014	**133**
Dissolved	3/10/2015	**79**
Dissolved	9/17/2015	**120**
Dissolved	3/15/2016	6.9
Dissolved	10/3/2018	**210**
Dissolved	*10/3/2018*	***200***
Dissolved	12/11/2018	**190**
Dissolved	*12/11/2018*	***160***

12-MW20

Sample	Date	Arsenic
Dissolved	3/26/2014	30
Dissolved	8/26/2014	**90**
Dissolved	3/10/2015	**41**
Dissolved	9/17/2015	**110**
Dissolved	3/15/2016	2.2 J
Dissolved	10/11/2018	6.1 J
Dissolved	12/11/2018	8.0 U

12-MW37

Sample	Date	Arsenic
Dissolved	10/10/2018	800 U
Dissolved	12/10/2018	20 U

12-MW38R

Sample	Date	Arsenic
Dissolved	10/10/2018	16 J
Dissolved	12/11/2018	8.0 U

12-MW36

Sample	Date	Arsenic
Dissolved	10/9/2018	800 U
Dissolved	12/10/2018	20 U

12-MW07

Sample	Date	Arsenic
Dissolved	10/11/2018	12
Dissolved	12/13/2018	11

12-MW23

Sample	Date	Arsenic
Dissolved	3/25/2014	**84**
Dissolved	8/26/2014	**111**
Dissolved	3/11/2015	**84**
Dissolved	9/17/2015	**150**
Dissolved	3/15/2016	**53**
Dissolved	10/4/2018	**140**
Dissolved	12/11/2018	**140**

12-MW24

Sample	Date	Arsenic
Dissolved	3/25/2014	**63**
Dissolved	3/11/2015	**89**
Dissolved	3/15/2016	5.5
Dissolved	10/3/2018	4.2 J
Dissolved	12/12/2018	8.0 U

12-MW35

Sample	Date	Arsenic
Dissolved	10/9/2018	800 U
Dissolved	*10/9/2018*	*800 U*
Dissolved	12/6/2018	20 U
Dissolved	*12/6/2018*	*800 U*

12-MW34

Sample	Date	Arsenic
Dissolved	3/25/2014	22
Dissolved	3/11/2015	7.9
Dissolved	3/15/2016	4.6 J
Dissolved	10/9/2018	800 U
Dissolved	12/6/2018	20 U

12-MW33

Sample	Date	Arsenic
Dissolved	10/10/2018	400 U
Dissolved	12/12/2018	20 U

12-MW22

EU 19

Sample	Date	Arsenic
Dissolved	3/26/2014	17
Dissolved	8/26/2014	15
Dissolved	3/10/2015	28
Dissolved	9/17/2015	10
Dissolved	3/15/2016	9.5
Dissolved	*3/15/2016*	*10*
Dissolved	10/11/2018	20 U
Dissolved	12/13/2018	40 U

12-MW21

Sample	Date	Arsenic
Dissolved	3/26/2014	**53**
Dissolved	3/11/2015	**38**
Dissolved	3/16/2016	5.4
Dissolved	10/11/2018	5.1 J
Dissolved	12/12/2018	8.0 U

Screening Criteria

Analyte	Ambient Concentration[2]	Project Screening Level[3]
Arsenic	15	36

- Monitoring Well Location
- Exposure Unit or Area of Interest
- SWDA Boundary
- Building
- Demolished Building
- Fence
- Road Curb
- Site 12 Boundary

Notes:

1. All concentrations shown in µg/L.
2. Ambient metals concentrations are based on samples collected using the low-flow purge and sample method and were not field filtered and are comparable to the total metals results reported in this table. Ambient metals concentrations are presented in the Final Technical Memorandum, Estimation of Ambient Concentrations of Metals in Groundwater, Naval Station Treasure Island, San Francisco, California (Tetra Tech 2001).
3. Arsenic is the only COC for groundwater. The project screening level is the remediation goal identified for arsenic in the Record of Decision signed by the Navy and the State in March 2017. The remediation goal is based on the California Toxics Rule.
4. Bold highlighted **value** exceeds the Project Screening Level. Results from 2014 through 2018 shown.
5. Duplicate samples shown in *italics*.

J Analyte reported between the reporting limit and method detection limit
µg/L Micrograms per liter
SWDA Solid Waste Disposal Area

40 0 40 80
Feet

NAVFAC Naval Facilities Engineering Command

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FIGURE 2-15
SITE 12
ARSENIC RESULTS IN GATEVIEW ARSENIC/TPH AREA

Second Five-Year Review
DCN: ADAN-6004-0000-0006

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2.3 SITE 21 – VESSEL WASTE OIL RECOVERY AREA

2.3.1 Site Description and Background

Site 21 covers approximately two acres and is also known as the Vessel Waste Oil Recovery Area. Site 21 is located along the southeastern edge of TI adjacent to Clipper Cove. Site 21 was originally a 400-foot long by 75-foot wide area along the shoreline. The site boundary has not been changed since the last Five-Year Review and includes the southeast corner of Building 3 and the open area between Building 3 and the shoreline (Figure 2-16).

The vessel waste oil recovery area operated between 1946 and 1995. Waste oil from ships was unloaded into floating cylindrical steel shells called donuts. The waste oil was transferred from the donuts to an onshore oil-water separation facility at Site 21. The separation facility consisted of five ASTs, each with a capacity of 2,000 gallons. These tanks were removed in 1995. The separation system was maintained on a paved area that was reportedly heavily stained, but little staining was still visible. Analytical data from monitoring well sampling at Site 21 demonstrated no pattern of elevated levels of TPH or petroleum-related constituents such as benzene, ethylbenzene, toluene and xylene in groundwater.

Building 3, near the waste oil recovery area, was used for various activities including aircraft maintenance and ship repair activities. A dip tank to clean aircraft parts was reportedly located at the southeastern corner outside of Building 3. No records are available that describe the types and quantities of chemicals used or disposed of during parts cleaning operations; however, using solvents tetrachloroethene (PCE) and trichloroethene (TCE) as degreasing agents for cleaning metal parts was widespread at the time of DON operations. Groundwater contamination at Site 21 is believed to be from small spills of PCE and TCE in the dip tank area during historical parts cleaning operations.

Several buildings were formerly or are currently located on or near Site 21 (Figure 2-17). A portion of Building 3 is within Site 21; this building housed the Shore Intermediate Maintenance Activity Facility, port and damage control services, and an applied instruction school for welding, cutting, and brazing. Chemicals stored in Building 3 included small quantities of battery fluid (sulfuric acid), several hundred gallons of paint, paint thinner, lubrication oil, and hydraulic fluid. Historically, Building 3 was used as an exhibition hall during the 1939 and 1940 Golden Gate International Exhibition and as an aircraft (Clipper Ship) maintenance area. The Building 3 Annex, a small two-story structure attached to the southeastern portion of Building 3, was formerly used as office space. A solvent dip tank located behind Building 3 was used to clean aircraft parts and motors.

Other buildings partially within or near Site 21 include former Building 111, an old firehouse that was abandoned because of earthquake damage and later demolished in 2017/2018; and Building 112, a former small storage and office building. Building 112 was subdivided and portions were renumbered to include Buildings 12A, 12B, and 12C (demolished). Building 12A has most recently been used as the Harbor Master's office and Building 12B has been used for parts and tool storage.

2.3.1.1 Land and Resource Use

The site was transferred from the DON to TIDA on September 20, 2016. Site 21 is currently used as a regional sailing and boat storage facility and Building 3 is subleased by TIDA for various industrial uses and occasional movie production (DON, 2013). A temporary trailer and deck used by the sailing center are also present on the site.

The future reuse of Site 21 is identified in the 2011 Final EIR (CCSF, 2011) and the 2011 TIDA Design for Development (TIDA, 2011) as mixed use (Building 3) and open space/recreational (shoreline).

There are no perennial surface water bodies located at Site 21. As discussed in Section 1.2.5.3, groundwater is not currently used as a source of drinking water and is not planned to be used as such in the future.

2.3.2 Response Action Summary

During the RI, VOC contamination was reported in groundwater immediately downgradient from the suspected location of the former dip tank. Subsequent basewide groundwater monitoring has continued to detect elevated concentrations of PCE, TCE, 1,2-dichloroethene (DCE), and vinyl chloride (VC).

2.3.2.1 Basis for Taking Action

Investigations of the contamination at Site 21, including the 2007 RI, identified a risk to future commercial/industrial workers through inhalation of VOCs that migrate from groundwater into indoor air, and a risk to future construction workers from dermal contact with, and inhalation of, VOCs in groundwater in a construction trench.

2.3.2.2 Previous Investigations

Table 2-16: Previous Investigations Summary – Site 21

Previous Investigations	Date	Investigation Summary
PA/SI	1988	The PA/SI report included observations made during the SI, information from personnel interviews, and a review of historical records and aerial photographs. The PA/SI report concluded that the areas of operation between Building 3 and San Francisco Bay (now Site 21) warranted further investigation because of the potential for soil and groundwater contamination from past site operations.
Phase I RI	1992	A Phase I basewide RI was conducted at the PA/SI sites to assess the nature and extent of soil and groundwater contamination at each site. During Phase I, 15 soil samples were collected from five locations at Site 21 to evaluate whether soils adjacent to the donut storage area and the oil-water separation system were contaminated with TPH. Soil samples were analyzed for metals, VOCs, SVOCs, and TPH-extractables. VOCs were not reported in samples from any of the five soil borings installed as part of the Phase I RI. TPH-diesel was not reported in concentrations that exceed the NAVSTA TI screening criteria. SVOCs were not reported in soil samples collected during the Phase I RI.
Phase II RI	1997	Phase IIA of the basewide RI was conducted to determine the mean hydraulic gradient and direction of groundwater flow throughout NAVSTA TI. During the basewide Phase IIB RI, soil and groundwater samples were collected at Site 21 from (1)

Previous Investigations	Date	Investigation Summary
		near the oil recovery system and fuel oil pipeline to assess the extent of petroleum contamination, and (2) near the sampling location where VOCs were detected in groundwater during the inactive fuel line investigation. Soil and groundwater samples were analyzed for metals, SVOCs, and TPH extractables. Groundwater samples were also analyzed for VOCs. Based on the results of the Phase I and Phase IIB RIs, an FS was recommended to evaluate remedial alternatives for VOC-contaminated soils, and additional groundwater sampling was recommended to assess potential migration of the chlorinated VOC groundwater plume.
Treatability Study	2005 – 2010	Phase 1 of the Site 21 treatability study was conducted from August 2005 to May 2006 to evaluate the effectiveness of enhanced anaerobic ISB of VOCs in groundwater. An ISB system was installed within the VOC plume and consisted of two well networks: (1) ISB injection point wells, and (2) PRB wells. The ISB system consisted of bioaugmentation of dechlorinating bacteria cultures and injection of sodium lactate in ISB injection point wells and EHC™ compound in PRB wells. The PRB wells were designed to prevent lateral migration of contaminated groundwater at the San Francisco Bay shoreline. EHC™ is a patented combination of controlled-release, complex carbon and zero valent iron used for in situ chemical reduction. Phase 2 of the treatability study was conducted from June 2008 to April 2010.
RI	2007	The RI presented the analytical results of all investigations completed at Site 21, including the inactive fuel line investigation, the Phase I and Phase II RIs, the EBS investigation, the basewide quarterly groundwater monitoring, and the Site 21 RI itself. Data collected during these investigations were used to evaluate site conditions for the HHRA and the SLERA. The HHRA concluded that VOCs in groundwater were the COCs at Site 21; no soil COCs were identified. The SLERA concluded that the industrial setting and managed habitat on NAVSTA TI were inadequate to support healthy terrestrial ecological populations. The SLERA concluded that COCs in groundwater from Site 21 do not pose an unacceptable risk to benthic invertebrates or other aquatic biota offshore because the groundwater VOC plume is stable and not migrating off-site.
FFS	2009	The FFS report provided a comparative analysis of remedial alternatives to address chlorinated VOCs in groundwater at Site 21. Enhanced anaerobic ISB was the only treatment technology carried forward for evaluation in the FFS report based on results of the Site 21 treatability study that demonstrated enhanced anaerobic ISB could reduce chlorinated VOCs to ethene gas. In

Previous Investigations	Date	Investigation Summary
		2007, during development of the FFS, the DON made a risk management decision to identify chemicals as COCs for nonresidential receptors if the chemical-specific ELCR exceeded 1×10^{-5} or the chemical-specific incremental hazard index exceeded 1. Based on this decision and pre-treatability study concentrations in groundwater, VOCs identified in groundwater did not pose risks to commercial/industrial workers or construction workers (the anticipated future receptors). However, the DON chose to develop RAOs and RGs for future commercial/industrial workers and future construction workers that address the intermediate degradation products produced during the in situ treatment. Three remedial alternatives were evaluated: (1) no action, (2) ICs, and (3) enhanced anaerobic groundwater ISB combined with groundwater monitoring.
Proposed Plan/Draft RAP	2011	The Proposed Plan/Draft RAP identified the DON's preferred alternative for Site 21 and invited the public to review and comment on the preferred alternative prior to selection of the final remedy.
Human Health Risk Assessment Addendum	2012	The soil gas investigation included collecting vadose zone soil gas samples to (1) define the extent of chlorinated VOCs in soil gas above and surrounding the chlorinated VOC groundwater plume and (2) calculate the potential human health risk associated with VI using the VOC concentrations in soil gas. The results of the soil gas investigation show that the extent of chlorinated VOC concentrations in soil gas is within the boundary of the chlorinated VOC groundwater plume. The risk assessment addendum included a calculation of human health risk using soil gas data rather than groundwater data, as was used in the RI HHRA. VI analysis confirmed that the potential human health risk from chlorinated VOCs in soil gas at Site 21 is within the risk management range for commercial workers.
ROD/Final RAP	2013	The selected RA addresses chlorinated VOCs in groundwater. Chlorinated ethenes are the VOCs of concern at Site 21. The remedy included ICs, which were implemented to: (1) prohibit all uses of groundwater including groundwater extraction except for dewatering purposes; (2) require evaluation and potential installation of ECs if new non-commercial buildings are constructed or the current land use of existing buildings changes; and (3) prohibit residential use unless appropriate ECs are implemented that are protective of residential receptors. The remedy also included soil gas and groundwater monitoring to confirm that the human health risk from the VI pathway remains within or below the risk management range for non-residential users.

Previous Investigations	Date	Investigation Summary
LUC RD	2013	Lists the ICs and land use restrictions required to limit potential exposure of future property users to VOCs that remain on site.
RACR	2015	Documents that the remedy is in place and has achieved the response complete milestone. Soil gas monitoring was recommended to support the Five-Year Review.
Soil Gas Monitoring	Ongoing	The groundwater and soil gas monitoring program was designed to confirm that the human health risk from the VI pathway remains in the acceptable range for commercial workers. Since previous soil gas monitoring has provided data for the vapor risk pathway in accordance with the ROD/Final RAP, additional periodic groundwater monitoring as part of the remedy was no longer performed. In accordance with the recommendations presented in the Final 2014 Annual Basewide Groundwater and Soil Gas Monitoring Report (Trevet, 2015), groundwater monitoring at Site 21 was discontinued after the two semiannual events in 2015. The first Five-Year Review concluded that soil gas concentrations at Site 21 showed a stable trend and further soil gas monitoring was not needed unless residential use was proposed. No sampling was conducted at Site 21 in 2016 and 2017. Soil gas monitoring was conducted in 2018 for this Five-Year Review and is discussed in the data review section.

Notes:

COC	Contaminant of concern	RG	Remediation goal
DON	United States Department of the Navy	RACR	Remedial action completion report
EC	Engineering controls	RAO	Remedial action objective
ELCR	Excess lifetime cancer risk	RAP	Remedial action plan
FS	Feasibility Study	RD	Remedial design
FFS	Focused feasibility study	ROD	Record of Decision
HHRA	Human health risk assessment	RI	Remedial investigation
IC	Institutional control	SI	Site inspection
ISB	In situ bioremediation	SLERA	Screening-level ecological risk assessment
LUC	Land use control		
NAVSTA TI	Former Naval Station Treasure Island	SVOC	Semivolatile organic compound
PA	Preliminary assessment	TPH	Total petroleum hydrocarbons
PRB	Permeable reactive barrier	VOC	Volatile organic compound
RA	Remedial action		

2.3.2.3 Remedial Action Objectives

The ROD/Final RAP for Site 21 was finalized in February 2013 (DON, 2013). The treatability study successfully treated VOCs in groundwater at Site 21, including the source area. However, the treatability study caused fluctuations in VOC concentrations in groundwater as degradation of VOCs was occurring. Therefore, the DON chose to develop RAOs and RGs for future commercial/industrial workers and future construction workers to address the degradation products produced during the treatability study. The DON developed the following RAOs to address exposure of future commercial/industrial and future construction workers to post-treatability study VOC concentrations:

- Prevent exposure of future commercial/industrial workers through inhalation of VOCs in groundwater that migrate through the subsurface to indoor air (VI) from groundwater that contains VOCs at concentrations above remedial goals.
- Prevent exposure of future construction workers through dermal contact with and inhalation of VOCs in groundwater that contains VOCs at concentrations above RGs in a construction trench.

2.3.2.4 Selected Remedy

The remedy consists of ICs, which will be implemented to: (1) prohibit all uses of groundwater including groundwater extraction except for dewatering purposes; (2) require evaluation and potential installation of engineering controls (EC) if new non-commercial buildings are constructed or the current land use of existing buildings changes; and (3) prohibit residential use unless appropriate ECs are implemented that are protective of residential receptors.

The remedy also includes soil gas monitoring to confirm that the human health risk from the VI pathway remains within or below the risk management range for non-residential users. Future landowners may be permitted to develop Site 21 to residential uses by implementing ECs and performing O&M on those controls to prevent exposure of future residents from inhalation of VOCs in groundwater through VI to indoor air.

Table 2-17: Site 21 Risk-Based Concentrations and RGs for Groundwater

Receptor	Chemical	Risk-Based Concentration [a] (µg/L)	Remedial Goal [b] (µg/L)
Current Commercial/Industrial Worker (Building 111) [c]	cis-1,2-DCE	9,450	NE
	PCE	326	NE
	TCE	1,520	NE
	trans-1,2-DCE	8,520	NE
	VC	165	NE
Future Commercial/Industrial Worker (Hypothetical Building Over Plume)	cis-1,2-DCE	9,450	NE
	PCE	326	NE
	TCE	1,520	NE
	trans-1,2-DCE	8,520	NE
	VC	165	165
Future Construction Worker	cis-1,2-DCE	712	712
	PCE	86	86
	TCE	56	56
	trans-1,2-DCE	1,420	1,420
	VC	336	NE
Hypothetical Future Resident (Adult and Child) [d]	cis-1,2-DCE	630	NE [d]
	PCE	5	NE [d]
	TCE	11.5	NE [d]
	trans-1,2-DCE	170	NE [d]
	VC	2	NE [d]

Notes:

a. Risk-based concentrations for carcinogenic chemicals (PCE, TCE, and VC) are based on a target cancer risk of 1E-05 for nonresidential receptors and a target cancer risk of 1E-06 for hypothetical future residential receptors. Risk-based concentrations for noncarcinogenic chemicals (cis-1,2-DCE and trans-1,2-DCE) are based on a target noncancer hazard quotient of 1.

b. Remedial goals were selected based on the lowest risk-based concentrations for a future commercial/industrial worker and future construction worker.

c. The risk-based concentrations for the current commercial/industrial worker at Building 111 are based on risk-based concentrations for a future commercial/industrial worker in a hypothetical building; risk-based concentrations for the future worker and hypothetical building are lower (that is, more health-protective) than Building 111-specific risk-based concentrations.

d. No RAO and no remedial goals were developed for the hypothetical future resident; however, residential use was evaluated as a hypothetical future land use scenario to develop the unrestricted use alternative.

e. Source: DON, 2017

µg/L Microgram per liter
DCE Dichloroethene
NE Not established
PCE Tetrachloroethene
TCE Trichloroethene
VC Vinyl chloride

2.3.2.5 Implementation Status

Table 2-18: Demonstration of Completion – Site 21

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Prevent exposure of future commercial/industrial workers through inhalation of VOCs in groundwater that migrate through the subsurface to indoor air (VI) from groundwater that contains VOCs at concentrations above remedial goals.	The ROD/Final RAP specified use of ICs to prohibit groundwater extraction and use, and prevent direct exposure. ICs were implemented at Site 21 under the final LUC RD issued in 2013 and included inspection and reporting requirements to ensure compliance. Annual inspections documented that ICs are effective at the site. During and after the treatability study, the DON has continued to conduct groundwater and soil gas monitoring at Site 21 and compared concentrations of COCs with RGs for groundwater and SSSL for soil gas. Groundwater monitoring was discontinued in 2016 and groundwater wells were removed in 2017 and 2018. The DON plans to collect soil gas data at Site 21 to support the 2025 Five-Year Review as long as LUCs are in place.	Yes
Prevent exposure of future construction workers through dermal contact with and inhalation of VOCs in groundwater that contains VOCs at concentrations above remedial goals in a construction trench.	The ROD/Final RAP specified use of ICs to prohibit groundwater extraction and use and prevent direct exposure. ICs were implemented at Site 21 under the final LUC RD issued in 2013 and included inspection and reporting requirements to ensure compliance. Inspections have been conducted annually.	Yes

Notes:

DON	United States Department of the Navy	RG	Remediation goal
IC	Institutional control	ROD	Record of decision
LUC	Land use control	SSSL	Soil gas site-specific risk-based screening level
RAO	Remedial action objective	VI	Vapor intrusion
RAP	Remedial action plan	VOC	Volatile organic compound

Land Use Control Implementation: The DON finalized the LUC RD report in October 2013 (DON, 2013b). A summary of the Site 21 ICs is below:

- Restrict interior building alterations resulting in the southeast corner of Building 3 being converted to a fully enclosed space (i.e., “non-enclosure area”) unless a VI assessment is performed.
- Restrict groundwater uses, including groundwater extraction, except for dewatering and sampling purposes unless performed in accordance with an approved site management plan (SMP).

- Restrict changes of current land use from commercial to residential at existing buildings, and the construction of new non-commercial or new residential buildings without the evaluation and potential installation of ECs to address VOCs.
- Restrict residential use until a VI assessment is conducted and ECs, if needed, are implemented that are protective of residential uses.
- Restrict land-disturbing activities without a DON-, DTSC-, and Regional Water Board-approved SMP.
- Restrict activities that may alter or interfere with survey monuments, groundwater monitoring wells or soil gas monitoring wells without prior DTSC approval. TIDA may request from the DON and DTSC a list of wells that have not been destroyed.

Site 21 was found suitable for transfer in the Finding of Suitability to Transfer (FOST) 5 report (DON, 2016). On September 20, 2016, Site 21 was transferred to TIDA under individual Quitclaim Deeds and a Covenant to Restrict Use of Property (CRUP) dated May 29, 2015 (Site 21 and 27 CRUP). In accordance with the Site 21 CRUP, the ICs associated with Site 21 require on-going annual inspections and monitoring. The DON previously conducted annual LUC inspections and prepared reports for Site 21 in 2015, 2016, and 2017 (TriEco-Tt, 2015b, 2016; Adanta, 2017). TIDA conducted the annual LUC inspections in 2018 and 2019 (Langan, 2018, 2019b). Findings from those inspections are summarized in Table 2-19.

Table 2-19: ICs for Site 21

IC Status	2015	2016	2017	2018	2019
In-compliance?	Partially – Damaged wells and well covers	Partially – Damaged well covers	Partially – Compromised well covers at the time of inspection	Partially – the transfer deed and CRUP prohibit a 50-foot by 50-foot area within the southeast corner of Building 3 from being enclosed (referred to as the non-enclosure area). A larger portion of Building 3 was observed as partially enclosed and this partial enclosure encroached on the non-enclosure area.	Yes, based on determination in 2018 that the partial enclosure area complies with the requirements detailed in the Site 21 CRUP

IC Status	2015	2016	2017	2018	2019
Resolved?	Yes, in Summer 2015	Yes, wells were part of the decommissioning conducted in March 2017	Yes, by March 2017, the wells were properly destroyed	Yes – TIDA contacted DTSC who reviewed the partial enclosure area and non-enclosure area and concluded that the partial enclosure area appears to be sufficiently larger than the non-enclosure area, and therefore complies with requirements detailed in the Site 21 CRUP.	No Issues

Notes:

CRUP Covenant to restrict use of property
DTSC Department of Toxic Substances Control
TIDA Treasure Island Development Authority

2.3.2.6 Systems Operations/Operation & Maintenance

No significant O&M costs have been incurred for Site 21. Minor costs are expected for maintenance of the monitoring network and for enforcement of administrative ICs.

2.3.3 Site 21 Progress Since Last Five-Year Review

The 2014 Five-Year Review made the following protectiveness statement for Site 21:

> *The remedy for Site 21 is protective of human health and the environment. Soil gas and groundwater monitoring confirm that human health risk from the vapor intrusion pathway remains in the acceptable range. The IC performance objectives specified in the ROD/Final RAP are being met by access controls until the time of transfer to prevent potential exposure. The effective implementation of IC performance objectives through land use and activity restrictions incorporated into deeds and CRUPs at the time of transfer will effectively prevent exposure to COCs and prevent activities that could damage the integrity of the remedy following transfer of the property.*

2.3.3.1 Recommendations and Follow-up Actions Status

No recommendations or follow-up actions were identified during the first Five-Year Review for Site 21.

2.3.4 Site 21 Five-Year Review Process

This section discusses the activities performed during the Five-Year Review process for Site 21. Section 1.3 outlines the general Five-Year Review process, which was applied to each site evaluated in this Five-Year Review.

2.3.4.1 Data Review

Monitoring results from the Five-Year Review period are evaluated in this section for groundwater samples collected from 2014 through 2015 (prior to groundwater wells being removed) and soil gas samples collected from 2014 through 2018. In addition, results from the 2019 indoor air evaluation are included in this section.

Table 2-20: Site 21 Remedy Summary

Medium	Risk Basis for Action/COCs	RAOs	Remedy/ Cleanup Goal	Performance Metric
Groundwater	Human Health Exposure – Dermal or inhalation/ VOCs	Prevent exposure for future construction workers	ICs	NA. The LUC RD did not include ICs for the construction worker because at the time of the LUC RD, COCs in groundwater did not pose an unacceptable risk to the construction worker. Groundwater monitoring was discontinued in 2016 because VOC concentrations were lower than RGs in sampling events completed in 2014 and 2015.
Soil Gas	Human Health Exposure – inhalation/ VOCs	Prevent exposure for future commercial/ industrial workers and residents	ICs	SSSLs for VOCs are detailed in Table 2-25: .

Notes:

COC	Contaminant of concern	RAP	Remedial action plan
IC	Institutional control	RG	Remediation goal
LUC RD	Land use control remedial design	ROD	Record of decision
NA	Not applicable	SSSL	Soil gas site-specific risk-based screening level
RAO	Remedial action objective	VOC	Volatile organic compound

Sampling was performed at the five established soil gas wells (21-SG-04, 21-SG-05, 21-SG-27, 21-SG-30, and 21-SG-31) in June and November 2018. Figure 2-18 shows the location of the soil gas wells. Samples were analyzed using USEPA method Toxic Organics-15 (TO-15). Soil gas wells 21-SG-27, 21-SG-30 and 21-SG-31 are located within Building 3 and represent sub-slab samples and 21-SG-04 and 21-SG-05 are located outside Building 3 in the subsurface.

The treatability studies at Site 21 conducted in 2005 to 2006 and 2008 to 2010 successfully treated VOCs in groundwater at Site 21, including the source area (Figure 2-19). A permeable reactive barrier (PRB) installed in 2005 near the downgradient end of the VOC plume prevented VOC migration toward the Bay. Analysis of groundwater monitoring data in 2014 and 2015

suggested concentrations of VOCs in groundwater exhibited stable, decreasing, or no trends, except for an increasing PCE trend in well 21-MW02A in 2015; however, all VOC concentrations were lower than RGs. Table D-8 presents groundwater data collected from within the center of the Site 21 groundwater plume in 2014 and 2015. Groundwater monitoring was discontinued in 2016 in accordance with the recommendation in the Final 2014 Annual Basewide Groundwater and Soil Gas Monitoring Report (Trevet, 2015) that was reviewed and approved by the regulatory agencies. Groundwater monitoring wells were subsequently decommissioned.

Table 2-21,Table D-7, and Figure 2-20 show the soil gas concentrations measured at all five of the monitoring locations. Note that chloroform is not a COC for commercial/industrial workers at Site 21, but is listed in Table 2-21 because it was detected at levels exceeding the soil gas site-specific risk-based screening level (SSSL) but within the risk management range of 10^{-4} to 10^{-6}. Concentrations of PCE and TCE measured in soil gas suggest no trend or increasing trends for locations inside Building 3 and stable, probably increasing, or no trends for exterior locations above the plume of VOCs in groundwater. Table 2-21 illustrates the Mann-Kendall trends estimated for soil gas concentrations at Site 21 (NOREAS, 2019b).

Table 2-21: Site 21 Soil Gas Mann-Kendall Results

Well	Analyte	Estimated Trend
21-SG-04	Chloroform	Stable
	PCE	Stable
	TCE	No Trend
21-SG-05	Chloroform	No Trend
	PCE	No Trend
	TCE	Probably Increasing
21-SG-27	Chloroform	Probably Decreasing
	PCE	No Trend
	TCE	No Trend
21-SG-30	Chloroform	Stable
	PCE	No Trend
	TCE	No Trend
21-SG-31	Chloroform	Decreasing
	PCE	Increasing
	TCE	Increasing

Note: Mann-Kendall results are taken from Appendix D of the Draft 2018 Annual Basewide Monitoring Report (NOREAS, 2019b).

Concentrations of VOCs in soil gas at locations 21-SG-27, 21-SG-30, and 21-SG-31 drive the need for a deed notice inside this portion of Building 3. Concentrations at locations 21-SG-27, 21-SG-30 suggest no trend. Analysis of concentrations at location 21-SG-31 suggest an increasing trend. Similarly, concentrations of VOCs in soil gas at locations 21-SG-04 and 21-SG-05 in the exterior area above the plume of VOCs in groundwater continue to indicate the need for the restriction on residential reuse of a portion of Site 21. Soil gas concentrations in this area suggest a stable trend, no trend, or probably increasing trend and levels similar to those measured in 2014 and 2015.

Although some VOCs in soil gas are above the SSSLs, the SSSLs were developed using the conservative end of the risk management range, 10^{-6}. The 2018 sub-slab soil gas

concentrations are within the cancer risk management range of 10^{-4} to 10^{-6} for commercial or industrial users. Soil gas concentrations at 21-SG-27, located underneath Building 3, are similar to the concentrations observed at the time that the ROD/Final RAP was signed, and therefore continue to slightly exceed the regulatory criteria with a hazard index (HI) greater than 1. The 2018 sub-slab soil gas concentrations indicate that the noncancer hazard for TCE is a concern because it may exceed 1, indicating the need to continue implementation of the ICs.

An indoor air evaluation was completed by TIDA, the current landowner at Building 3, in 2019 (Langan 2019c). That evaluation included a building survey, indoor and ambient air sampling, and sub-slab soil vapor sampling. The building survey was a visual inspection of the eastern corner of Building 3 (including the non-enclosure area) to identify potential preferential pathways for vapor migration, such as cracks or penetrations through the slab, and to identify potential sources of indoor air contaminants. The building survey identified small holes in the main room of Building 3 and noted that the area was vacant. Four indoor air samples, one duplicate indoor air sample, and two ambient air samples were collected outside the Site 21 boundary representing upwind and downwind conditions. Three sub-slab soil vapor samples and one duplicate sub-slab soil vapor sample were collected. Sample results were compared with the most conservative (lowest concentration) commercial land use screening criteria from the Regional Water Board (January 2019); the DTSC screening levels in HERO HHRA Note 3 (April 2019); or the USEPA RSLs (May 2019). Results for indoor air indicate that PCE was not detected above its screening criterion of 0.47 µg/m^3 and TCE was not detected above its laboratory reporting limit of 0.0537 µg/m^3. Results for indoor air also indicated that benzene, ethylbenzene, naphthalene, and carbon tetrachloride were detected above their screening criteria. However, benzene, ethylbenzene, and naphthalene were not detected in sub-slab soil vapor suggesting that the indoor air concentrations are a result of an aboveground source rather than vapor intrusion from the subsurface. Carbon tetrachloride concentrations in indoor air closely matched the concentrations in ambient air suggesting that indoor air concentrations are related to ambient conditions rather than vapor intrusion from the subsurface. Results for sub-slab soil vapor indicate PCE was detected above its screening criterion of 67 µg/m^3 in the four sub-slab samples (including the duplicate sample); TCE was detected above its screening criterion of 100 µg/m^3 in two of the four sub-slab samples; and chloroform was detected above its screening criterion of 18 µg/m^3 in one of the four sub-slab samples (Langan 2019c).

2.3.4.2 Site Inspection

The DON and Adanta, Inc. conducted a site inspection at Site 21 for this Five-Year Review on January 8, 2019. The purpose of the site inspection was to review and document current site conditions and evaluate visual evidence on the protectiveness of the remedial systems. Site access and general site conditions were also evaluated during the inspection. Appendix A contains the site inspection checklists, and Appendix B contains the photographic log, which documents observations made during the inspection.

Observations made during the site inspection indicated that the remedy monitoring network and security measures are being implemented. Site inspection identified missing bolts or damaged wells boxes in some monitoring wells.

2.3.5 Site 21 Technical Assessment

2.3.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Table 2-22: Technical Evaluation – Question A (Site 21)

Question	Summary
RA Performance	**Yes.** Groundwater monitoring was discontinued in 2016 because groundwater monitoring conducted in 2014 and 2015 indicated that VOC concentrations were lower than RGs. The network of soil gas monitoring wells provides sufficient data to assess the condition of soil gas at the site. The soil gas results continue to indicate the need for ICs and a deed notice. In 2018, TCE concentrations in soil gas at 21-SG-05 were identified as probably increasing and TCE and PCE concentrations in soil gas at 21-SG-31 were identified as increasing. In 2018, TCE concentrations at 21-SG-05 were similar to historical concentrations of TCE measured in 2014 and 2015. PCE and TCE concentrations in soil gas at 21-SG-31 have increased from concentrations reported in 2014 and 2015; however, the concentrations measured in 2018 remain below the current commercial/industrial worker soil gas SSSL. PCE and TCE concentrations at the other three soil gas sample wells are similar to concentrations measured in 2014 and 2015.
System Operations/O&M	**Yes.** No O&M issues have been identified for Site 21.
Implementation of Institutional Controls	**Yes.** On September 20, 2016, Site 21 was transferred to TIDA. In accordance with the Site 21 CRUP, ICs associated with Site 21 require on-going (annual) inspections and monitoring. The DON previously conducted annual IC compliance monitoring in 2015, 2016 and 2017. TIDA conducted the annual IC compliance inspection in 2018 (Langan, 2018). minor non-compliance items were discovered during the annual inspections but were addressed in a timely manner, as detailed in Section 2.3.2.5.

Notes:

CRUP	Covenant to restrict use of property	PCE	Tetrachloroethene
DON	Department of the Navy	RA	Remedial action
DTSC	California Department of Toxic Substances Control	SSSL	Soil gas site-specific risk-based screening level
IC	Institutional control	TCE	Trichloroethene
LUC	Land use control	TIDA	Treasure Island Development Authority
O&M	Operations and maintenance	VOC	Volatile organic compound

2.3.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of Remedy Selection Still Valid?

USEPA's guidance document for Five-Year Reviews identifies several areas for consideration in evaluating whether the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid (USEPA, 2001). Areas of consideration include changes in standards identified as ARARs and TBC criteria in the ROD/Final RAP, changes in exposure pathways, changes in toxicity and other contaminant characteristics, changes in risk assessment methods, and expected progress toward meeting RAOs.

The DON reviewed the ARARs, exposure assumptions, toxicity data, and derivation of the cleanup levels used to develop the RAOs for Site 21. The DON evaluated the protectiveness of the RG that was selected in the ROD/Final RAP. This was done by dividing the RG by a current risk-based screening level and either multiplying by 1E-06 to estimate the cancer risk or by 1 to estimate the noncancer hazard for a given chemical. The results of this evaluation were compared with standard risk thresholds in the following table for Question B to determine whether the RG is still protective.

The response to Question B is Yes, the assumptions made at the time of remedy selection remain valid. There have not been any changes to the ARARs identified in ROD/Final RAP that would affect the protectiveness of the remedies. The soil gas screening levels for residential and commercial/industrial worker VI exposure are protective.

Table 2-23: Technical Evaluation – Question B (Site 21)

Question	Summary
Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria	In September 2018, the State of California promulgated a regulation at Cal. Code Regs. title 22, Division 4.5, Chapter 51, Article 2, §§ 69020, 69021, and 69022. These provisions are applicable to cleanups done under the authority of California Health and Safety Code, Division 20, Chapters 6.8 and 6.82. The purposes of these provisions include the use of the toxicity criteria identified in Appendix I, Tables A and B for human health risk assessments, human health risk-based screening levels, and human health risk-based RGs. None of these regulations was selected as an ARAR in the ROD/Final RAP because the regulations had not been promulgated at the time the ROD/Final RAP was finalized. Therefore, the regulations were evaluated to determine if they call into question the protectiveness of the remedy selected in the ROD/Final RAP. The regulations at Cal. Code Regs. tit. 22 §§ 69020, 69021, and 69022 are not applicable to the RAs at Site 21 because Site 21 is being addressed under CERCLA and these regulations are applicable to sites being addressed under the authority of the California Health and Safety Code. The following regulations are relevant and appropriate because the regulations address the same chemicals that were released at the Site and the regulations prescribe a method by which remediation goals are determined: Cal. Code Regs. tit. 22 §§ 69021 and 69022(c). These sections use Appendix I, Tables A and B as the primary source of toxicity criteria when determining risk-based RGs.

Question	Summary
	Groundwater: The newly promulgated criteria affect PCE, which was identified as a COC for a construction worker (dermal contact with groundwater) and current and future commercial/industrial workers (inhalation of groundwater vapors in indoor air), and VC, which was identified as a COC for the current and future commercial/industrial workers (inhalation of groundwater vapors in indoor air) at Site 21. Effects of these toxicity criteria on the RGs selected in the ROD/Final RAP are presented in Table 2-24, which are derived based on a target cancer risk of 1E-05 and target noncancer hazard of 1. The newly promulgated toxicity criterion for PCE does not affect the protectiveness of the RG because concentrations developed with the new criteria are only slightly different than the RGs. Applying the current DTSC regulatory criteria, the RG selected in the ROD/Final RAP for PCE results in a cancer risk of 1E-05, which is in the risk management range for carcinogens, and a noncancer hazard of 0.3, which is below the noncancer threshold of 1. The newly promulgated toxicity criterion for VC does not affect the protectiveness of the RG, which was based on a VI risk from groundwater vapors in indoor air, because site-specific screening levels for soil gas were developed for evaluating VI exposure. Applying the current DTSC regulatory criteria, the RG selected in the ROD/Final RAP for VC results in a cancer risk of 1E-05, which is in the risk management range for carcinogens, and a noncancer hazard of 0.2, which is below the noncancer threshold of 1. ***Soil Gas:*** The newly promulgated criteria affect chloroform, naphthalene, PCE, TCE, and VC, identified as risk drivers for potential VI risk in the 2012 HHRA Addendum. Effects of these toxicity criteria on the soil gas screening levels are presented in Table 2-25, which are derived based on a target cancer risk of 1E-06 and target noncancer hazard of 1. The newly promulgated toxicity criteria do not affect the protectiveness of the soil gas screening levels attached to the Site 21 ROD/Final RAP because the concentrations developed with the newly promulgated toxicity criteria are only slightly different from the soil gas screening levels in the ROD/Final RAP, except for VC. The newly promulgated toxicity criteria for VC ultimately do not affect the protectiveness of the soil gas screening level for VC based on the cancer risks of 2E-06 for future commercial/industrial workers and 4E-06 for future residents, which do not exceed the risk management range, and noncancer hazards of 0.0009 for future commercial/industrial workers and 0.0003 for future residents, which do not exceed 1 for either receptor. In addition, VC has been consistently not detected in soil gas. There were no changes to other ARARs selected in the ROD/Final RAP that affect the protectiveness of the remedy.
Changes in Toxicity and Other Contaminant Characteristics	***Groundwater***: The groundwater RGs are based on construction worker exposure except for VC, which is based on a commercial worker scenario; however, groundwater monitoring was discontinued following the 2015 event because RGs were achieved and the focus shifted to soil gas and sub-slab sampling as the preferred medium by which VI risks are assessed.

Question	Summary
	Current risk-based criteria are shown on Table 2-24. The 2007 HHRA identified PCE as a COC for the future construction worker and the 2012 HHRA Addendum did not identify any COCs for the future construction worker. Therefore, PCE is the only COC reviewed here for construction worker exposure to groundwater. Table 2-24 shows the groundwater RGs for all COCs identified in the ROD/Final RAP and are derived based on a target cancer risk of 1E-05 (for non-residential receptors) and target noncancer hazard of 1. The noncancer reference dose used in the 2007 HHRA for PCE of 1.0E-02 mg/kg-day has been revised to 6.0E-03 mg/kg-day. However, the PCE RG remains protective because when using the current toxicity criteria, the RG concentration results in a cancer risk of 2E-05, which is within the risk management range, and a noncancer hazard of 0.3, which does not exceed the noncancer threshold of 1. Additionally, the 2015 groundwater data showed maximum concentrations of PCE (2.9 µg/L), TCE (4.2 µg/L), cis-1,2-DCE (14 µg/L) and trans-1,2-DCE (4.8 µg/L) are all below the RGs selected in the ROD/Final RAP, below the current USEPA and DTSC screening criteria, and, for PCE, are also below the DTSC newly promulgated criteria. The 2015 groundwater data showed a maximum concentration of 6.3 µg/L for VC, which is below the RG based on the commercial/industrial worker and the current USEPA groundwater VI screening level for commercial/industrial worker exposure, but is above the current Regional Water Board groundwater VI ESL for commercial/industrial worker exposure. Based on the groundwater data, VC in groundwater was only identified as a COC for potential VI risk; however, soil gas is the preferred medium for evaluating potential VI risk. ***Sub-slab and Subsurface Soil Gas***: Sub-slab and subsurface soil gas screening levels were developed in the 2012 Risk Assessment Addendum. The more health protective of the Cal/EPA and USEPA IURs and RfCs were used. Updated soil gas screening levels are provided in Table 2-25, which are derived based on a target cancer risk of 1E-06 and target noncancer hazard of 1. The toxicity criteria for TCE and VC are consistent with what is currently recommended by OEHHA (DTSC, 2019). Toxicity criteria for PCE used in the development of the screening levels have been updated (DTSC, 2019). The RfCs for cis-, and trans-1,2-dichloroethene have also been updated by DTSC (DTSC, 2019). The inhalation toxicity values for cis- and trans-1,2-dichloroethene are extrapolated by DTSC based on an oral exposure. The USEPA does not recommend inhalation toxicity values for cis- or trans-1,2-dichloroethene and therefore inhalation risk is not estimated using USEPA criteria. The soil gas screening levels are protective under both the residential and commercial/industrial scenarios. Additionally, concentrations of cis-1,2-DCE and trans-1,2-DCE in soil gas are consistently below the soil gas screening levels for residential and commercial/industrial receptors or are not detected. Concentrations of VC in soil gas are consistently not detected at Site 21 (see Table D-7 of Appendix D). The current toxicity criteria do not affect the protectiveness of the soil gas screening levels because when using the current criteria,

Question	Summary
	the screening level concentrations result in cancer risks ranging from 1E-07 to 2E-06 for future commercial/industrial workers and from 4E-08 to 4E-06 for future residents, which are within the risk management range. In addition, the noncancer hazards range from 0.0009 to 0.8 for future commercial/industrial workers and from 0.0003 to 0.3 for future residents, which do not exceed the noncancer threshold of 1 for either receptor.
Changes in Risk Assessment Methods	The DTSC, Regional Water Board, and USEPA currently implement a default attenuation factor of 0.03 for VI screening levels. The DON conservatively used a sub-slab attenuation factor of 0.025 for evaluating current and future commercial/industrial use of existing buildings at Site 21, which is reflected in the soil gas screening levels attached to the ROD/Final RAP. Table 2-25 presents updated soil gas screening levels based on the USEPA, DTSC, and Regional Water Board default attenuation factor of 0.03, and are derived based on a target cancer risk of 1E-06 and target noncancer hazard of 1. Revised USEPA, DTSC, and Regional Water Board soil gas screening levels for future residential receptors are similar to the residential soil gas screening levels provided in the ROD/Final RAP for chloroform, naphthalene, PCE, and TCE, except for the USEPA soil gas screening level for PCE which is greater than the ROD/Final RAP soil gas screening level. The ROD/Final RAP residential soil gas screening level for VC is higher than the Regional Water Board soil gas ESL but is less than the revised residential USEPA soil gas screening level. For all chemicals, residential cancer risks and noncancer hazards associated with concentrations set at the ROD/Final RAP soil gas screening levels range from 4E-08 to 4E-06 for future residents, which are within or below the risk management range for carcinogens. In addition, the noncancer hazards range from 0.0003 to 0.3 for future residents, which are less than the noncancer threshold of 1. Thus, the residential soil gas screening levels from the ROD/Final RAP remain protective. In addition, the commercial/industrial soil gas screening levels for chloroform, naphthalene, PCE, TCE, and VC listed in the ROD/Final RAP are all lower than the revised USEPA soil gas screening levels and Regional Water Board soil gas ESLs; thus, the commercial/industrial soil gas screening levels listed in the ROD/Final RAP remain protective. The cancer risks range from 1E-07 to 2E-06 for future commercial/industrial workers, which are either within or below the risk management range for carcinogens. In addition, the noncancer hazards range from 0.0009 to 0.8 for future commercial/industrial workers, which are less than the noncancer threshold of 1. In addition, changes in exposure parameters for the evaluation of the construction worker include adult body weight increasing from 70 kg to 80 kg, and skin surface area increasing from 5,700 cm^2 to 6,032 cm^2. Similarly, changes in exposure parameters for the evaluation of commercial/industrial workers and residents include an adult body

Question	Summary
	weight increasing from 70 kg to 80 kg. Lastly, the exposure duration for the adult resident decreased from 24 years to 20 years.
Changes in Exposure Pathways	This Five-Year Review identified no changes in exposure pathways, physical site conditions, or land use since the remedy was selected. The ICs prevent exposures to groundwater and vapor intrusion. The DON documented in the 2013 ROD/Final RAP for Site 21 the land use and therefore exposure potential would be limited by likely future commercial/industrial and open space use. Currently the commercial use land is occupied by leased commercial space at Building 3 and the Treasure Island Sailing Center; outside of buildings, the ground is paved. This Five-Year Review identified no new contaminants not previously addressed by the selected remedy. Land use at Site 21 has not changed since the ROD/Final RAP was signed; however, land use at NAVSTA TI is expected to change as parcels are transferred and the land is redeveloped. Exposure assumptions developed in the HHRA considered the potential future exposures based on the expected reuses. The future redevelopment plan (CCSF, 2011) did not introduce any new exposure scenarios that were not already taken into account by the HHRA and ROD/Final RAP.
Expected Progress Towards Meeting RAOs	The remedy is progressing as expected. ICs are in place to prevent exposure and soil gas is being monitored.

Notes:

§	Section
µg/L	Micrograms per liter
mg/kg-day	Milligrams per kilogram per day
ARAR	Applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chemical of concern
DCE	Dichloroethene
DON	United States Department of the Navy
DTSC	Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
IC	Institutional control
IUR	Inhalation unit risk
NAVSTA TI	Former Naval Station Treasure Island
PCE	Tetrachloroethene
RA	Remedial action
RAO	Remedial action objective
RAP	Remedial action plan
RfC	Reference concentration
RG	Remediation goal
ROD	Record of decision
TBC	To be considered
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
VC	Vinyl chloride
VI	Vapor intrusion

2.3.5.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No human health or ecological risks have been identified. No other information has been identified to suggest that the remedies may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have affected the protectiveness of the remedies.

2.3.6 Site 21 Issues, Recommendations, and Follow-Up Actions

Issue	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
Soil gas concentrations at Site 21 exceed soil gas screening levels and are increasing in select wells.	No	No	Evaluate amount and frequency of soil gas data collection in support of the 2025 Five-Year Review under the Basewide Monitoring Program.	DON	DTSC	May 2025

2.3.7 Site 21 Protectiveness Statement

Site(s): Site 21	**Protectiveness Determination**: Protective
Protectiveness Statement: The remedy for Site 21 is protective of human health and the environment. RAOs have been met, the LUC RD has been finalized, ICs are in place to prevent exposure to COCs in soil gas, annual LUC inspections are occurring, and the recent indoor air evaluation indicates that concentrations of PCE and TCE in indoor air do not exceed indoor air screening levels for current users. However, soil gas concentrations at Site 21 exceed soil gas screening levels and are increasing in select wells. To ensure ongoing protectiveness, soil gas monitoring locations and frequency will be evaluated under the Basewide Monitoring Program.	

SITE 21 FIGURES

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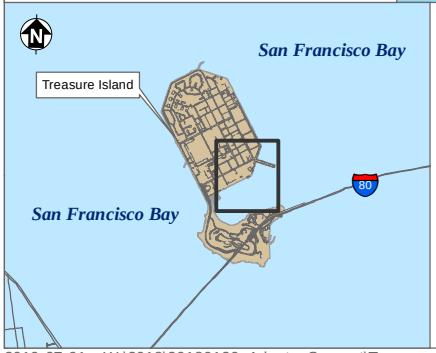
Notes:
Area boundaries are approximate and not based on legal descriptions

200 0 200 400
Feet



Site 21 Boundary
Building
Road

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Figure 2-16
SITE 21
GENERAL LOCATION MAP

Second Five-Year Review

2019-07-01 W:\2018\20180120_Adanta_Support\Treasure_Island\04_IR21_5YR\2.3-1_GeneralLocMap.mxd Adanta brodrigues

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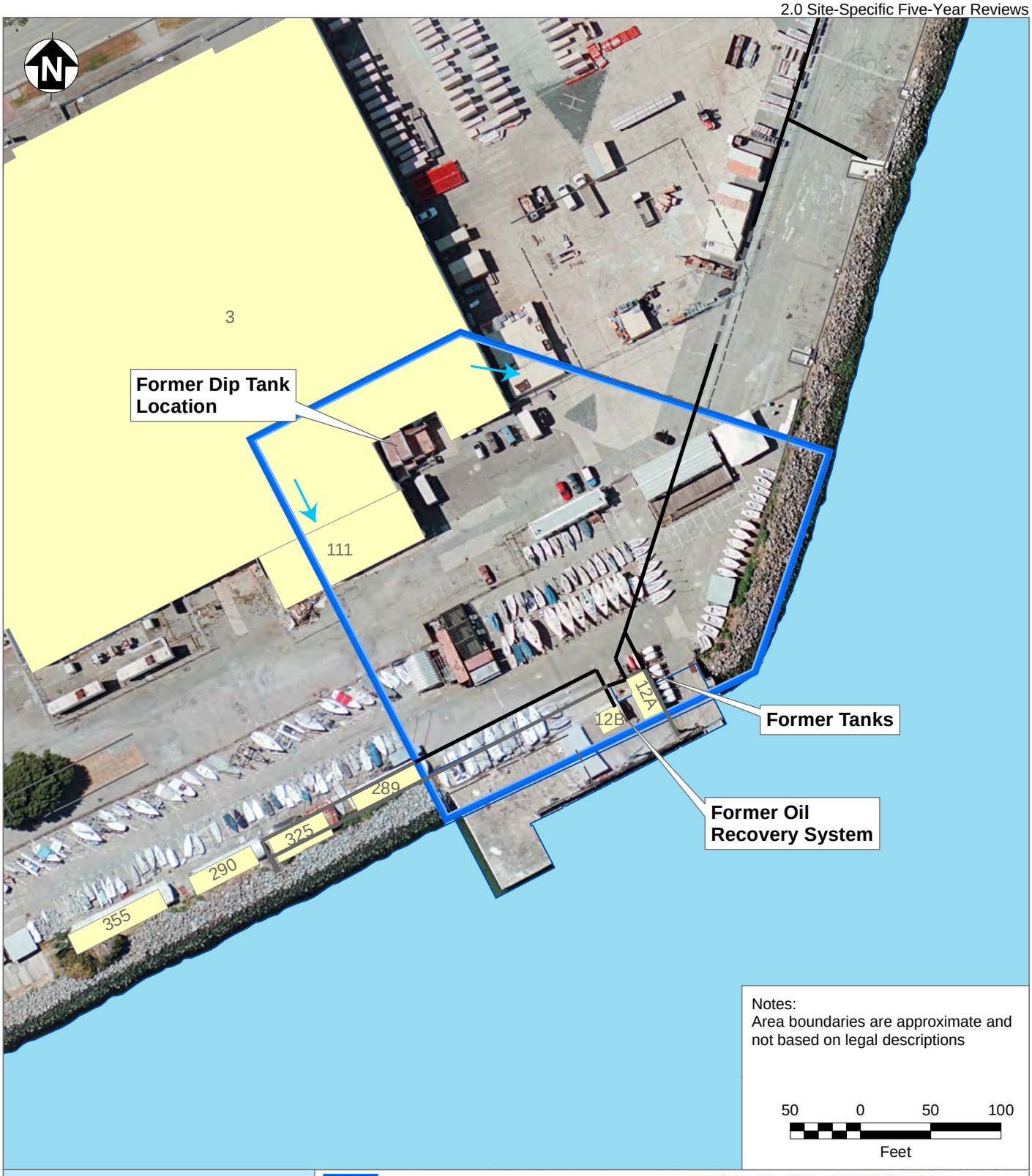

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

Figure 2-17
SITE 21
SITE PLAN

Second Five-Year Review

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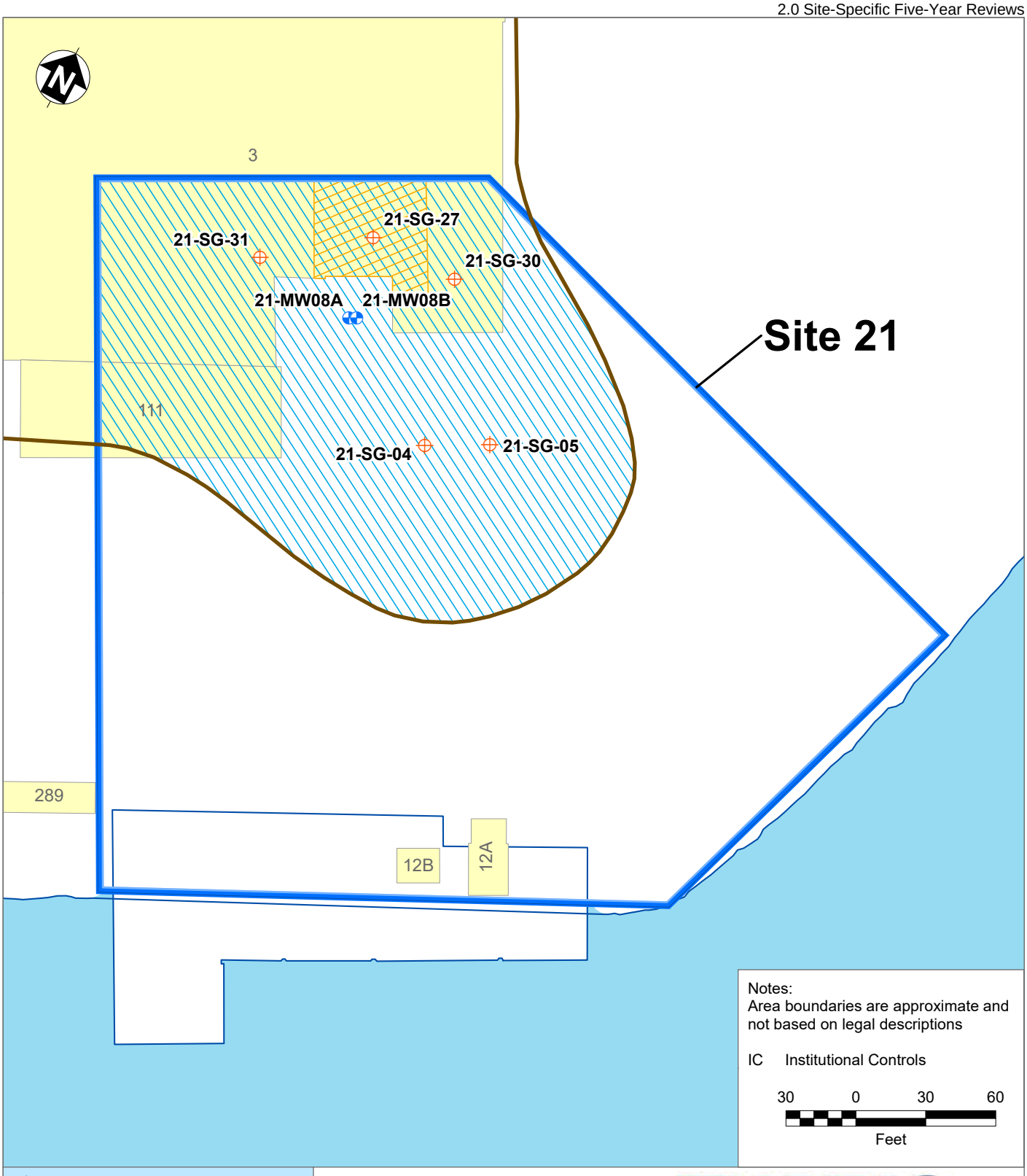

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FIGURE 2-18

SITE 21
AREAS REQUIRING INSTITUTIONAL CONTROLS

Second Five-Year Review

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21 MW02A					
Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
3/25/2014	3.2	1.1	0.30 J	0.51	0.34 J
8/25/2014	2.6	1.1	0.34 J	0.40 J	0.32 J
3/10/2015	0.94	0.37 J	0.28 J	0.29 J	0.31 J
3/10/2015	*1.3*	*0.41 J*	*0.30 J*	*0.29 J*	*0.32 J*
9/17/2015	2.9	0.69 J	0.56 J	0.45 J	0.54 J

21 MW09A					
Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
3/25/2014	1.3	4.4	18	3.0	5.0
8/25/2014	0.52	1.4	12	1.8	6.6
3/10/2015	1.1	4.2	14	1.9	4.1
9/17/2015	1.0 U	1.5	11	1.3	6.3

21 IP07					
Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
3/25/2014	0.50 U	0.50 U	0.50 U	5.6	0.19 J
8/25/2014	0.50 U	0.50 U	0.15 J	5.4	0.58
3/10/2015	0.50 U	0.50 U	0.50 U	4.8	0.96

Site 21

3
111
289
12B
12A

Notes:
DCE Dichloroethene
PCE Tetrachloroethene
RG Remediation goal
TCE Trichloroethene

30 0 30 60
Feet

Chemical	RG
PCE	86
TCE	56
cis-1,2-DCE	712
trans-1,2-DCE	1,420
Vinyl Chloride	165

San Francisco Bay
Treasure Island
San Francisco Bay
80

Groundwater Monitoring Well
Site 21 Boundary
Building

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Naval Station Treasure Island
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FIGURE 2-19

SITE 21
GROUNDWATER RESULTS

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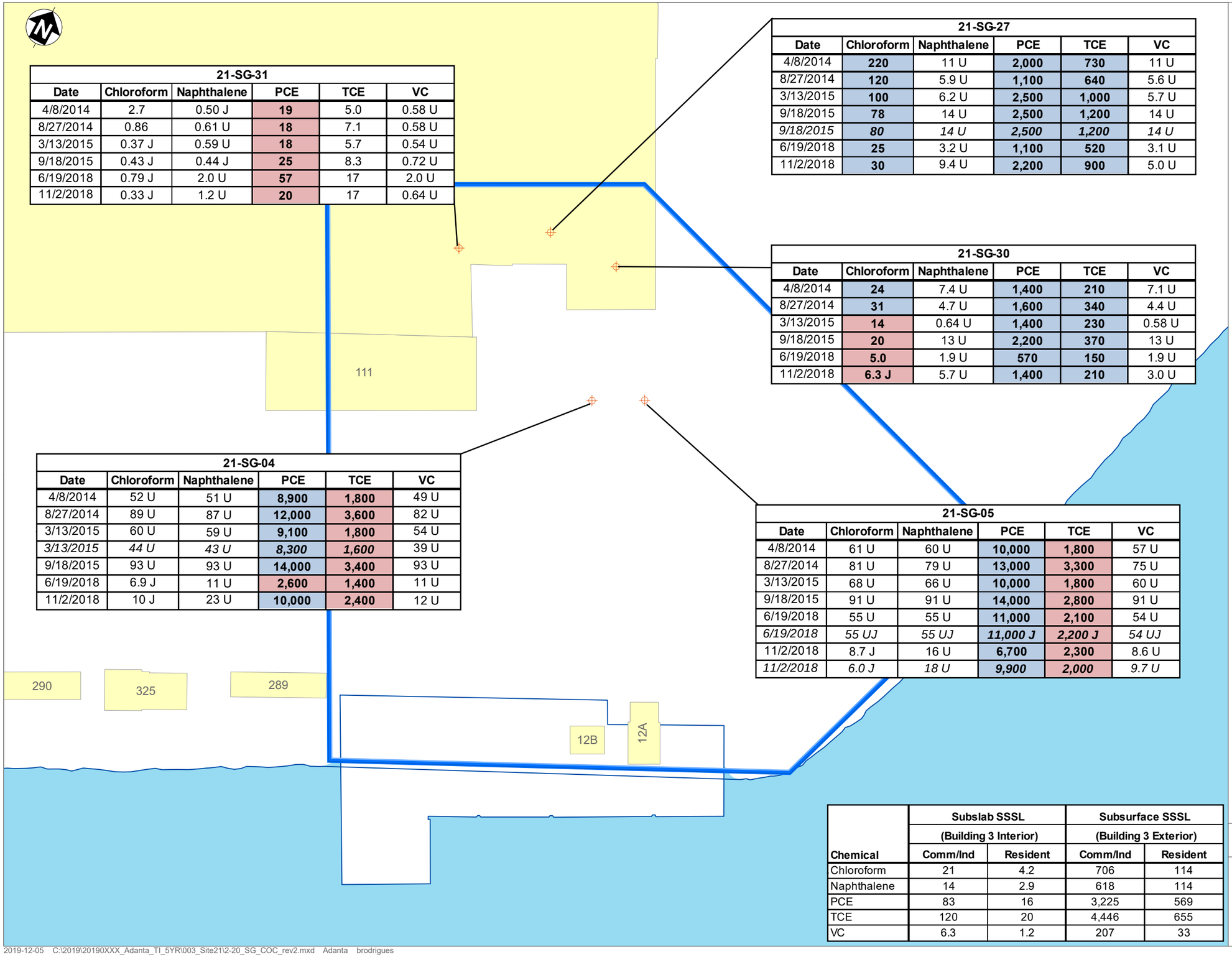

21-SG-31

Date	Chloroform	Naphthalene	PCE	TCE	VC
4/8/2014	2.7	0.50 J	**19**	5.0	0.58 U
8/27/2014	0.86	0.61 U	**18**	7.1	0.58 U
3/13/2015	0.37 J	0.59 U	**18**	5.7	0.54 U
9/18/2015	0.43 J	0.44 J	**25**	8.3	0.72 U
6/19/2018	0.79 J	2.0 U	**57**	17	2.0 U
11/2/2018	0.33 J	1.2 U	**20**	17	0.64 U

21-SG-27

Date	Chloroform	Naphthalene	PCE	TCE	VC
4/8/2014	**220**	11 U	**2,000**	**730**	11 U
8/27/2014	**120**	5.9 U	**1,100**	**640**	5.6 U
3/13/2015	**100**	6.2 U	**2,500**	**1,000**	5.7 U
9/18/2015	**78**	14 U	**2,500**	**1,200**	14 U
9/18/2015	***80***	*14 U*	***2,500***	***1,200***	*14 U*
6/19/2018	**25**	3.2 U	**1,100**	**520**	3.1 U
11/2/2018	**30**	9.4 U	**2,200**	**900**	5.0 U

21-SG-30

Date	Chloroform	Naphthalene	PCE	TCE	VC
4/8/2014	**24**	7.4 U	**1,400**	**210**	7.1 U
8/27/2014	**31**	4.7 U	**1,600**	**340**	4.4 U
3/13/2015	**14**	0.64 U	**1,400**	**230**	0.58 U
9/18/2015	**20**	13 U	**2,200**	**370**	13 U
6/19/2018	**5.0**	1.9 U	**570**	**150**	1.9 U
11/2/2018	**6.3 J**	5.7 U	**1,400**	**210**	3.0 U

21-SG-04

Date	Chloroform	Naphthalene	PCE	TCE	VC
4/8/2014	52 U	51 U	**8,900**	**1,800**	49 U
8/27/2014	89 U	87 U	**12,000**	**3,600**	82 U
3/13/2015	60 U	59 U	**9,100**	**1,800**	54 U
3/13/2015	*44 U*	*43 U*	***8,300***	***1,600***	39 U
9/18/2015	93 U	93 U	**14,000**	**3,400**	93 U
6/19/2018	6.9 J	11 U	**2,600**	**1,400**	11 U
11/2/2018	10 J	23 U	**10,000**	**2,400**	12 U

21-SG-05

Date	Chloroform	Naphthalene	PCE	TCE	VC
4/8/2014	61 U	60 U	**10,000**	**1,800**	57 U
8/27/2014	81 U	79 U	**13,000**	**3,300**	75 U
3/13/2015	68 U	66 U	**10,000**	**1,800**	60 U
9/18/2015	91 U	91 U	**14,000**	**2,800**	91 U
6/19/2018	55 U	55 U	**11,000**	**2,100**	54 U
6/19/2018	*55 UJ*	*55 UJ*	***11,000 J***	***2,200 J***	*54 UJ*
11/2/2018	8.7 J	16 U	**6,700**	**2,300**	8.6 U
11/2/2018	*6.0 J*	*18 U*	***9,900***	***2,000***	*9.7 U*

Chemical	Subslab SSSL (Building 3 Interior)		Subsurface SSSL (Building 3 Exterior)	
	Comm/Ind	Resident	Comm/Ind	Resident
Chloroform	21	4.2	706	114
Naphthalene	14	2.9	618	114
PCE	83	16	3,225	569
TCE	120	20	4,446	655
VC	6.3	1.2	207	33

Soil Gas Sample Location
Site 21 Boundary
Building

Notes:
1. All concentrations measured in µg/m^3.
2. SSSLs are based on site-specific risk-based screening levels presented in the Final HHRA Addendum, IR Site 21, Naval Station Treasure Island, San Francisco, California (Shaw 2012b) for future building slab on grade without engineered fill.
3. Duplicate sample are *italicized*.
4. Bolded highlighted RED values exceed the residential SSSL.
   Bolded highlighted BLUE values exceeds the commercial/industrial SSSL.

Comm/Ind Commercial / Industrial
J Validation flag signifying analyte was reported between the reporting limit and the method detection limit
µg/m^3 Micrograms per cubic meter
PCE Tetrachloroethene
SSSL Site-specific screening level
TCE Trichloroethene
U Validation flag signifiying analyte not reported at or above the method detection limit
VC Vinyl chloride

30 0 30 60
Feet

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-20

SITE 21
SOIL GAS RESULTS

Second Five-Year Review

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SITE 21 TABLES

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Table 2-24: Site 21 Groundwater Cleanup Goals

Primary COC in Groundwater [1]	ROD/ Final RAP RG	Current USEPA Criteria [3]		Current DTSC Criteria [4]		DTSC Regulation Based Criteria – Toxicity Criteria for HHRA [4,10]	
		Construct Worker [5,6,7]	Comm/Ind Worker [8]	Construct Worker [5,6,7]	Comm/Ind Worker [9]	Construct Worker	Comm/Ind Worker
cis-1,2-DCE	712	417	NE	198	NE	Not Applicable	NE
PCE	86	336	NE	83	NE	83	NE
TCE	56	51	NE	51	NE	Not Applicable	NE
trans-1,2-DCE	1,420	4,169	NE	1,972	NE	Not Applicable	NE
VC [2]	165	NE	25	NE	1.4	NE	1.4

Notes:

All criteria are based on cancer risk of 1E-05 and noncancer hazard of 1. All values shown in units of microgram per liter (µg/L).

1. PCE is the only chemical of concern identified in the ROD/Final RAP for the future construction worker based on exposure to groundwater in a construction trench. PCE, TCE, and VC were identified as COCs for the future commercial/industrial worker based on exposure to vapors from groundwater in indoor air (hypothetical building over plume).
2. Vinyl chloride RG selected in the ROD/Final RAP is based on groundwater vapor intrusion exposure by a future commercial/industrial worker (hypothetical building over plume).
3. USEPA Toxicity Criteria from: USEPA RSLs dated November 2019. Available online at: https://www.epa.gov/risk/regional-screening-levels-rsls
4. OEHHA Toxicity Criteria from Cal/EPA HERO Note Number 10, Toxicity Criteria. Dated February 2019. Available online at: https://dtsc.ca.gov/human-health-risk-hero/
5. Construction worker includes dermal and inhalation exposures to groundwater in a construction trench.
6. Revised construction worker cleanup goals based current exposure parameters: body weight = 80 kilograms, skin surface area = 6,032 square centimeters.
7. VFs based on trench dimensions from Site 24 ROD/Final RAP (trench is 10-feet long, 8-feet wide, 4-feet deep; 360 air exchanges per hour).
8. USEPA VISL. Updated November 2019. Calculator available online at: https://epa-visl.ornl.gov/cgi-bin/visl_search
9. San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs). Dated July 2019. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html
10. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.

Cal/EPA	California Environmental Protection Agency	OEHHA	Office of Environmental Health Hazard Assessment
COC	Contaminant of Concern	PCE	Tetrachloroethene
Comm/Ind	Commercial/industrial	RAP	Remedial action plan
Construct	Construction	RG	Remediation Goal
DCE	Dichloroethene	ROD	Record of Decision
DTSC	Department of Toxic Substances Control	TCE	Trichloroethene
ESL	Environmental Screening Level	USEPA	U.S. Environmental Protection Agency
HERO	Human and Ecological Risk Office	VC	Vinyl chloride
HHRA	Human Health Risk Assessment		
NE	Not established		

Table 2-25: Site 21 Soil Gas Screening Levels

Primary COC in Soil Gas [1]	ROD/ Final RAP SSSL [1]	ROD/Final RAP SSSL [1]		USEPA SG SL [3]		Regional Water Board SG ESL [4]		DTSC Regulation Based Criteria – Toxicity Criteria for HHRA [5]	
	Resident	Comm/Ind Worker		Resident [1,2]	Comm/ Ind Worker [1,2]	Resident [1,2]	Comm/ Ind Worker [1,2]	Resident	Comm/ Ind Worker
	Future Building	Existing Building	Future Building						
Chloroform	4.2	21	43	4.1	18	4.1	18	Not Applicable	Not Applicable
Naphthalene	2.9	14	29	2.8	12	2.8	12	Not Applicable	Not Applicable
PCE	16	83	166	360	1,573	15	67	15	67
TCE	20	120	239	16	100	16	100	Not Applicable	Not Applicable
VC	1.2	6.3	13	5.6	93	0.32	5.2	0.32	5.2

Notes:

All criteria are based on cancer risk of 1E-06 and noncancer hazard of 1 for all receptors. All values shown in units of microgram per cubic meter (µg/m^3).

1. Primary COCs in soil gas were identified in the 2012 HHRA Addendum (Shaw, 2012). Chloroform, naphthalene, PCE, TCE, and VC were identified as COCs for the future resident. PCE and TCE were identified as COCs for the current and future commercial/industrial workers.
2. Updated residential and industrial/commercial worker soil gas screening levels based on current exposure parameters: body weight = 80 kilograms; residential exposure duration = 20 years for an adult and 6 years for a child.
3. USEPA VISL. Updated November 2019. Calculator available online at: https://epa-visl.ornl.gov/cgi-bin/visl_search
4. San Francisco Bay Regional Water Quality Control Board ESLs. Dated July 2019. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html
5. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.

COC	Contaminant of concern
Comm/Ind	Commercial/industrial
DTSC	Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
PCE	Tetrachloroethene
RAP	Remedial action plan
ROD	Record of decision
SG	Soil gas
SL	Screening level
SSSL	Soil gas site-specific risk-based screening level
TCE	Trichloroethene
USEPA	United States Environmental Protection Agency
VC	Vinyl chloride
VISL	Vapor intrusion screening level

2.4 SITE 24 – DRY CLEANING FACILITY

2.4.1 Site Description and Background

Site 24 includes approximately 20 acres in the east-central portion of TI and contains Building 99, which was used as a laundry from 1942 to 1977 and as a dry cleaning facility for an unknown interval within that period. Waste solvents used during dry cleaning operations were discharged to soil and groundwater beneath the floor of Building 99 from leaks or spills. Building 99 was later used for meat processing and as a print shop, and most recently as an office and workshop for film sets. Building 99 is located along 6th Street, between Avenues H and I, approximately 1,500-feet from the bay.

Former Sites 5 and 17 were incorporated into Site 24 for further investigation. Site 5 included Building 102, a boiler plant that operated from 1943 through its demolition in 1968. Various chemicals may have been used during the boiler operations to prevent scaling. Site 17 contains the area surrounding ASTs 103 and 104. These diesel fuel ASTs were installed before 1943, decommissioned in 1993, and emptied and cleaned in 1996, and dismantled in early 2018 along with the associated oil pump house (Building 105). Historical releases in the area have been documented, including application of waste oil, possibly containing PCBs, around the base of both ASTs for weed and dust control. This practice was discontinued when the area was paved after 1983 (Figure 2-21).

Site 24 area is primarily paved, with some landscaping, and numerous utilities traverse the site. Site 24 contains several buildings in addition to Building 99 described above. Building 69 was used as an engineers and shipfitters shop, hobby shop, garage, and storage. Building 96 was used as storage, reserve training, and a printing plant. Building 230 was used as storage. Building 260 was used as supply offices and a warehouse. Buildings 342 and 343 were part of the Hydraulic Training School and former Building 344 was used as storage for the school. Building 455 was used as a boiler plant.

2.4.1.1 Land and Resource Use

Currently, Building 96 is occupied and used as a winery or spirits storage and tasting rooms for the public. Building 260 is infrequently occupied by workers to retrieve and return items stored at the building. The remaining six buildings (69, 99, 230, 342, 343, and 455) are not in use. In addition, landscape workers may frequent some unpaved areas within Site 24.

The site was transferred from the DON to TIDA on October 30, 2019. The 2011 Final EIR (CCSF, 2011) and 2011 TIDA Design for Development (TIDA, 2011) list the proposed future uses of the western and northeastern parts of Site 24 as open space and the southeastern part of Site 24 as residential (see Figure 1-2). The Site 24 open space area is planned to be developed as a regional sports complex. The regional sports complex may include baseball diamonds, soccer fields, and other sports facilities, including concessionaire, parking, and restroom facilities. The residential portion of Site 24 is designated as the Eastside Residential District and is planned to consist of dense, low-rise and mid-rise structures, with neighborhood high-rise structures serving as neighborhood markers. Most residential parking will be in subsurface garages within residential buildings. Community and commercial spaces will be included at the ground-floor level of some buildings.

In addition, the 2011 Disposition and Development Agreement between TIDA and their developer, Treasure Island Community Development, LLC, provides for a “Redesign Trigger Event” that allows for the developer to re-entitle, redesign and rebuild portions of the project on portions of Site 24 and the surrounding area if environmental restrictions prohibit the timely development of the Site 12 development parcel or there is a termination of the conveyance

agreement for failure to meet certain other closing conditions. Property that is the subject to the Redesign Trigger Event includes residential development.

Future plans for lands adjacent to Site 24 may also include residential development and open space.

There are no perennial surface water bodies located at Site 24. Groundwater at Site 24 is not a potential source of drinking water, and no other uses of groundwater are planned at Site 24 (DON, 2015b).

2.4.2 Response Action Summary

This section provides the framework for the response actions that have been undertaken at Site 24. The following text discusses the basis for taking action, summarizes the initial (pre-ROD/Final RAP) response actions that have occurred and the RAOs and components of the selected remedy, and describes the implementation status of the selected remedy.

2.4.2.1 Basis for Taking Action

COCs in groundwater and soil gas pose unacceptable risk to human health at Site 24. The HHRA (SulTech, 2008) evaluated potential exposures to industrial and construction workers as well as future residents. No COCs were identified for soil, but PCE, TCE, cis-1,2-DCE, and VC in groundwater and soil gas were found to pose a risk greater than 10^{-6} for carcinogens or with an HI greater than 1 for noncarcinogens. No COECs were identified at Site 24 for terrestrial or aquatic receptors. Note that these COCs in groundwater and soil gas were found to pose unacceptable human health risks at the time of the publication of the RI but may no longer pose risks following the response actions.

2.4.2.2 Previous Investigations

Table 2-26: Previous Investigations Summary – Site 24

Previous Investigations*	Date	Investigation Summary
PA/SI	1988	The PA/SI report included observations made during the SI, information from personnel interviews, and a review of historical records and aerial photographs. The PA/SI did not identify the former dry cleaning facility for further investigation. The PA/SI report concluded that Site 5 and Site 17, located within the current Site 24 boundary, required further action.
Petroleum Investigations within Site 24	1991-2003	The Site 24 boundary encompasses several petroleum program sites, including Site 4/19; Inactive Fuel Line Sites D1A, D4B, F2B, and a small portion of Site F2A; Building 530 Fuel Line Site; and former UST 230. Based on analytical results for soil samples collected during fuel line and UST removal, the petroleum program sites received NFA concurrence from the Regional Water Board. CERCLA contaminants detected at the petroleum program sites were addressed in the RI/FFS report.

Previous Investigations*	Date	Investigation Summary
Phase I RI	1992	A Phase I basewide RI was conducted at the PA/SI sites to assess the nature and extent of soil and groundwater contamination at each site. During Phase I, samples were collected from eight soil borings and two monitoring wells at Site 24 to evaluate the dry cleaning facility, buried building debris (Site 5), and aboveground storage tanks (Site 17). Soil samples were analyzed for metals, VOCs, SVOC, pesticides, PCBs, and TPH. VOCs and metals were reported in samples from the dry cleaning facility area. No contaminants were reported in samples from Site 5; metals, VOCs, SVOCs, and TPH were reported in samples from Site 17.
Phase II RI	1994-1996	Phase IIA of the basewide RI involved quarterly groundwater monitoring and evaluation of groundwater conditions at sites with monitoring wells. During the basewide Phase IIB RI, soil and groundwater samples were collected at Site 24. Phase IIB RI activities consisted of collecting soil and groundwater samples for analysis of VOCs. Based on reported VOC concentrations, a feasibility study was recommended to address VOC contamination in groundwater.
Basewide Groundwater Monitoring Program	1995-2003	The former NAVSTA TI facility-wide groundwater monitoring program provided data in support of site-specific environmental investigations throughout former NAVSTA TI. The later, final Site 24 RI/FFS report summarizes data gathered from Site 24 monitoring wells during these quarterly groundwater monitoring events.
Building 99 Investigations	1997	The DON conducted a source area investigation at Building 99 to (1) identify the source(s) of VOCs in soil and groundwater, and (2) assess if DNAPL were present. The investigation was conducted beneath and adjacent to Building 99, which was determined to be the source of VOCs. A soil gas study was conducted to delineate the extent of VOCs at Building 99. The study involved collecting soil gas samples at a depth of 3-feet bgs from 52 locations around Building 99. Based on the soil gas and groundwater results, the primary source of VOCs was in the northeastern portion of Building 99. Two additional sources of elevated VOCs were identified: an area inside the southern wall of Building 99 and a sanitary sewer line extending from Building 99.
Treatability Study	2003-2012	The DON completed several phases of a treatability study designed to evaluate the ability of ISB technology to degrade chlorinated VOCs present at Site 24. The initial treatability study, conducted in the Site 24 source area, evaluated whether ISB was capable of degrading high concentrations of chlorinated VOCs in a relatively small portion of the site. ISB was shown to be an effective mechanism for treatment of groundwater with both low concentrations and high concentrations of chlorinated ethenes at Site 24.

Previous Investigations*	Date	Investigation Summary
C Zone Groundwater Investigation	2005	The DON installed two wells to assess groundwater flow and potential contamination in the C Zone. The wells were sampled for VOCs; however, no VOCs were detected during either round of well sampling. The groundwater flow direction was assessed to be to the southeast and east.
Final RI/FFS	2008	The final RI/FFS report presented the analytical results of all investigations completed at Site 24. Data collected during these investigations were used to evaluate site conditions for human health and ecological risk. The HHRA identified VOCs as COCs for Site 24 groundwater and no COCs for Site 24 soil. The SLERA concluded that the industrial setting and managed habitat on TI were inadequate to support healthy terrestrial ecological populations. The SLERA concluded that chemical migration in groundwater from Site 24 does not pose an unacceptable risk to benthic invertebrates or aquatic biota offshore of TI. The RI/FFS report provided a comparative analysis of remedial alternatives to address chlorinated VOCs in groundwater at Site 24. Enhanced anaerobic ISB was the only treatment technology carried forward for evaluation in the RI/FFS report, based on results of the Site 24 treatability study that demonstrated that enhanced anaerobic ISB could reduce chlorinated VOCs to ethene gas. In 2007, during development of the RI/FFS, the DON made a risk management decision to identify chemicals as COCs for nonresidential receptors if the chemical-specific cancer risk exceeded 10^{-5} or the noncancer hazard exceeded 1. The following remedial alternatives were evaluated: (1) no action; (2) ECs, ICs, and groundwater monitoring; (3A) enhanced anaerobic ISB of groundwater and groundwater monitoring; and (3B) enhanced anaerobic ISB of groundwater, ICs, and groundwater monitoring.
Soil Gas Investigation	2011	The DON conducted a soil gas investigation to characterize COCs in the area proposed for future residential development and determine the concentration of COCs in soil gas along the southern margin of Site 24. A site-specific risk and hazard screening evaluation for current and potential future uses of the site was completed for each soil gas sample. The results showed that the cancer risk and noncancer hazards were below the USEPA risk management point of departure of 10^{-6} and HI threshold of 1 for soil gas along the southern margin of Site 24.
FFS Addendum	2014	The Site 24 FFS Addendum briefly summarized the 2008 RI/FFS report; presented updated information, including a revised conceptual site model, current extent of contamination, and proposed site reuse; developed updated RAOs; and evaluated remedial alternatives such as vapor barriers, capping, soil excavation and different groundwater treatments.

Previous Investigations*	Date	Investigation Summary
Proposed Plan/Draft RAP	2015	The DON proposed its preferred chemical remedial alternative: soil excavation at the source area, ZVI/ISB treatment of groundwater, and monitoring. This preferred alternative includes the excavation of soil and off-site disposal, in situ ZVI/ISB treatment of remaining VOC groundwater plumes, and groundwater and soil gas monitoring. The soil beneath and adjacent to Building 99 would be excavated based on the potential for soil being an ongoing source of PCE and TCE to groundwater.
ROD/Final RAP	2015	The Site 24 cleanup goals were developed based on achieving UU/UE levels except groundwater which is of insufficient quality and nature to be a potential drinking water source. Implementation of the RA will be followed by groundwater and soil gas monitoring until analytical results allow for termination of further monitoring.
Final RD/RAWP	2016	This work plan included plans for source area soil removal, downgradient hotspot groundwater treatment, and soil gas and groundwater monitoring. Soil removal and initial groundwater treatment activities were performed in 2016.
Final Soil Gas Data Gap Survey	2017	A comparison of soil gas and groundwater data for the 2015 dry season and 2016 wet season indicated that plumes of PCE and TCE, the dominant soil gas COCs, and VC, the dominant groundwater COC, were near each other and in most cases overlapped in lateral extent. Based on the plume extents exceeding the respective soil gas screening levels and groundwater RGs, the soil gas plumes were larger than the groundwater plumes. Results from the four quarterly monitoring events indicated generally higher concentrations of COCs in the July 2015 (dry season) event and lower concentrations of COCs in the February 2016 (wet season) event.
Final Interim RACR	2017	Documentation of RA activities that were intended to comply with the remedy selected in the ROD/Final RAP for the site and to achieve site-specific RAOs. Actions included soil excavation – approximately 126 yd^3 of concrete and asphalt debris were removed from the two excavation areas and 1,200 yd^3 of soil were excavated. Groundwater treatment products were injected at Areas 96, 99A and 99B.
Ongoing Soil Gas and Groundwater Monitoring	2013 – present	<u>Post-RA groundwater monitoring summary:</u> • Performance monitoring results indicate rapid treatment of the Area 96 groundwater plume to concentrations below cleanup goals immediately following the RA. Groundwater treatment has successfully reduced the concentrations of COCs to low or nondetect levels (Figure 2-26). • Significant reductions in groundwater contaminant concentrations have been achieved at the Area 99A groundwater plume following the RA. As of December 2018, all COCs were reported below cleanup goals at the Area 99A groundwater plume (Figure 2-26).

Previous Investigations*	Date	Investigation Summary
		• Significant reductions in groundwater contaminants have been made at the Area 99B groundwater plume following the RA. As of December 2018, PCE and TCE were reported below cleanup goals at the Area 99B groundwater plume, while cis-1,2-DCE and VC were reported above cleanup goals at one well (24-TW-48R) within the treatment area (Figure 2-26). <u>Soil Gas:</u> • Reductions in soil gas contaminant concentrations have been achieved in the Building 96 soil gas plume following the RA. As of December 2018, PCE was reported above the cleanup goal at 24-SG-21 (Figure 2-27). • Significant reductions in soil gas contaminant concentration have also been achieved at the Building 99 soil gas plume following the RA. As of December 2018, TCE, cis-1,2-DCE, and VC were reported at concentrations below cleanup goals. As of December 2018, PCE was reported at concentrations above the residential cleanup goals in four wells but was not reported at concentrations above the commercial/industrial cleanup goals for the Building 99 plume (Figure 2-27).

Notes:

bgs	Below ground surface	RA	Remedial action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	RAO	Remedial action objective
		RAP	Remedial action plan
		RAWP	Remedial action work plan
COC	Contaminant of concern	RD	Remedial design
DNAPL	Dense nonaqueous-phase liquid	Regional Water Board	San Francisco Bay Regional Water Quality Control Board
DON	United States Department of the Navy		
EBS	Environmental baseline survey	RI	Remedial investigation
EC	Engineering control	ROD	Record of Decision
ELCR	Excess lifetime cancer risk	SLERA	Screening-level ecological risk assessment
FFS	Focused feasibility study		
FFSA	Focused feasibility study addendum	SVOC	Semivolatile organic compound
HHRA	Human health risk assessment	TI	Treasure Island
HI	Hazard index	TPH	Total petroleum hydrocarbons
HRA	Historical Radiological Assessment	USEPA	U.S. Environmental Protection Agency
IC	Institutional control	UST	Underground storage tank
ISB	In situ bioremediation	UU/UE	Unlimited use and unrestricted exposure
NAVSTA TI	Naval Station Treasure Island	VC	Vinyl chloride
NFA	No further action	VOC	Volatile organic compound
PA/SI	Preliminary assessment and site inspection	yd^3	Cubic yard
		ZVI	Zero valent iron

2.4.2.3 Remedial Action Objectives

Upon determination that RA is necessary, RAOs are established to address potential risks posed by a site, and to assess the ability of a technology to address those risks. RAOs are environmental, medium-specific goals that will protect human health and the environment. The DON developed the following RAOs to address exposures to future residents, commercial workers, and construction workers under the reasonably anticipated future use of the property:

- Prevent or minimize exposure of future residents and future commercial workers to COCs in soil gas at concentrations that would pose an unacceptable risk via indoor inhalation of vapors.
- Prevent or minimize exposure of construction workers to COCs in groundwater at concentrations that would pose an unacceptable risk via dermal exposure or inhalation of trench vapors.
- Prevent or minimize potential for volatile COCs in soil source zones to migrate at concentrations that pose an unacceptable risk to future residents and future commercial workers via indoor inhalation of vapors.

Table 2-27: Site 24 Cleanup Goals

Receptor	COC	Soil Gas Cleanup Goals (µg/m^3) [1]	Groundwater Cleanup Goals (µg/L) [2]
Commercial/ Industrial Worker	cis-1,2-DCE	209,217	NE
	PCE	2,862	NE
	TCE	3,970	NE
	VC	188	NE
Construction Worker	cis-1,2-DCE	NE	230
	PCE	NE	210
	TCE	NE	42
	VC	NE	15
Resident (Adult and Child)	cis-1,2-DCE	46,408	NE
	PCE	533	NE
	TCE	615	NE
	VC	31	NE

Source: DON, 2015a

Notes:

1. Soil gas cleanup goals developed for future commercial/industrial and residential receptors are based on a cancer risk of 1E-06 and an HI of 1.
2. Groundwater cleanup goals were developed based on a cancer risk of 1E-06 and an HI of 1. For the future construction worker, groundwater concentrations are protective of the dermal and inhalation pathways under a trench scenario.

µg/L Microgram per liter
µg/m^3 Microgram per cubic meter
COC Contaminant of concern
DCE Dichloroethene
HI Hazard index
NE Not established
PCE Tetrachloroethene
TCE Trichloroethene
VC Vinyl chloride

2.4.2.4 Selected Remedy

The Site 24 cleanup goals were developed for each complete exposure pathway and are based on achieving UU/UE. UU/UE levels will be met for Site 24 media except groundwater, which is not suitable for use as a drinking water supply. The selected remedies for Site 24 are anticipated to meet UU/UE levels except groundwater use. The remedy for COCs includes:

- Remove and dispose of soil in areas that may be contaminating groundwater or soil gas;
- Implement groundwater treatment with zero-valent iron (ZVI) and in situ bioremediation (ISB);

- Conduct groundwater and soil gas corrective action monitoring and detection monitoring to confirm that cleanup goals are met.

If Site 24 cleanup goals are not met at the time Site 24 is transferred, the selected remedy will include the following component:

- Implement ICs to meet RAOs by: (1) requiring construction workers to follow a contaminated groundwater management plan during construction; (2) requiring evaluation and potential installation of ECs if new buildings are constructed or the use of existing buildings changes; and (3) prohibiting residential use unless appropriate ECs are implemented that are protective of residential receptors.

2.4.2.5 Implementation Status

The actions completed at Site 24 include excavation of approximately 126 yd^3 of concrete and asphalt debris from the two excavation areas and excavation of 1,200 yd^3 of soil. Groundwater treatment products were injected at Areas 96, 99A, and 99B.

Table 2-28: Demonstration of Completion – Site 24

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Prevent or minimize exposure of future residents and future commercial workers to COCs in soil gas at concentrations that would pose an unacceptable risk via indoor inhalation of vapors	The soil excavation and groundwater treatment portions of the RA were implemented to reduce concentrations of COCs in soil and groundwater and thus reduce concentrations in soil gas. The soil excavation portion of the RA removed source soil from the vadose zone (see Section 2.4.4.1 for details about one minor exception caused by an adjacent gas line). The groundwater treatment portion of the RA is operating as designed with groundwater COC concentration trends estimated as stable or decreasing. The performance soil gas monitoring program will be used to document the progress of the RA and to determine when cleanup goals for soil gas have been achieved. Since cleanup goals have not been met at the time Site 24 is to be transferred, the DON has completed a LUC RD that implements ICs to meet RAOs in the areas of the site where cleanup goals were not met. ICs will be maintained until the concentrations of hazardous substances in soil gas are at levels that allow UU/UE.	Yes – LUC RD has been finalized and ICs have been implemented
Prevent or minimize exposure of construction workers to COCs in groundwater at concentrations that would pose an unacceptable risk via dermal exposure or	The microscale ZVI and ISB groundwater treatment RA was implemented to treat contaminants in the groundwater. The first round of performance monitoring demonstrates that the groundwater treatment RA is performing as designed. The performance groundwater monitoring program will be used to document the progress of the RA and to	Yes – LUC RD has been finalized and ICs have been implemented

RAO	Demonstration of Completion	RAO Met? (Yes/No)
inhalation of trench vapors	determine when cleanup goals for groundwater have been achieved. Since cleanup goals have not been met at the time Site 24 is to be transferred, the DON has completed a LUC RD that implements ICs to meet RAOs in the areas of the site where cleanup goals were not met. ICs will be maintained until the concentrations of hazardous substances in groundwater are at levels that allow UU/UE.	
Prevent or minimize potential for volatile COCs in soil source zones to migrate at concentrations that pose an unacceptable risk to future residents and future commercial workers via indoor inhalation of vapors	Approximately 1,200 yd^3 of soil were excavated and removed from the unsaturated soil source zones in two areas at the site where soils were determined to exceed the soil screening levels. The pre-design site characterization study soil sample results and the soil confirmation sample results following excavation confirmed that the RA removed unsaturated zone soil source zones. The microscale ZVI and ISB groundwater treatment RA was implemented to treat contaminants in the groundwater and saturated soil source zones. The performance soil gas monitoring program will be used to document the progress of the RA and to determine when cleanup goals for soil gas have been achieved. Since cleanup goals have not been met at the time Site 24 is to be transferred, the DON has completed a LUC RD that implements ICs to meet RAOs in the areas of the site where cleanup goals were not met. ICs will be maintained until the concentrations of hazardous substances in soil gas are at levels that allow UU/UE.	Yes – LUC RD has been finalized and ICs have been implemented

Notes:

COC	Contaminant of concern	RAO	Remedial action objective
DON	United States Department of the Navy	RD	Remedial design
IC	Institutional control	UU/UE	Unlimited use and unrestricted exposure
ISB	In situ bioremediation	yd^3	Cubic yard
LUC	Land use control	ZVI	Zero valent iron
RA	Remedial action		

2.4.2.6 Institutional Controls

RGs will not be met by the time Site 24 is transferred, so the DON has placed ICs to meet RAOs in the areas of the site where cleanup goals were not met in the final LUC RD. The ICs will prevent human exposure to areas of the site where potential unacceptable risk is posed by chlorinated ethenes in groundwater.

LUCs, in the form of ICs, will be implemented to prohibit the following (Parsons, 2019):

- Intrusive work involving grading, soil excavation, trenching, backfilling, or groundwater contact, unless such work is conducted pursuant to an SMP approved by DTSC. The

SMP shall specify the characterization, handling, and disposal requirements applicable to any contaminated media that may be encountered during site redevelopment or maintenance activities. The SMP shall also specify health and safety requirements for construction workers.

- New commercial/industrial building construction within the area requiring institutional controls (ARIC) for commercial/industrial workers and new residential building construction within the ARIC for residential use unless a VI assessment is conducted to determine whether ECs to address VI are necessary, and any required ECs are implemented and maintained by the transferee in accordance with a vapor mitigation plan reviewed and approved by DTSC.
- Change of use of existing buildings from unoccupied to commercial/industrial within the ARIC for commercial/industrial workers and change from unoccupied or commercial/industrial use to residential use within the ARIC for residential uses unless a VI assessment is conducted to determine whether ECs to address VI are necessary, and any required ECs are implemented and maintained by the transferee in accordance with a vapor mitigation plan reviewed and approved by DTSC.
- Residential use unless appropriate ECs are implemented that are protective of residential receptors within the ARIC for residential use.

The ICs will be proprietary controls in the form of environmental restrictive covenants as provided in the Memorandum of Agreement between the DON and DTSC and associated covenant models (the DON/DTSC Memorandum of Agreement [MOA]). More specifically, the ICs will be incorporated into two separate legal instruments as provided in the DON/DTSC MOA:

- Restrictive covenants included in one or more quitclaim deeds from the DON to the property recipient.
- Restrictive covenants included in one or more CRUPs entered into by the DON and DTSC as provided in the DON/DTSC MOA.

In addition, while not addressing a RAO, the DON will include a restriction in appropriate real property transfer documents that will prohibit the installation of groundwater production wells for any purpose.

The CRUP will incorporate the ICs into environmental restrictive covenants that run with the land and are enforceable by DTSC against future transferees. Figure 2-28 shows the ARICs for Site 24. The quitclaim deed(s) would include identical ICs in environmental restrictive covenants that run with the land and that will be enforceable by the DON against future transferees. Although the DON may transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DON will retain ultimate responsibility for remedy integrity. If, in the future, contaminant concentrations are shown to have been reduced to levels where land use controls are not needed, a future landowner may remove or modify the CRUP with approval of DTSC.

2.4.2.7 Systems Operations/Operations & Maintenance

No significant O&M costs have been incurred for Site 24. Minor costs are expected for maintenance of the monitoring network at Site 24.

2.4.3 Site 24 Progress Since Last Five-Year Review

This is the first Five-Year Review for Site 24.

2.4.4 Site 24 Five-Year Review Process

This section discusses the activities performed during the Five-Year Review process for Site 24. Section 1.3 outlines the general Five-Year Review process, which was applied to each site evaluated in this Five-Year Review. Monitoring results from the Five-Year Review period (from 2014 through 2018) are evaluated in this section for groundwater and soil gas samples. In addition, results from the 2019 indoor air evaluation are included.

Table 2-29: Site 24 Remedy Summary

Medium	Risk Basis for Action/ COCs	RAOs	Remedy/Cleanup Goal	Performance Metric
Groundwater	Human Health Exposure – Dermal or Inhalation / VOCs	Prevent exposure for future construction workers	Active remediation (Excavation of soil; implement groundwater treatment with ZVI and ISB), followed by corrective action monitoring	Site-specific screening levels are detailed in Table 2-24
Soil Gas	Human Health Exposure – Inhalation / VOCs	Prevent exposure for future residents and commercial/ industrial workers	Active remediation (Excavation of soil; implement groundwater treatment with ZVI and ISB), followed by corrective action monitoring	Site-specific screening levels are detailed in Table 2-25

Notes:

COC	Contaminant of concern	VOC	Volatile organic compound
ISB	In situ bioremediation	ZVI	Zero valent iron
RAO	Remedial action objective		

2.4.4.1 Excavation

Excavation Area 99A is shown on Figure 2-22. The concrete floor within the excavation extent was saw cut and removed prior to excavation. After reaching the proposed excavation horizontal extents, sidewall confirmation samples were collected. Sidewall sample results indicated that soil screening levels had been achieved for Area 99A.

Excavation Area 99B is shown on Figure 2-23. Area 99B was excavated until groundwater was encountered, at depths of approximately 7-feet bgs. After reaching the proposed excavation extents, sidewall confirmation samples were collected. Where sample results indicated that soil screening levels had not been achieved, additional excavation was conducted until confirmation sampling indicated that the soil screening levels were attained in the excavation sidewalls. As shown on Figure 2-23, additional excavation occurred on the southwestern and southeastern sides of the original excavation. The exceedance at soil confirmation sample SC11 at 5.5-feet bgs was directly adjacent to an active San Francisco Public Utilities Commission (SFPUC) gas line and other utilities. Additional excavation at SC11 was not permitted by SFPUC due to the active gas line. In consultation with the BRAC Cleanup Team, it was determined that the small volume of impacted soil would be left in place and that the remedial objective could be achieved at Area 99B despite the inability to remove all the impacted soil at SC11.

Approximately 126 yd^3 of concrete and asphalt debris 1,200 yd^3 of soil were removed from the two excavation areas at Site 24.

2.4.4.2 Active Remediation

The groundwater treatment component of the RA consisted of the application of a microscale ZVI product to promote in situ chemical reduction and addition of an electron donor/substrate to promote ISB. The groundwater treatment was designed to treat groundwater at Site 24 with concentrations of COCs exceeding the cleanup goals.

Groundwater treatment products were injected in 100 locations at Area 96 from 15- to 25-feet bgs, 14 locations at Area 99A from 7.5- to 25-feet bgs and 68 locations at Area 99B from 7.5- to 35-feet bgs.

The groundwater plume identified in the pre-Treatability Study (PCE and TCE) extended from Building 99 in the A and B Zones approximately 500- to 700-feet east toward the Bay. Concentrations of chlorinated VOCs were low to not detected in the C Zone wells, indicating the vertical migration of VOCs had been impeded (SulTech, 2008). The ISB Treatability Studies greatly reduced the size and concentration of the VOC plumes at Site 24 (Shaw, 2005, 2008, 2011; CB&I 2013).

Prior to the RA, groundwater data were collected on a semiannual basis (Trevet, 2016). The four COCs (PCE, TCE, cis-1,2-DCE, and VC) were detected in groundwater samples collected during the groundwater sampling event in September 2015. Exceedances of groundwater cleanup goals were reported in five groundwater monitoring wells in September 2015 (Parsons, 2016).

The COC exceedances are distributed in three distinct groundwater plumes. The first plume, consisting of TCE and VC, is centered on groundwater monitoring well 24-TW-11 at the southeastern edge of Building 99. The second plume, consisting of TCE, cis-1,2-DCE, and VC, extends to the east of Building 99. This plume includes the exceedances reported in wells 24-EW6, 24-TW-47, and 24-TW-48. A smaller VC plume is present on the north side of Building 96 at well 24-EW11.

2.4.4.3 Post-Treatment Monitoring

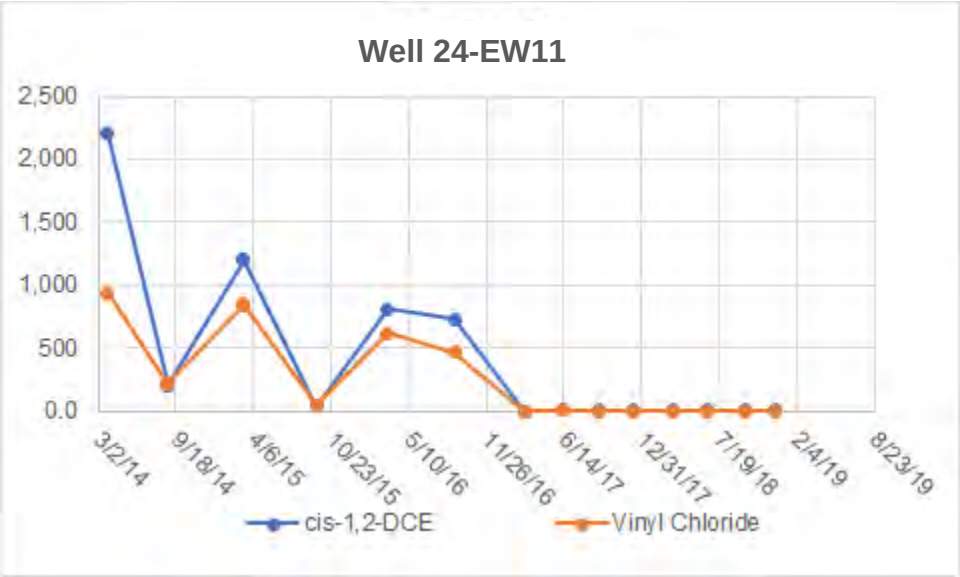
The final component of the RA is groundwater and soil gas performance monitoring to confirm when cleanup goals are met. The RD/RAWP prescribed eight rounds of quarterly performance monitoring of groundwater and soil gas to verify treatment efficacy (Parsons, 2016). In addition, two more extensive annual performance monitoring events will be performed to determine when cleanup goals are met across the broader treatment area. Performance monitoring wells were selected to verify treatment effectiveness.

On September 25, 2018, the DTSC and the Regional Water Board approved reduction in the performance monitoring program to annual sampling of 11 groundwater monitoring wells and 16 soil gas monitoring wells for the December 2018 sampling round (NOREAS, 2019b).

2.4.4.3.1 Treatment Area 96

One well in the groundwater monitoring program is associated with the Treatment Area 96 plume near the northern edge of Building 96. Well 24-EW11 groundwater results have been below cleanup goals in all eight quarters since the remedy injections. Performance monitoring results indicate rapid treatment of the Area 96 groundwater plume to concentrations below cleanup goals immediately following the RA. Groundwater treatment has successfully reduced the concentrations of COCs to nondetect or near nondetect levels in Treatment Area 96 over eight sampling events since March 2017 (NOREAS, 2019b).

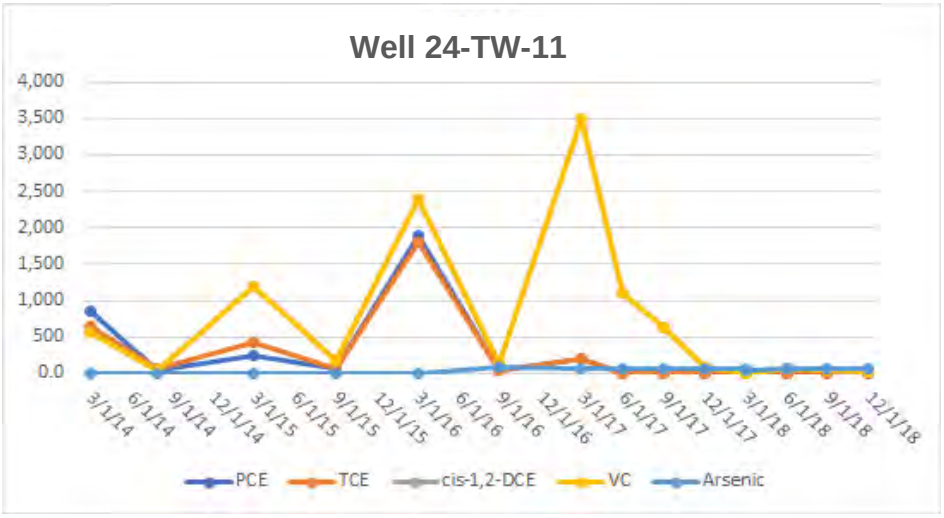
Graph 2-1: Well 24-EW11



2.4.4.3.2 Treatment Area 99A

Five wells (24-TW-11, 24-EW28R, 24-EW29, 24-IW4, and 24-IW21) in the groundwater monitoring program are associated with Treatment Area 99A plume near the southern edge of Building 99. The groundwater sampling results for upgradient well 24-EW29, downgradient well 24-IW4, and cross-gradient well 24-IW21 indicate that COCs were not detected at concentrations above cleanup goals before or after the RA groundwater injections. These results confirm that lateral migration of contaminated groundwater did not occur during the groundwater treatment injections. December 2018 results from well 24-EW28R, within the groundwater remedy treatment area, indicate that COCs were not detected. December 2018 results from 24-TW-11, also within the groundwater remedy treatment area have detected concentrations below the cleanup goals. Thus, as of December 2018, groundwater at Treatment Area 99A meets RGs (NOREAS, 2019b).

Graph 2-2: Well 24-TW-11

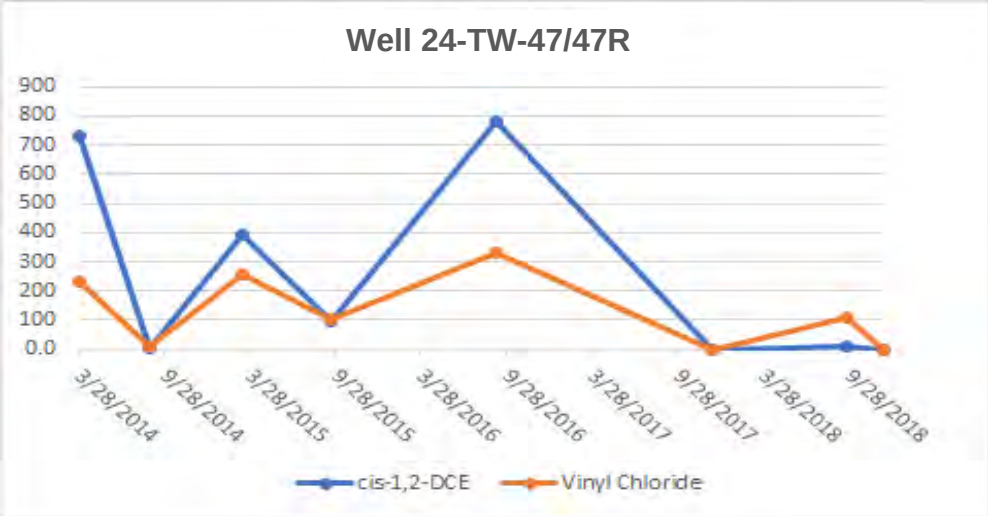


2.4.4.3.3 Treatment Area 99B

Five wells (24-TW-47R, 24-TW-48R, 24-BB76, 24-BB80, and 24-IW24) in the groundwater monitoring program are associated with Treatment Area 99B and the plume southeast of Building 99. The groundwater sampling results for downgradient well 24-IW24 and cross-gradient well 24-BB76 indicate that COCs were not detected at concentrations above cleanup goals before or after the RA groundwater injections. These results confirm that lateral migration of contaminated groundwater did not occur during the groundwater treatment injections.

December 2018 results from well 24-TW-47R at indicate that COCs were not detected at concentrations above cleanup goals. Quarterly fluctuations in cis-1,2-DCE and VC concentrations at well 24-TW-48R indicate that residual contamination is likely present in the system and is being released into the dissolved phase during times of elevated water levels (during the winter months). This introduced contaminant mass is then degraded in the treatment area through anaerobic reductive dechlorination resulting in the temporary spikes in intermediate products (cis-1,2-DCE and VC) and ultimately destruction of the newly introduced contaminant mass, as indicated by low detected COC concentrations in the summer months. High concentrations of ethane and ethene at this location indicate that complete reductive dechlorination is continuing and that the contaminant mass introduced to the dissolved phase at this well is being degraded.

Graph 2-3: Well 24-TW-47/47R



2.4.4.4 Groundwater Post-Treatment Summary

The following items summarize the results of post-RA groundwater monitoring at Site 24:

- Performance monitoring results indicate rapid treatment of the Area 96 groundwater plume to concentrations below cleanup goals immediately following the RA. Groundwater treatment has successfully reduced the concentrations of COCs to nondetect or near nondetect levels in Treatment Area 96 over eight sampling events since March 2017 (NOREAS, 2019b).
- Significant reductions in groundwater contaminant concentrations have been achieved at the Area 99A groundwater plume following the RA. PCE, TCE, and cis-1,2-DCE concentrations have declined to below cleanup goals over a minimum of five quarterly sampling events since December 2017. Fluctuating concentrations of VC in well 24-TW-11 over the last four sampling events since March 2018 indicate that there may be

residual COCs entering the dissolved phase; however, geochemical and microbial conditions in well 24-TW-11 are anoxic, pH neutral, and conducive to continued contaminant degradation through biologically mediated reductive dechlorination. High concentrations of ethane and ethene at this location indicate that complete reductive dechlorination is continuing and that the contaminant mass introduced to the dissolved phase at this well is being degraded. As of December 2018, all COCs were reported below cleanup goals at the Area 99A groundwater plume (NOREAS, 2019b).

- Significant reductions in groundwater contaminants have been made at the Area 99B groundwater plume following the RA. PCE and TCE have been reported below cleanup goals over a minimum of three quarterly sampling events since June 2018. Fluctuations in cis-1,2-DCE and VC concentrations at wells 24-TW-47R and 24-TW-48R indicate that residual contamination is present in the system and is being released into the dissolved phase; however, geochemical and microbial conditions in the treatment areas are anoxic, pH neutral, and conducive to continued contaminant degradation through biologically mediated reductive dechlorination. High concentrations of ethane and ethene at these locations indicate that complete reductive dichlorination is continuing in the groundwater at these wells and that the contaminant mass introduced to the vicinity of these wells will continue to be degraded. As of December 2018, PCE and TCE were reported below cleanup goals at the Area 99B groundwater plume, while cis-1,2-DCE and VC were reported above cleanup goals at one well (24-TW-48R) within the treatment area (NOREAS, 2019b).

Groundwater analytical data are included in Table D-9 in Appendix D.

2.4.4.5 Soil Gas

Following the RA, the first and second round of performance monitoring data indicated that TCE concentrations in soil gas at the site had decreased to below soil gas cleanup goals. PCE and VC remain elevated in portions of the site; however, significant reductions in the maximum concentration of PCE were achieved by the removal of the source area soils. The residual contaminant concentrations are likely due to volatilization of contaminants from the groundwater both prior to and as a result of remediation. As the groundwater treatment process continues to remediate contaminants in groundwater, the soil gas concentrations are expected to decrease concurrently.

2.4.4.5.1 Building 96 Plume

Six wells in the soil gas monitoring program are associated with the soil gas plume at Building 96. Four of the six wells (24-SG-21, 24-SG-22, 24-SG-24, and 24-SG-25) are associated with the pre-remedy soil gas plume extent north of Building 96, and two of the six wells (24-SG-27 and 24-SG-28) are outside of the pre-remedy soil gas plume extent. Prior to the RA, soil gas results for TCE, cis-1,2-DCE, and VC were below their respective residential cleanup goals (615 µg/m^3, 46,408 µg/m^3, and 31 µg/m^3) at all six wells associated with the Building 96 plume (Parsons, 2017) (Figure 2-26).

2.4.4.5.2 Building 99 Plume

Twelve wells in the soil gas monitoring program are associated with the soil gas plume beneath, south, and east of Building 99. Six of the 12 wells (24-SG-32, 24-SG-33, 24-SG-36, 24-SG-37/24-SG-37R, 24-SG-38R, and 24-SG-39) are within the pre-remedy soil gas plume extent, whereas six of the 12 wells (24-SG-01, 24-SG-02, 24-SG-40, 24-SG-45, 24-SG-46, and 24-SG-47) are outside of the pre-remedy soil gas plume extent. Prior to the RA, soil gas results for

cis-1,2-DCE, and VC were below their respective residential cleanup goals at five of the six wells within the Building 99 plume. In December 2018, cis-1,2-DCE and VC were reported below residential cleanup goals in all 12 wells analyzed from within and outside the Building 99 plume. Prior to the RA, soil gas results for TCE exceeded the residential cleanup goal at wells 24-SG-33 and 24-SG-38. In December 2018, TCE was not reported above the residential cleanup goal at any wells associated with the Building 99 plume. As of December 2018, PCE was not reported above commercial/industrial cleanup goals for the Building 99 plume, but was reported above residential cleanup goals at four wells (24-SG-32, 24-SG-33, 24-SG-36, and 24-SG-37/24-SG-37R) (Figure 2-27).

2.4.4.6 Soil Gas Post-Treatment Summary

The following items summarize the results of post-RA soil gas monitoring at Site 24 following the 2018 sampling event:

- Reductions in soil gas contaminant concentrations have been achieved in the Building 96 soil gas plume following the RA. TCE, cis-1,2-DCE, and VC continue to be reported at concentrations below cleanup goals following the RA. Between September 2017 and December 2018, PCE was reported at wells 24-SG-21 and 24-SG-22 at concentrations that exceeded the residential cleanup goal. As of December 2018, PCE was reported above the cleanup goal at 24-SG-21. The Mann-Kendall trend analysis estimated no trend for PCE at 24-SG-21 and a decreasing trend for PCE at 24-SG-22 (NOREAS, 2019b).
- Significant reductions in soil gas contaminant concentrations have also been achieved at the Building 99 soil gas plume following the RA. As of December 2018, TCE, cis-1,2-DCE, and VC were reported at concentrations below cleanup goals. PCE remains elevated directly beneath and south of Building 99 in wells 24-SG-32, 24-SG-33, 24-SG-36, and 24-SG-37/24-SG-37R. As of December 2018, PCE was reported at concentrations above the residential cleanup goals in the four wells but was not reported at concentrations above the commercial/industrial cleanup goals for the Building 99 plume. The Mann-Kendall trend analysis for two of the four wells with PCE concentrations exceeding residential cleanup goals estimated decreasing trends (24-SG-36 and 24-SG-37R) (NOREAS, 2019b).

Soil gas analytical data are included in Table D-10 in Appendix D.

2.4.4.7 Indoor Air Evaluation

An indoor air evaluation was completed by TIDA, the current landowner, at Site 24 in 2019 (Langan 2019d). The indoor air sampling was conducted at Buildings 96, 99, 260, and 455. These buildings are currently occupied or are anticipated to be occupied, with the exception of Buildings 99 and 455 that are not in use. The evaluation included building surveys and indoor air and ambient air sampling. The building surveys were visual inspections to identify potential preferential pathways for vapor migration, such as cracks or penetrations through the slabs, and to identify potential sources of indoor air contaminants. Eight indoor air samples, one duplicate indoor air sample, and two ambient air samples from within the Site 24 boundary representing upwind and downwind conditions were collected. Sample results were compared with the current Regional Water Board commercial/industrial land use environmental screening levels (January 2019). The only VOCs detected in indoor air at concentrations greater than their screening levels were carbon tetrachloride and naphthalene. Carbon tetrachloride detections ranged from 0.274 to 0.552 µg/m^3 with seven of the eight exceeding the screening criterion of 0.29 µg/m^3. Carbon tetrachloride was also detected at concentrations ranging from 0.496 to

0.524 µg/m^3 in ambient air, indicating that the indoor air concentrations are not the result of vapor intrusion. Naphthalene detections ranging from 0.287 to 0.561 µg/m^3 exceeded the screening criterion of 0.36 µg/m^3 at four of eight locations. Naphthalene was not detected in ambient air samples. The four exceedances of naphthalene only slightly exceed the screening criterion indicating potential risk at the lower end of the risk management range. The naphthalene exceedances were detected in samples collected from Buildings 99 and 260, both of which are currently used for storage or are unoccupied. None of the VOCs commonly associated with dry cleaning solvents were detected at concentrations exceeding their respective commercial/industrial screening criteria. The indoor air sampling report concluded that there was no immediate unacceptable risk to occupants at Buildings 96, 99, 260, or 455 under the current or anticipated near-future commercial occupancy scenario (Langan, 2019d).

2.4.4.8 Site Inspection

The DON and Adanta, Inc. conducted a site inspection at Site 24 for this Five-Year Review on January 8 and 17, 2019. The purpose of the site inspection was to review and document current site conditions and evaluate visual evidence on the protectiveness of the remedial systems. Site access and general site conditions were also evaluated during the inspection. Appendix A contains the site inspection checklist, and Appendix B contains the photographic log, which documents observations made during the inspection.

Observations made during the site inspection indicated that the remedies' monitoring network was in place. However, the site inspection identified monitoring wells that were inaccessible by equipment or other materials overlaying the well, some wells were observed to be missing bolts, and one well had been damaged as it was no longer level with the ground surface. The well has since been repaired and missing bolts have been replaced.

2.4.5 Site 24 Technical Assessment

2.4.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Table 2-30: Technical Evaluation – Question A (Site 24)

Question	Summary
RA Performance	**Yes.** The groundwater and soil gas monitoring have continued and will continue to (1) document progress toward achieving cleanup levels, (2) evaluate whether the remedy is functioning properly and whether contingency actions are warranted, and (3) document when all cleanup levels have been achieved and that the remedy is complete.
System Operations/O&M	**Yes.** O&M issues were identified. Site inspection identified some inaccessible monitoring wells, missing bolts, and a damaged monitoring well box. The well has since been repaired and missing bolts have been replaced.

Question	Summary
Implementation of ICs	**Yes.** RGs will not be met by the time Site 24 is transferred, so the DON has implemented ICs in the LUC RD (Parsons, 2019) to meet the RAOs in areas of the site where cleanup goals are not met. The ICs will prevent human exposure to areas of the site where potential unacceptable risk is posed by chlorinated ethenes in groundwater. The ICs prohibit the following: • Intrusive work involving grading, soil excavation, trenching, backfilling, or groundwater contact, unless such work is conducted pursuant to an SMP approved by DTSC. The SMP shall specify the characterization, handling, and disposal requirements applicable to any contaminated media that may be encountered during site redevelopment or maintenance activities. The SMP shall also specify health and safety requirements for construction workers. • New commercial/industrial building construction within the ARIC for commercial/industrial workers and new residential building construction within the ARIC for residential use unless a VI assessment is conducted to determine whether ECs to address VI are necessary, and any required ECs are implemented and maintained by the transferee in accordance with a vapor mitigation plan reviewed and approved by DTSC. • Change of use of existing buildings from unoccupied to commercial/industrial within the ARIC for commercial/industrial workers and change from unoccupied or commercial/industrial use to residential use within the ARIC for residential uses unless a VI assessment is conducted to determine whether ECs to address VI are necessary, and any required ECs are implemented and maintained by the transferee in accordance with a vapor mitigation plan reviewed and approved by DTSC. • Residential use unless appropriate ECs are implemented that are protective of residential receptors within the ARIC for residential use.

Notes:

ARIC	Area requiring institutional controls	O&M	Operation and maintenance
DON	United States Department of the Navy	RA	Remedial action
DTSC	Department of Toxic Substances Control	RD	Remedial design
EC	Engineering control	SMP	Site management plan
IC	Institutional control	VI	Vapor intrusion
LUC	Land use control		

2.4.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of Remedy Selection Still Valid?

USEPA's guidance document for Five-Year Reviews identifies several areas for consideration in evaluating whether the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid (USEPA, 2001). Areas of consideration include changes in standards identified as ARARs and TBC criteria in the ROD/Final RAP, changes in exposure pathways, changes in toxicity and other contaminant characteristics, changes in risk assessment methods, and expected progress toward meeting RAOs.

The DON reviewed the ARARs, exposure assumptions, toxicity data, and derivation of the cleanup levels used to develop the RAOs for Site 24. The DON evaluated the protectiveness of the RG that was selected in the ROD/Final RAP. This was done by dividing the RG by a current risk-based screening level and either multiplying by 1E-06 to estimate the cancer risk or by 1 to estimate the noncancer hazard for a given chemical. The results of this evaluation were compared with standard risk thresholds in the following table for Question B to determine whether the RG is still protective.

The response to Question B is No. A newly promulgated state regulation that identifies state toxicity criteria has been identified and current default attenuation factors from DTSC, USEPA and the Regional Water Board indicate that the soil gas RGs for residential and commercial/industrial worker VI exposure are not protective.

Table 2-31: Technical Evaluation – Question B (Site 24)

Question	Summary
Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria	In September 2018, the State of California promulgated a regulation at Cal. Code Regs. title 22, Division 4.5, Chapter 51, Article 2, §§ 69020, 69021, and 69022. These provisions are applicable to cleanups done under the authority of California Health and Safety Code, Division 20, Chapters 6.8 and 6.82. The purposes of these provisions include the use of the toxicity criteria identified in Appendix I, Tables A and B for human health risk assessments, human health risk-based screening levels, and human health risk-based remediation goals. None of these regulations was selected as an ARAR in the ROD/Final RAP because the regulations had not been promulgated at the time the ROD/Final RAP was finalized. Therefore, the regulations were evaluated to determine if they call into question the protectiveness of the remedies selected in the ROD/Final RAP. The regulations at Cal. Code Regs. tit. 22 §§ 69020, 69021, and 69022 are not applicable to the RAs at Site 24 because Site 24 is being addressed under CERCLA and these regulations are applicable to sites being addressed under the authority of the California Health and Safety Code. The following regulations are relevant and appropriate because the regulations address the same chemicals that were released at the site and the regulations prescribe a method by which remediation goals are determined: Cal. Code Regs. tit. 22 §§ 69021 and 69022(c). These sections use Appendix I, Tables A and B as the primary source of toxicity criteria when determining risk-based remediation goals. Appendix I, Tables A and B contain toxicity criteria for PCE and VC,

Question	Summary
	which were identified as COCs for the resident and commercial/industrial worker exposure to vapor intrusion at Site 24. How these toxicity criteria would affect the risk-based remediation goals selected in the ROD/Final RAP is presented in Table 2-32. ***Groundwater:*** The newly promulgated criteria affect both PCE and VC. The newly promulgated criteria result in a lower concentration for PCE than was selected in the ROD/Final RAP and result in the same concentration for VC that was selected in the ROD/Final RAP. However, the newly promulgated criteria do not affect the protectiveness of the RGs because the new criteria result in cancer risks of 3E-05 for PCE and 1E-06 for VC, which are equal to the lower end of or within the risk management range, and noncancer hazards of 0.6 for PCE and 0.02 for VC, which are below the noncancer threshold of 1. Therefore, the newly promulgated criteria do not affect the protectiveness of the remedy. ***Soil Gas:*** The newly promulgated criteria affect both PCE and VC and result in lower concentrations in soil gas for VI exposure. The new criteria for PCE result in a cancer risk of 4E-05 for future commercial/industrial workers and 3E-05 for the future residents, which are within the risk management range, and noncancer hazards of 0.5 for future commercial/industrial workers and 0.4 for the future residents, which are below the noncancer threshold of 1. The new criteria for VC result in cancer risks of 4E-05 for future commercial/industrial workers and 1E-04 for future residents, which are within or equal to the top end of the risk management range, and noncancer hazards of 0.01 for future commercial/industrial workers and 0.009 for future residents, which are below the noncancer threshold of 1. The newly promulgated criteria affect the protectiveness of the remedy for VC but not PCE. There were no changes to other ARARs selected in the ROD/Final RAP that affect the protectiveness of the remedy.
Changes in Toxicity and Other Contaminant Characteristics	***Groundwater:*** The 2008 RI/FFS included the HHRA from which the COCs were originally identified. The groundwater RGs were revised from those calculated in the 2008 RI/FFS in the 2014 FFS Addendum (TriEco-Tt, 2014). RGs are based on the construction worker scenario (i.e., someone working in a trench who could be in skin contact with the groundwater and could inhale VOCs which volatilize from the groundwater). Since the 2014 update to the groundwater RGs, there have been revisions to the toxicity criteria for PCE and cis-1,2-DCE. Table 2-32 shows the groundwater screening levels, which are derived based on a target cancer risk of 1E-06 and target noncancer hazard of 1. Use of the current USEPA criteria results in concentrations greater than the RGs for all COCs, with cancer risks ranging from 1E-07 to 6E-07 that are below the risk management range, and noncancer hazards ranging from 0.02 to 0.8 that are below the noncancer threshold of 1. Using the current DTSC criteria, concentrations changed only slightly, except for PCE. However, use of the current DTSC toxicity criteria relative to the RGs selected in the ROD/Final RAP, including PCE, results in cancer risks ranging from 2E-07 to 3E-05, which are below or

Question	Summary
	within the risk management range, and noncancer hazards ranging from 0.02 to 1, which are below or equal to the noncancer threshold of 1. If the groundwater cleanup goals are evaluated using current toxicity criteria and exposure parameters, the cleanup criteria are protective of the construction worker. ***Soil Gas:*** The development of the soil gas RGs for cis-1,2-DCE, PCE, TCE and VC is described in Attachment 1 to the Focused Feasibility Study Addendum (TriEco-Tt, 2014). Soil gas RGs were developed using building-specific parameters (for example, thickness of soil stratum) and site-specific/chemical-specific soil gas attenuation factors. Table 2-33 shows the soil gas RGs, which are derived based on a target cancer risk of 1E-06 and target noncancer hazard of 1. The toxicity criteria for TCE and VC are current. The inhalation unit risk for PCE used in the development of the cleanup goals was 5.9E-06 $(\mu g/m^3)^{-1}$ whereas the current value from the DTSC Human and Ecological Risk Office (HERO) April 2019 Note #3 is 6.1E-06 $(\mu g/m^3)^{-1}$. The reference concentration used in the cleanup value for cis-1,2-DCE was 3.5E-02 mg/m^3, which is an extrapolated value based on the oral route of exposure, as is the basis of the HERO April 2019 Note #3 DTSC value of 8.0E-03 mg/m^3. While some toxicity criteria have changed since the ROD/Final RAP, the resulting cancer risks and noncancer hazards were more impacted by the changes to the default attenuation factors that are discussed in the next row, Changes in Risk Assessment Methods. ***Radiological:*** The goals developed for radioisotopes of concern, Radium (Ra)-226 and Cesium (Cs)-137, are site-specific goals developed in the Final Radiological Management Plan (ITSI Gilbane, 2013). There have been no changes that affect the protectiveness of these goals.
Changes in Risk Assessment Methods	***Dermal Contact with Groundwater:*** The construction worker could contact groundwater while working in a trench. Two exposure factors for the construction worker have been revised since the risk assessment was finalized: the adult body weight has changed from 70 kg to 80 kg and the skin surface area exposed to groundwater in the trench for the construction worker has changed from 5,700 cm^2 to 6,032 cm^2 (DTSC, 2019). ***Inhalation of Soil Gas Inside a Building***: The soil gas RGs selected in the ROD/Final RAP were developed using standard exposure parameters and methods for VI for commercial worker and residential scenarios. The attenuation factor to account for how a chemical reduces (or attenuates) in concentration from below the slab of a building to the concentration within a building was developed by the DON using site-specific information for each COC (TriEco-Tt, 2014). Currently, DTSC, the Regional Water Board, and USEPA have implemented a default attenuation factor of 0.03 for VI screening levels. Revision of the soil gas cleanup levels from the site-specific attenuation factor to the generic

Question	Summary
	factor of 0.03 would substantially reduce the soil gas RGs for all COCs (see Table 2-33). As a result, the soil gas RGs for cis-1,2-DCE, TCE, and VC are not protective. Using the current default attenuation factors and current DTSC toxicity criteria, the soil gas RG for cis-1,2-DCE is not protective based on a noncancer hazard of 179 for future commercial/industrial workers and 167 for future residents; these results exceed the noncancer threshold of 1. No cancer risk estimate is available for cis-1,2-DCE because the chemical is not carcinogenic. The soil gas RG for TCE is not protective based on a noncancer hazard of 14 for future commercial/industrial workers and 9 for future residents; these results exceed the noncancer threshold of 1. The cancer risks for TCE of 4E-05 for future commercial/industrial workers and 4E-05 for future residents are within the risk management range. The soil gas RG for VC is not protective based on a cancer result of 1E-04 that is equal to the high end of the risk management range for future residents, though the cancer risk is 4E-05 for the future commercial/industrial workers is within the risk management range. The noncancer hazards for VC of 0.01 for future commercial/industrial workers and 0.009 for future residents are less than the noncancer threshold of 1. The soil gas RG for PCE is protective based on a cancer risk of 4E-05 for future commercial/industrial workers and 3E-05 for future residents, which are within the risk management range, and noncancer hazards of 0.5 for future commercial/industrial workers and 0.4 for future residents, which are below the noncancer threshold of 1.
Changes in Exposure Pathways	Results of the HHRA indicated that concentrations of COCs in groundwater posed unacceptable risk to future commercial/industrial workers and future residents via the VI to indoor air pathway and to future construction workers via dermal exposure to groundwater and inhalation of trench vapors. Physical site conditions or the understanding of these conditions have not changed in a way that could affect the protectiveness of the remedies. Land use at Site 24 has not changed since the ROD/Final RAP was signed; however, land use at NAVSTA TI is expected to change as parcels are transferred and the land is redeveloped. Exposure assumptions developed in the HHRAs considered the potential future exposures based on the expected reuses. The future redevelopment plan (CCSF, 2011) did not introduce any new exposure scenarios that were not already considered by the HHRAs and ROD/Final RAPs. No new human health or ecological routes of exposure that could affect the protectiveness of the remedies have been identified. No changes to site conditions that could result in increased exposure have been identified. The protectiveness of the remedies is sufficient because the remedy is based in ICs and LUCs. The VI exposure pathway is the

Question	Summary
	primary pathway considered during the risk assessments that were used to support remedy selection along with construction worker dermal and inhalation within a trench exposure.
Expected Progress Towards Meeting RAOs	The remedies at Site 24 are progressing as expected. ICs are in place and are working to prevent exposure. Groundwater COC concentrations are all at or below groundwater RGs, except cis-1,2-DCE (at well 24-TW-48R) and VC (at wells 24-TW-11, 24-TW-47R, and 24-TW-48R). Mann-Kendall trend analyses estimated no trend for wells 24-TW-48R and 24-TW-11 and insufficient data for well 24-TW-47R (NOREAS, 2019b). Soil gas concentrations for cis-1,2-DCE and VC were not reported above the residential RGs. Soil gas concentrations of PCE and TCE were reported above the residential RGs. Mann-Kendall trend analyses estimated decreasing, probably decreasing, stable, or no trends (NOREAS, 2019b). However, the review of the soil gas RGs in the ROD/Final RAP indicates that the soil gas RGs will be revised.

Notes:

§	Section
ARAR	Applicable or relevant and appropriate requirement
ARIC	Area requiring institutional controls
COC	Contaminant of concern
DCE	Dichloroethene
DON	United States Department of the Navy
DTSC HERO	California Department of Toxic Substances Control Human and Ecological Risk Office
FFS	Focused feasibility study
HHRA	Human health risk assessment
IC	Institutional control
LUC	Land use control
NAVSTA TI	Naval Station Treasure Island
PCE	Tetrachloroethene
RA	Remedial action
RAP	Remedial action plan
RD	Remedial design
RG	Remediation goal
RI	Remedial investigation
ROD	Record of decision
TCE	Trichloroethene
VC	Vinyl chloride

2.4.5.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No new human health or ecological risks have been identified. No other information has been identified to suggest that the remedies may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have affected the protectiveness of the remedy.

2.4.6 Site 24 Issues, Recommendations, and Follow-Up Actions

Issues	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
Use of current default attenuation factors from USEPA, DTSC, and Regional Water Board results in lower concentrations of cis-1,2-DCE, TCE, and VC in soil gas that are acceptable for resident and commercial/industrial worker VI exposures, indicating that the RGs selected in the ROD/Final RAP are not protective.	No	Yes	Revise soil gas RGs for cis-1,2-DCE, TCE, and VC selected in ROD/Final RAP. The ROD/Final RAP selected ICs as the remedy to address exposure to residual VI risk remaining after the groundwater treatment was complete and while concentrations of COCs in soil gas attenuate. Therefore, revising the soil gas RGs is necessary to ensure the ICs are enforceable and implemented when concentrations of COCs in soil gas are not at protective levels.	DON	DTSC	May 2023
Consideration of newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) results in a lower concentration of	No	Yes	Revise the soil gas RG for VC that was selected in ROD/Final RAP. The ROD/Final RAP selected ICs as the remedy to address exposure to residual VI risk remaining after the groundwater treatment was	DON	DTSC	May 2023

Issues	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
VC in soil gas acceptable for resident and commercial/industrial worker VI exposures indicating the RGs selected in the ROD/Final RAP are not protective.			complete and while concentrations of COCs in soil gas attenuate. Therefore, revising the RG is necessary to ensure the ICs are enforceable and implemented when VC concentrations in soil gas are not at protective levels.			
Site inspection identified inaccessible monitoring wells.	No	No	Ensure wells are accessible prior to any monitoring event.	DON	DTSC	May 2021
Soil gas concentrations are not fully delineated based on the current USEPA, DTSC, and Regional Water Board default attenuation factors.	No	Yes	Perform additional sampling to delineate the soil gas plume.	DON	DTSC	May 2021

Notes:

COC Chemical of concern
DCE Dichloroethene
DON United States Department of the Navy
DTSC California Department of Toxic Substances Control
IC Institutional control
PCE Tetrachloroethene
RAP Remedial action plan
Regional Water Board California Environmental Protection Agency Regional Water Quality Control Board, San Francisco Bay Region
RG Remediation goal
ROD Record of decision
TCE Trichloroethene
USEPA United States Environmental Protection Agency
VC Vinyl chloride
VI Vapor intrusion

2.4.7 Site 24 Protectiveness Statement

Site(s): Site 24	**Protectiveness Determination:** Protective in the Short-term
Protectiveness Statement: The remedy for Site 24 is protective in the short-term for human health and the environment because no unacceptable exposure is occurring. RAOs have been met, soil excavation and groundwater treatment are complete, and the LUC RD has been finalized with an expanded area requiring institutional controls (ARIC). In addition, the recent indoor air evaluation concluded that there was no immediate unacceptable risk to current users at Buildings 96 and 260 from VI. However, the current USEPA, DTSC, and Regional Water Board default attenuation factors and the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) indicate that the RGs selected in the ROD/Final RAP for cis-1,2-DCE, TCE, and VC in soil gas are not protective of VI exposure for the resident and commercial/industrial worker. In order to be protective in the long-term, the RGs selected in the ROD/Final RAP will be reevaluated and revised, if necessary, and any potential soil gas plume outside the current ARIC for Site 24 will be delineated.	

SITE 24 FIGURES

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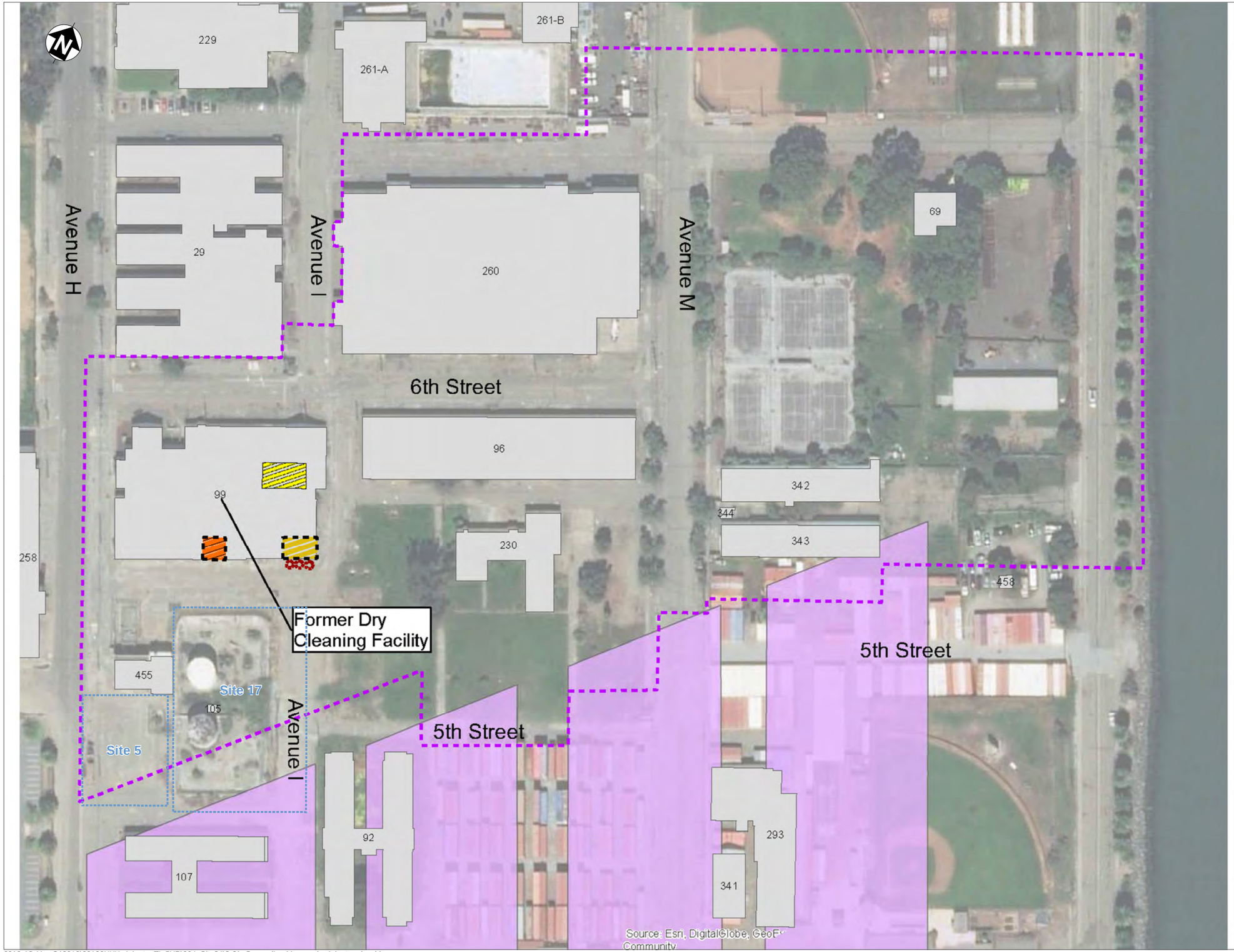

NAVAL STATION TREASURE ISLAND BOUNDARY
SITE 24 BOUNDARY
BUILDING/STRUCTURE
PLANNED FUTURE RESIDENTIAL LAND USE
FORMER INSTALLATION RESTORATION SITE

Three 1,000-Gallon Solvent USTs Shown in 1948 Navy PWC Map
Dry Cleaning Equipment Room Shown in 1948 Navy PWC Map
Dry Cleaning Equipment Room Shown in 1984 Navy PWC Map
Laundry Equipment Room Shown in 1958 Navy PWC Map

Notes:
PWC Navy Public Works Center
UST Underground Storage Tank

Source: Parsons, 2017

60 0 60 120
Feet

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-21

SITE 24
GENERAL LOCATION MAP

Second Five-Year Review

2019-12-11 C:\2019\20190XXX_Adanta_TI_5YR\004_Site24\2-21_GeneralLocMap.mxd Adanta brodrigues

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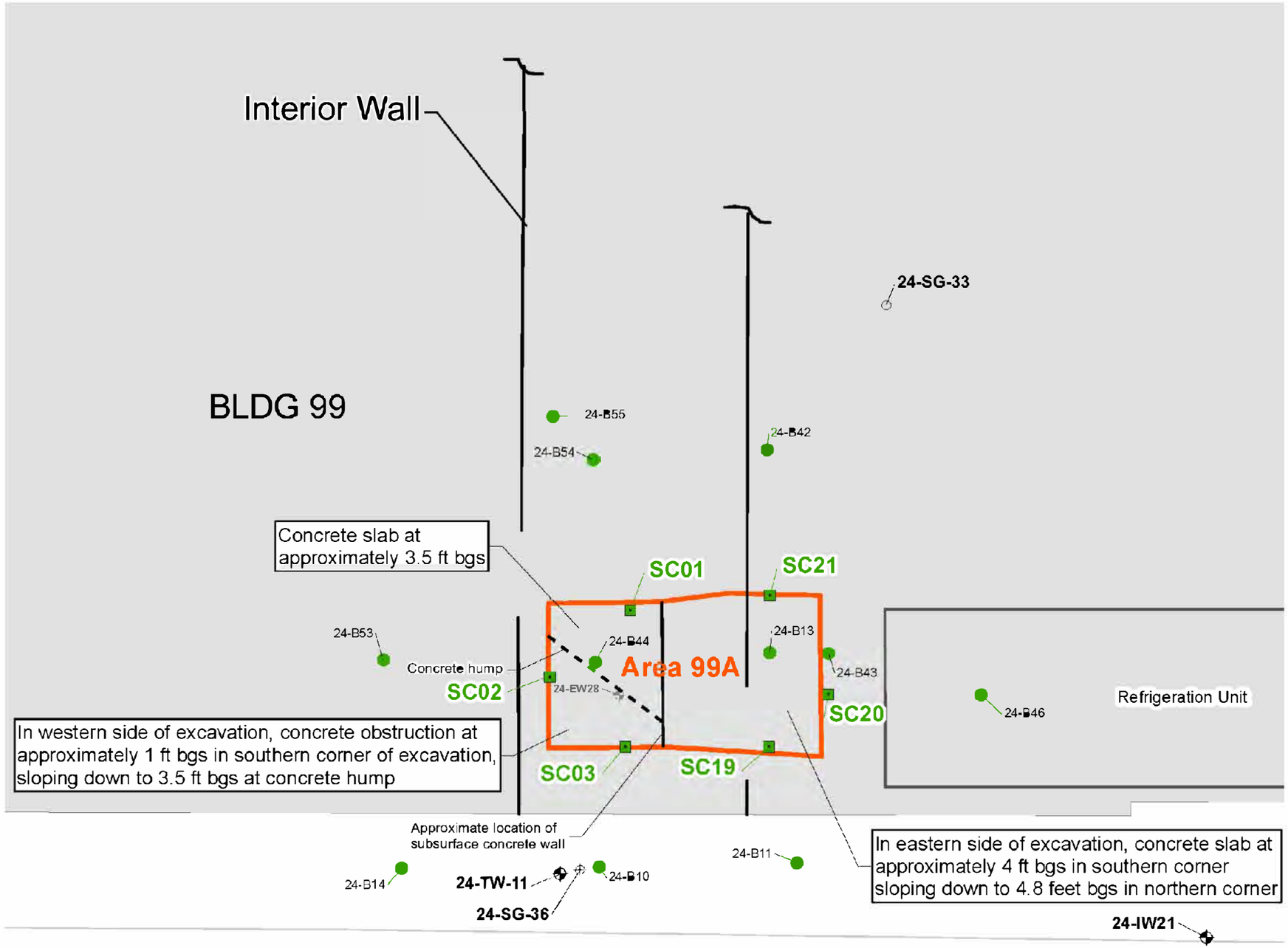

PERFORMANCE GROUNDWATER MONITORING WELL
ABANDONED GROUNDWATER MONITORING WELL
PERFORMANCE SOIL GAS MONITORING WELL
NAVAL STATION TREASURE ISLAND BOUNDARY
IR SITE 24 BOUNDARY
BUILDING/STRUCTURE
PLANNED FUTURE RESIDENTIAL LAND USE
PCE AND TCE BELOW SCREENING LEVELS IN PRE-DESIGN SOIL SAMPLE
PCE AND TCE BELOW SCREENING LEVELS IN SOIL CONFIRMATION SAMPLE
EXCAVATION EXTENT

Notes:
1. All sidewall samples collected at 3 ft bgs, except SC03 which was collected at 2.5 ft bgs.
2. Excavation proceeded vertically until concrete obstructions encountered. Pre-design site characterization soil samples 24-B44 collected at 5.5 ft bgs and 24-B13 collected at 6 ft bgs indicate that soil beneath the concrete is not impacted by the site contaminants of concern.

PCE Soil Screening Criterion 0.576 mg/kg
TCE Soil Screening Criterion 0.124 mg/kg

ft bgs feet below ground surface
mg/kg milligrams per kilogram
PCE tetrachloroethene
TCE trichloroethene

Source: Parsons, 2017

5 0 5 10
Feet

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-22

SITE 24
AREA 99A EXCAVATION EXTENTS AND SOIL CONFIRMATION SAMPLE RESULTS

Second Five-Year Review

2019-07-09 W:\2018\20180120_Adanta_Support\Treasure_Island\08_IR24_5YR\2.4-2_Area99A_Exca_ConfResults.mxd Adanta brodrigues

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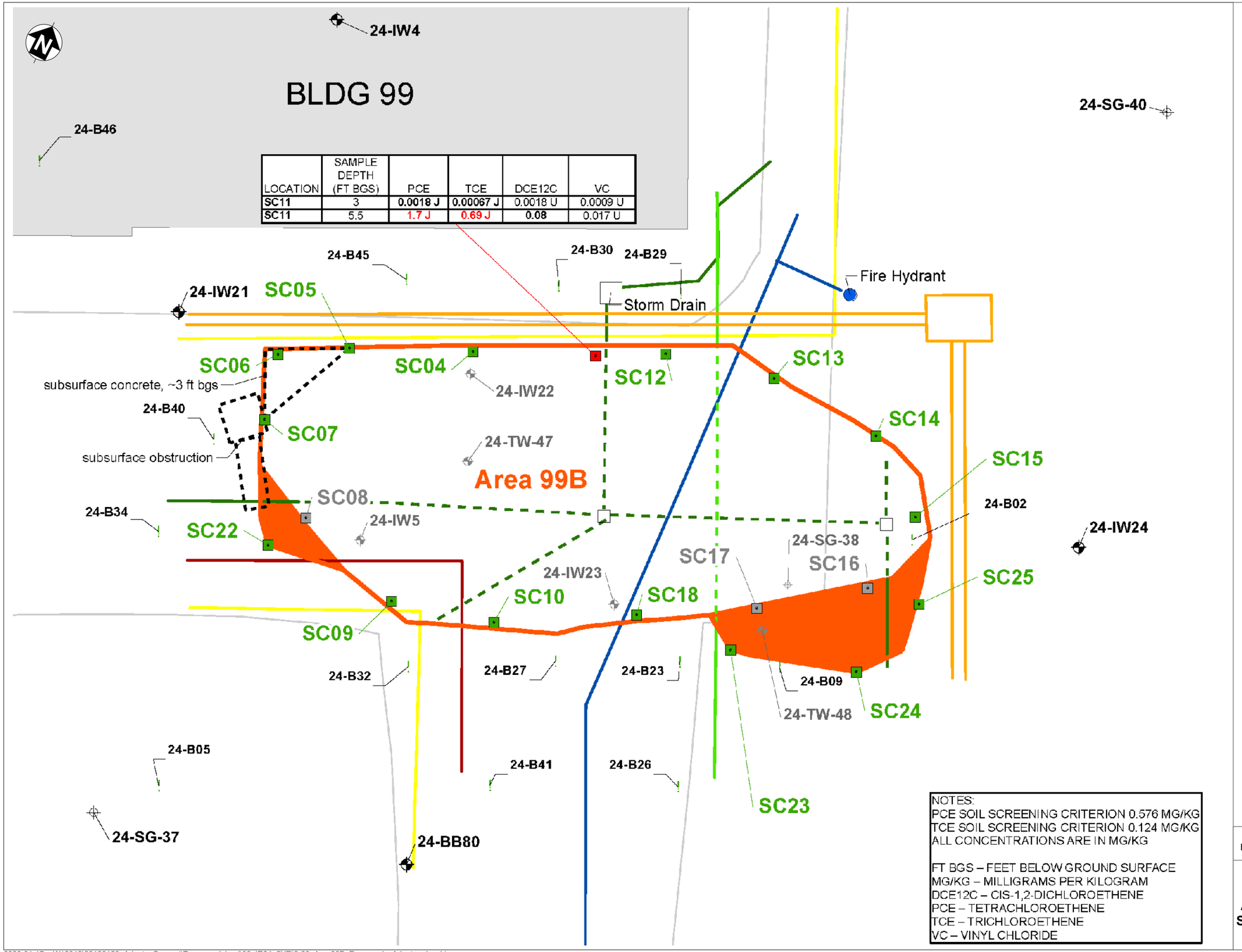

LOCATION	SAMPLE DEPTH (FT BGS)	PCE	TCE	DCE12C	VC
SC11	3	0.0018 J	0.00067 J	0.0018 U	0.0009 U
SC11	5.5	1.7 J	0.69 J	0.08	0.017 U

PERFORMANCE GROUNDWATER MONITORING WELL
ABANDONED GROUNDWATER MONITORING WELL
PERFORMANCE SOIL GAS MONITORING WELL
ABANDONED SOIL GAS WELL
BUILDING/STRUCTURE
PLANNED FUTURE RESIDENTIAL LAND USE
PCE AND TCE ABOVE SCREENING LEVELS IN SOIL CONFIRMATION SAMPLE
PCE AND TCE BELOW SCREENING LEVELS IN SOIL CONFIRMATION SAMPLE
SOIL SAMPLE SUBSEQUENTLY EXCAVATED
PCE AND TCE BELOW SCREENING LEVELS IN PRE-DESIGN SOIL SAMPLE
EXCAVATION EXTENT
ADDITIONAL EXCAVATION EXTENT

UTILITIES, DASHED WHERE REMOVED
STEAM LINE
UNKNOWN UTILITY
STORM DRAIN LINE
SANITARY SEWER LINE
WATER LINE
GAS LINE

Notes:
1. All sidewall samples collected at approximately 3 and 6 ft bgs, except SC06 was collected only at 3 ft bgs.
2. Excavation proceeded vertically until groundwater encounter at approximately 7 ft bgs.

Source: Parsons, 2017

15 0 15 Feet

NOTES:
PCE SOIL SCREENING CRITERION 0.576 MG/KG
TCE SOIL SCREENING CRITERION 0.124 MG/KG
ALL CONCENTRATIONS ARE IN MG/KG

FT BGS – FEET BELOW GROUND SURFACE
MG/KG – MILLIGRAMS PER KILOGRAM
DCE12C – CIS-1,2-DICHLOROETHENE
PCE – TETRACHLOROETHENE
TCE – TRICHLOROETHENE
VC – VINYL CHLORIDE

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FIGURE 2-23
SITE 24
AREA 99B EXCAVATION EXTENTS AND SOIL CONFIRMATION SAMPLE RESULTS
Second Five-Year Review

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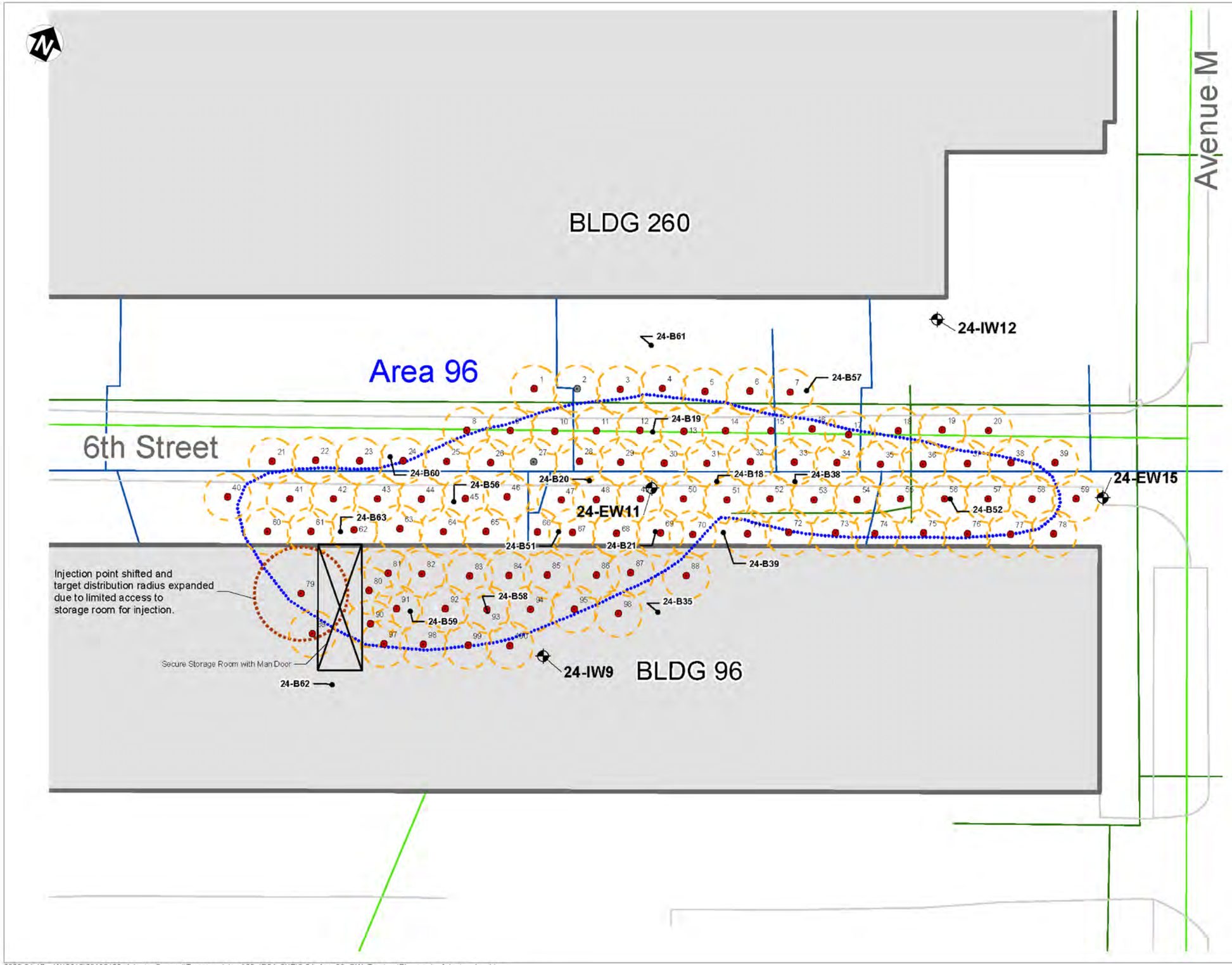

Notes:
1. Vertical treatment interval was 15 to 25 feet below ground surface.
2. Injection point locations were adjusted in the field for avoidance of subsurface utilities or other obstructions.
3. Injection locations 2 and 27 could not be completed to due to subsurface obstructions. The volume of groundwater treatment products intended for those locations was injected at adjacent injection points 10 and 11.

Source: Parsons, 2017

15 0 15 30
Feet

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FIGURE 2-24
SITE 24
AREA 96 GROUNDWATER TREATMENT LAYOUT

Second Five-Year Review

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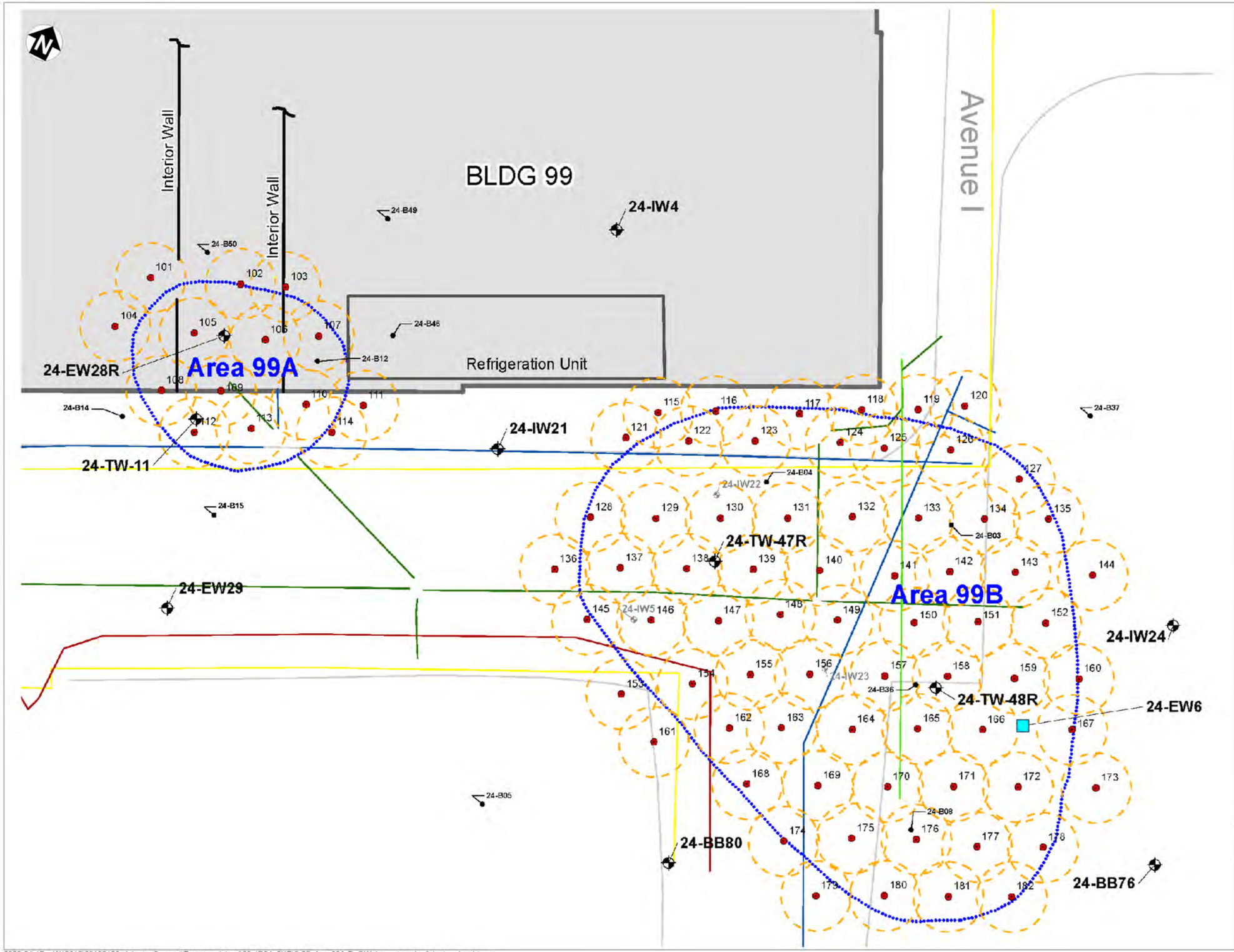

Notes:

1. Vertical treatment interval for Area 99A Injection points (101 to 114) was 7.5 to 25 feet below ground surface.
2. Vertical treatment for Area 99B injection points (115 to 182) was 7.5 to 35 feet below ground surface.
3. Injection point locations were adjusted in the field for avoidance of subsurface utilities or other obstructions.

Source: Parsons, 2017

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FIGURE 2-25
SITE 24
AREAS 99A AND 99B GROUNDWATER TREATMENT LAYOUT

Second Five-Year Review

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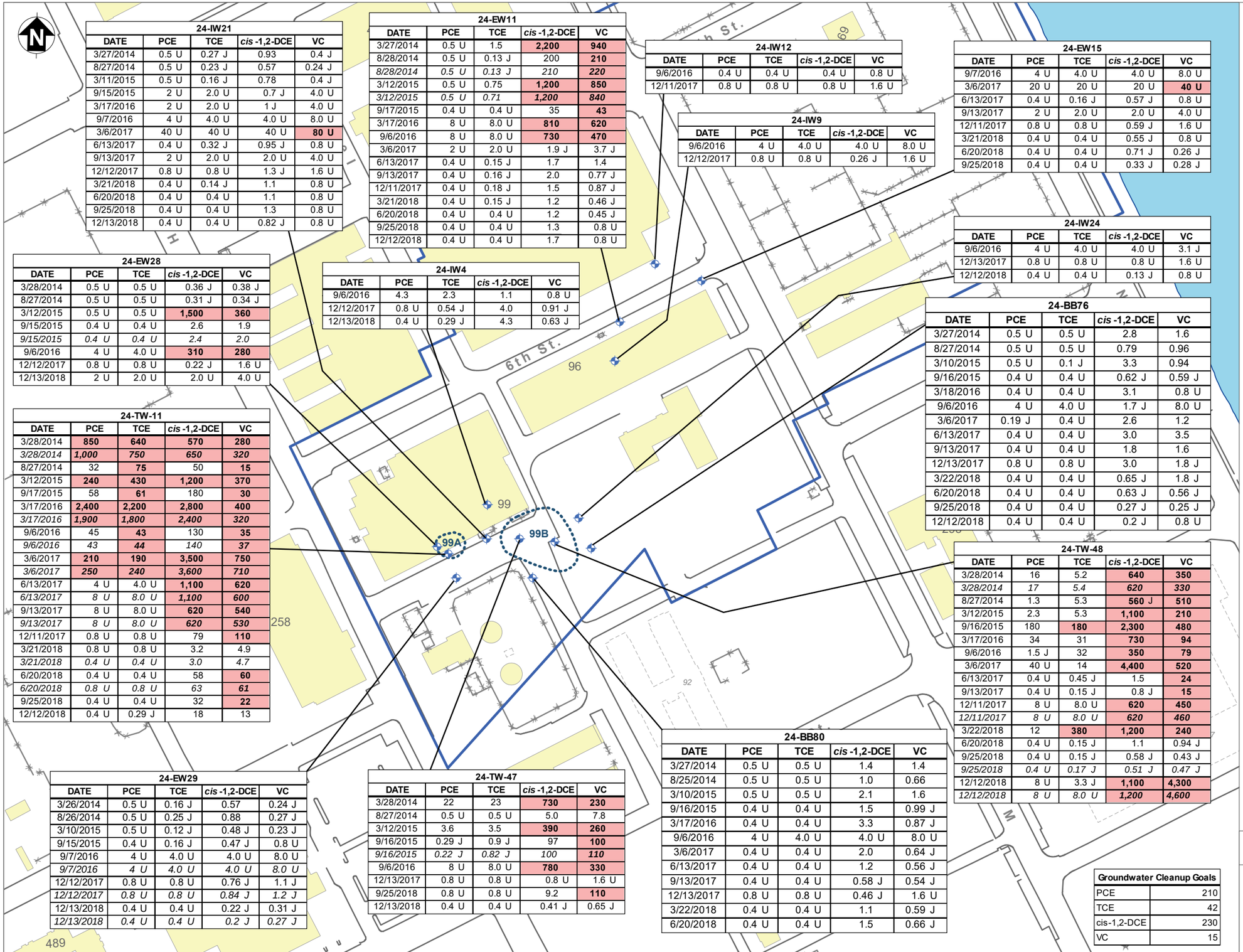

24-IW21

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/27/2014	0.5 U	0.27 J	0.93	0.4 J
8/27/2014	0.5 U	0.23 J	0.57	0.24 J
3/11/2015	0.5 U	0.16 J	0.78	0.4 J
9/15/2015	2 U	2.0 U	0.7 J	4.0 U
3/17/2016	2 U	2.0 U	1 J	4.0 U
9/7/2016	4 U	4.0 U	4.0 U	8.0 U
3/6/2017	40 U	40 U	40 U	**80 U**
6/13/2017	0.4 U	0.32 J	0.95 J	0.8 U
9/13/2017	2 U	2.0 U	2.0 U	4.0 U
12/12/2017	0.8 U	0.8 U	1.3 J	1.6 U
3/21/2018	0.4 U	0.14 J	1.1	0.8 U
6/20/2018	0.4 U	0.4 U	1.1	0.8 U
9/25/2018	0.4 U	0.4 U	1.3	0.8 U
12/13/2018	0.4 U	0.4 U	0.82 J	0.8 U

24-EW11

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/27/2014	0.5 U	1.5	**2,200**	**940**
8/28/2014	0.5 U	0.13 J	200	**210**
8/28/2014	*0.5 U*	*0.13 J*	*210*	***220***
3/12/2015	0.5 U	0.75	**1,200**	**850**
3/12/2015	*0.5 U*	*0.71*	***1,200***	***840***
9/17/2015	0.4 U	0.4 U	35	**43**
3/17/2016	8 U	8.0 U	**810**	**620**
9/6/2016	8 U	8.0 U	**730**	**470**
3/6/2017	2 U	2.0 U	1.9 J	3.7 J
6/13/2017	0.4 U	0.15 J	1.7	1.4
9/13/2017	0.4 U	0.16 J	2.0	0.77 J
12/11/2017	0.4 U	0.18 J	1.5	0.87 J
3/21/2018	0.4 U	0.15 J	1.2	0.46 J
6/20/2018	0.4 U	0.4 U	1.2	0.45 J
9/25/2018	0.4 U	0.4 U	1.3	0.8 U
12/12/2018	0.4 U	0.4 U	1.7	0.8 U

24-IW12

DATE	PCE	TCE	*cis* -1,2-DCE	VC
9/6/2016	0.4 U	0.4 U	0.4 U	0.8 U
12/11/2017	0.8 U	0.8 U	0.8 U	1.6 U

24-IW9

DATE	PCE	TCE	*cis* -1,2-DCE	VC
9/6/2016	4 U	4.0 U	4.0 U	8.0 U
12/12/2017	0.8 U	0.8 U	0.26 J	1.6 U

24-EW15

DATE	PCE	TCE	*cis* -1,2-DCE	VC
9/7/2016	4 U	4.0 U	4.0 U	8.0 U
3/6/2017	20 U	20 U	20 U	**40 U**
6/13/2017	0.4 U	0.16 J	0.57 J	0.8 U
9/13/2017	2 U	2.0 U	2.0 U	4.0 U
12/11/2017	0.8 U	0.8 U	0.59 J	1.6 U
3/21/2018	0.4 U	0.4 U	0.55 J	0.8 U
6/20/2018	0.4 U	0.4 U	0.71 J	0.26 J
9/25/2018	0.4 U	0.4 U	0.33 J	0.28 J

24-EW28

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/28/2014	0.5 U	0.5 U	0.36 J	0.38 J
8/27/2014	0.5 U	0.5 U	0.31 J	0.34 J
3/12/2015	0.5 U	0.5 U	**1,500**	**360**
9/15/2015	0.4 U	0.4 U	2.6	1.9
9/15/2015	*0.4 U*	*0.4 U*	*2.4*	*2.0*
9/6/2016	4 U	4.0 U	**310**	**280**
12/12/2017	0.8 U	0.8 U	0.22 J	1.6 U
12/13/2018	2 U	2.0 U	2.0 U	4.0 U

24-IW4

DATE	PCE	TCE	*cis* -1,2-DCE	VC
9/6/2016	4.3	2.3	1.1	0.8 U
12/12/2017	0.8 U	0.54 J	4.0	0.91 J
12/13/2018	0.4 U	0.29 J	4.3	0.63 J

24-IW24

DATE	PCE	TCE	*cis* -1,2-DCE	VC
9/6/2016	4 U	4.0 U	4.0 U	3.1 J
12/13/2017	0.8 U	0.8 U	0.8 U	1.6 U
12/12/2018	0.4 U	0.4 U	0.13 J	0.8 U

24-BB76

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/27/2014	0.5 U	0.5 U	2.8	1.6
8/27/2014	0.5 U	0.5 U	0.79	0.96
3/10/2015	0.5 U	0.1 J	3.3	0.94
9/16/2015	0.4 U	0.4 U	0.62 J	0.59 J
3/18/2016	0.4 U	0.4 U	3.1	0.8 U
9/6/2016	4 U	4.0 U	1.7 J	8.0 U
3/6/2017	0.19 J	0.4 U	2.6	1.2
6/13/2017	0.4 U	0.4 U	3.0	3.5
9/13/2017	0.4 U	0.4 U	1.8	1.6
12/13/2017	0.8 U	0.8 U	3.0	1.8 J
3/22/2018	0.4 U	0.4 U	0.65 J	1.8 J
6/20/2018	0.4 U	0.4 U	0.63 J	0.56 J
9/25/2018	0.4 U	0.4 U	0.27 J	0.25 J
12/12/2018	0.4 U	0.4 U	0.2 J	0.8 U

24-TW-11

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/28/2014	**850**	**640**	**570**	**280**
3/28/2014	***1,000***	***750***	***650***	***320***
8/27/2014	32	**75**	50	**15**
3/12/2015	**240**	**430**	**1,200**	**370**
9/17/2015	58	**61**	180	**30**
3/17/2016	**2,400**	**2,200**	**2,800**	**400**
3/17/2016	***1,900***	***1,800***	***2,400***	***320***
9/6/2016	45	**43**	130	**35**
9/6/2016	*43*	***44***	*140*	***37***
3/6/2017	**210**	**190**	**3,500**	**750**
3/6/2017	***250***	***240***	***3,600***	***710***
6/13/2017	4 U	4.0 U	**1,100**	**620**
6/13/2017	*8 U*	*8.0 U*	***1,100***	***600***
9/13/2017	8 U	8.0 U	**620**	**540**
9/13/2017	*8 U*	*8.0 U*	***620***	***530***
12/11/2017	0.8 U	0.8 U	79	**110**
3/21/2018	0.8 U	0.8 U	3.2	4.9
3/21/2018	*0.4 U*	*0.4 U*	*3.0*	*4.7*
6/20/2018	0.4 U	0.4 U	58	**60**
6/20/2018	*0.8 U*	*0.8 U*	*63*	***61***
9/25/2018	0.4 U	0.4 U	32	**22**
12/12/2018	0.4 U	0.29 J	18	13

24-TW-48

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/28/2014	16	5.2	**640**	**350**
3/28/2014	*17*	*5.4*	***620***	***330***
8/27/2014	1.3	5.3	**560** J	**510**
3/12/2015	2.3	5.3	**1,100**	**210**
9/16/2015	180	**180**	**2,300**	**480**
3/17/2016	34	31	**730**	**94**
9/6/2016	1.5 J	32	**350**	**79**
3/6/2017	40 U	14	**4,400**	**520**
6/13/2017	0.4 U	0.45 J	1.5	**24**
9/13/2017	0.4 U	0.15 J	0.8 J	**15**
12/11/2017	8 U	8.0 U	**620**	**450**
12/11/2017	*8 U*	*8.0 U*	***620***	***460***
3/22/2018	12	**380**	**1,200**	**240**
6/20/2018	0.4 U	0.15 J	1.1	0.94 J
9/25/2018	0.4 U	0.15 J	0.58 J	0.43 J
9/25/2018	*0.4 U*	*0.17 J*	*0.51 J*	*0.47 J*
12/12/2018	8 U	3.3 J	**1,100**	**4,300**
12/12/2018	*8 U*	*8.0 U*	***1,200***	***4,600***

24-EW29

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/26/2014	0.5 U	0.16 J	0.57	0.24 J
8/26/2014	0.5 U	0.25 J	0.88	0.27 J
3/10/2015	0.5 U	0.12 J	0.48 J	0.23 J
9/15/2015	0.4 U	0.16 J	0.47 J	0.8 U
9/7/2016	4 U	4.0 U	4.0 U	8.0 U
9/7/2016	*4 U*	*4.0 U*	*4.0 U*	*8.0 U*
12/12/2017	0.8 U	0.8 U	0.76 J	1.1 J
12/12/2017	*0.8 U*	*0.8 U*	*0.84 J*	*1.2 J*
12/13/2018	0.4 U	0.4 U	0.22 J	0.31 J
12/13/2018	*0.4 U*	*0.4 U*	*0.2 J*	*0.27 J*

24-TW-47

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/28/2014	22	23	**730**	**230**
8/27/2014	0.5 U	0.5 U	5.0	7.8
3/12/2015	3.6	3.5	**390**	**260**
9/16/2015	0.29 J	0.9 J	97	**100**
9/16/2015	*0.22 J*	*0.82 J*	*100*	***110***
9/6/2016	8 U	8.0 U	**780**	**330**
12/13/2017	0.8 U	0.8 U	0.8 U	1.6 U
9/25/2018	0.8 U	0.8 U	9.2	**110**
12/13/2018	0.4 U	0.4 U	0.41 J	0.65 J

24-BB80

DATE	PCE	TCE	*cis* -1,2-DCE	VC
3/27/2014	0.5 U	0.5 U	1.4	1.4
8/25/2014	0.5 U	0.5 U	1.0	0.66
3/10/2015	0.5 U	0.5 U	2.1	1.6
9/16/2015	0.4 U	0.4 U	1.5	0.99 J
3/17/2016	0.4 U	0.4 U	3.3	0.87 J
9/6/2016	4 U	4.0 U	4.0 U	8.0 U
3/6/2017	0.4 U	0.4 U	2.0	0.64 J
6/13/2017	0.4 U	0.4 U	1.2	0.56 J
9/13/2017	0.4 U	0.4 U	0.58 J	0.54 J
12/13/2017	0.8 U	0.8 U	0.46 J	1.6 U
3/22/2018	0.4 U	0.4 U	1.1	0.59 J
6/20/2018	0.4 U	0.4 U	1.5	0.66 J

Groundwater Cleanup Goals	
PCE	210
TCE	42
cis-1,2-DCE	230
VC	15

Monitoring Well Location
Building
Demolished Building
Fence
Road Curb
Approximate Extent of Groundwater with COC Concentrations Exceeding Cleanup Goals
Site 24 Boundary

Notes:
1. All concentrations measured in µg/L.
2. Groundwater cleanup goals presented in the Final Record of Decision/Final Remedial Action Plan for Installation Restoration Site 24, Former Naval Station Treasure Island, San Francisco, California (DON 2015).
3. Duplicate sample are *italicized*
4. Concentrations shaded **RED** exceed the Groundwater cleanup goal. Results from 2014 through 2018 shown.

COC Chemical of concern
DCE Dichloroethene
J Validation flag signifying analyte reported between the reporting limit and method detection limit
µg/L Micrograms per liter
PCE Tetrachloroethene
TCE Trichloroethene
U Analyte not reported at or above the method detection limit
VC Vinyl chloride

75 0 75 150
Feet

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-26
SITE 24
PERFORMANCE GROUNDWATER MONITORING
Second Five-Year Review

2019-12-11 C:\2019\20190XXX_Adanta_TI_5YR\004_Site24\2-26_GW_Results_rev2.mxd Adanta brodrigues

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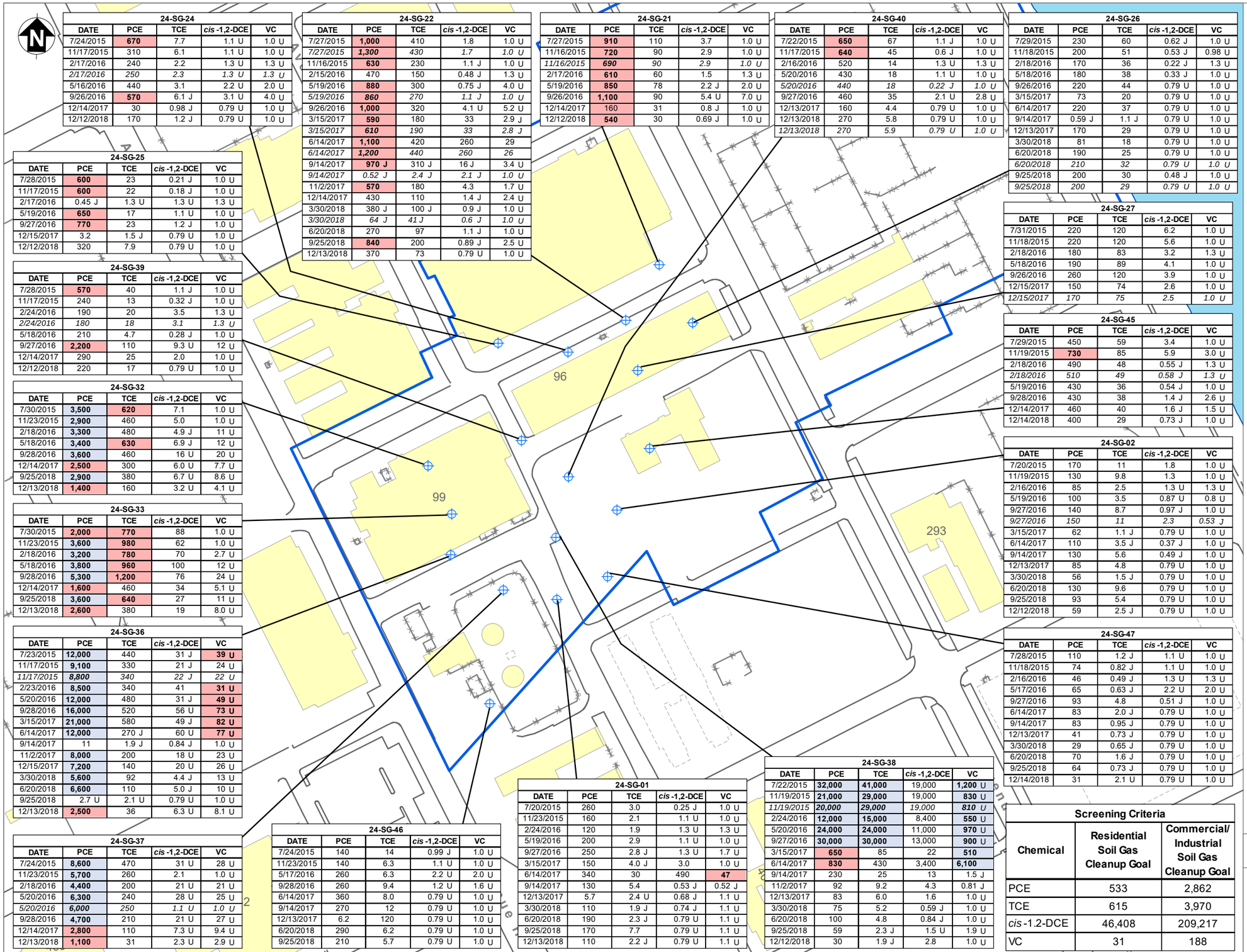

24-SG-24

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/24/2015	**670**	7.7	1.1 U	1.0 U
11/17/2015	310	6.1	1.1 U	1.0 U
2/17/2016	240	2.2	1.3 U	1.3 U
2/17/2016	*250*	*2.3*	*1.3 U*	*1.3 U*
5/16/2016	440	3.1	2.2 U	2.0 U
9/26/2016	**570**	6.1 J	3.1 U	4.0 U
12/14/2017	30	0.98 J	0.79 U	1.0 U
12/12/2018	170	1.2 J	0.79 U	1.0 U

24-SG-22

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/27/2015	**1,000**	410	1.8	1.0 U
7/27/2015	***1,300***	*430*	*1.7*	*1.0 U*
11/16/2015	**630**	230	1.1 J	1.0 U
2/15/2016	470	150	0.48 J	1.3 U
5/19/2016	**880**	300	0.75 J	4.0 U
5/19/2016	***860***	*270*	*1.1 J*	*1.0 U*
9/26/2016	**1,000**	320	4.1 U	5.2 U
3/15/2017	**590**	180	33	2.9 J
3/15/2017	***610***	*190*	*33*	*2.8 J*
6/14/2017	**1,100**	420	260	29
6/14/2017	***1,200***	*440*	*260*	*26*
9/14/2017	**970 J**	310 J	16 J	3.4 U
9/14/2017	*0.52 J*	*2.4 J*	*2.1 J*	*1.0 U*
11/2/2017	**570**	180	4.3	1.7 U
12/14/2017	430	110	1.4 J	2.4 U
3/30/2018	380 J	100 J	0.9 J	1.0 U
3/30/2018	*64 J*	*41 J*	*0.6 J*	*1.0 U*
6/20/2018	270	97	1.1 J	1.0 U
9/25/2018	**840**	200	0.89 J	2.5 U
12/13/2018	370	73	0.79 U	1.0 U

24-SG-21

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/27/2015	**910**	110	3.7	1.0 U
11/16/2015	**720**	90	2.9	1.0 U
11/16/2015	***690***	*90*	*2.9*	*1.0 U*
2/17/2016	**610**	60	1.5	1.3 U
5/19/2016	**850**	78	2.2 J	2.0 U
9/26/2016	**1,100**	90	5.4 U	7.0 U
12/14/2017	160	31	0.8 J	1.0 U
12/12/2018	**540**	30	0.69 J	1.0 U

24-SG-40

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/22/2015	**650**	67	1.1 J	1.0 U
11/17/2015	**640**	45	0.6 J	1.0 U
2/16/2016	520	14	1.3 U	1.3 U
5/20/2016	430	18	1.1 U	1.0 U
5/20/2016	*440*	*18*	*0.22 J*	*1.0 U*
9/27/2016	460	35	2.1 U	2.8 U
12/13/2017	160	4.4	0.79 U	1.0 U
12/13/2018	270	5.8	0.79 U	1.0 U
12/13/2018	*270*	*5.9*	*0.79 U*	*1.0 U*

24-SG-26

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/29/2015	230	60	0.62 J	1.0 U
11/18/2015	200	51	0.53 J	0.98 U
2/18/2016	170	36	0.22 J	1.3 U
5/18/2016	180	38	0.33 J	1.0 U
9/26/2016	220	44	0.79 U	1.0 U
3/15/2017	73	20	0.79 U	1.0 U
6/14/2017	220	37	0.79 U	1.0 U
9/14/2017	0.59 J	1.1 J	0.79 U	1.0 U
12/13/2017	170	29	0.79 U	1.0 U
3/30/2018	81	18	0.79 U	1.0 U
6/20/2018	190	25	0.79 U	1.0 U
6/20/2018	*210*	*32*	*0.79 U*	*1.0 U*
9/25/2018	200	30	0.48 J	1.0 U
9/25/2018	*200*	*29*	*0.79 U*	*1.0 U*

24-SG-25

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/28/2015	**600**	23	0.21 J	1.0 U
11/17/2015	**600**	22	0.18 J	1.0 U
2/17/2016	0.45 J	1.3 U	1.3 U	1.3 U
5/19/2016	**650**	17	1.1 U	1.0 U
9/27/2016	**770**	23	1.2 J	1.0 U
12/15/2017	3.2	1.5 J	0.79 U	1.0 U
12/12/2018	320	7.9	0.79 U	1.0 U

24-SG-27

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/31/2015	220	120	6.2	1.0 U
11/18/2015	220	120	5.6	1.0 U
2/18/2016	180	83	3.2	1.3 U
5/18/2016	190	89	4.1	1.0 U
9/26/2016	260	120	3.9	1.0 U
12/15/2017	150	74	2.6	1.0 U
12/15/2017	*170*	*75*	*2.5*	*1.0 U*

24-SG-39

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/28/2015	**570**	40	1.1 J	1.0 U
11/17/2015	240	13	0.32 J	1.0 U
2/24/2016	190	20	3.5	1.3 U
2/24/2016	*180*	*18*	*3.1*	*1.3 U*
5/18/2016	210	4.7	0.28 J	1.0 U
9/27/2016	**2,200**	110	9.3 U	12 U
12/14/2017	290	25	2.0	1.0 U
12/12/2018	220	17	0.79 U	1.0 U

24-SG-45

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/29/2015	450	59	3.4	1.0 U
11/19/2015	**730**	85	5.9	3.0 U
2/18/2016	490	48	0.55 J	1.3 U
2/18/2016	*510*	*49*	*0.58 J*	*1.3 U*
5/19/2016	430	36	0.54 J	1.0 U
9/28/2016	430	38	1.4 J	2.6 U
12/14/2017	460	40	1.6 J	1.5 U
12/14/2018	400	29	0.73 J	1.0 U

24-SG-32

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/30/2015	**3,500**	**620**	7.1	1.0 U
11/23/2015	**2,900**	460	5.0	1.0 U
2/18/2016	**3,300**	480	4.9 J	11 U
5/18/2016	**3,400**	**630**	6.9 J	12 U
9/28/2016	**3,600**	460	16 U	20 U
12/14/2017	**2,500**	300	6.0 U	7.7 U
9/25/2018	**2,900**	380	6.7 U	8.6 U
12/13/2018	**1,400**	160	3.2 U	4.1 U

24-SG-02

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/20/2015	170	11	1.8	1.0 U
11/19/2015	130	9.8	1.3	1.0 U
2/16/2016	85	2.5	1.3 U	1.3 U
5/19/2016	100	3.5	0.87 U	0.8 U
9/27/2016	140	8.7	0.97 J	1.0 U
9/27/2016	*150*	*11*	*2.3*	*0.53 J*
3/15/2017	62	1.1 J	0.79 U	1.0 U
6/14/2017	110	3.5 J	0.37 J	1.0 U
9/14/2017	130	5.6	0.49 J	1.0 U
12/13/2017	85	4.8	0.79 U	1.0 U
3/30/2018	56	1.5 J	0.79 U	1.0 U
6/20/2018	130	9.6	0.79 U	1.0 U
9/25/2018	93	5.4	0.79 U	1.0 U
12/12/2018	59	2.5 J	0.79 U	1.0 U

24-SG-33

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/30/2015	**2,000**	**770**	88	1.0 U
11/23/2015	**3,600**	**980**	62	1.0 U
2/18/2016	**3,200**	**780**	70	2.7 U
5/18/2016	**3,800**	**960**	100	12 U
9/28/2016	**5,300**	**1,200**	76	24 U
12/14/2017	**1,600**	460	34	5.1 U
9/25/2018	**3,600**	**640**	27	11 U
12/13/2018	**2,600**	380	19	8.0 U

24-SG-47

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/28/2015	110	1.2 J	1.1 U	1.0 U
11/18/2015	74	0.82 J	1.1 U	1.0 U
2/16/2016	46	0.49 J	1.3 U	1.3 U
5/17/2016	65	0.63 J	2.2 U	2.0 U
9/27/2016	93	4.8	0.51 J	1.0 U
6/14/2017	83	2.0 J	0.79 U	1.0 U
9/14/2017	83	0.95 J	0.79 U	1.0 U
12/13/2017	41	0.73 J	0.79 U	1.0 U
3/30/2018	29	0.65 J	0.79 U	1.0 U
6/20/2018	70	1.6 J	0.79 U	1.0 U
9/25/2018	64	0.73 J	0.79 U	1.0 U
12/14/2018	31	2.1 U	0.79 U	1.0 U

24-SG-36

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/23/2015	**12,000**	440	31 J	**39 U**
11/17/2015	**9,100**	330	21 J	24 U
11/17/2015	***8,800***	*340*	*22 J*	*22 U*
2/23/2016	**8,500**	340	41	**31 U**
5/20/2016	**12,000**	480	31 J	**49 U**
9/28/2016	**16,000**	520	56 U	**73 U**
3/15/2017	**21,000**	580	49 J	**82 U**
6/14/2017	**12,000**	270 J	60 U	**77 U**
9/14/2017	11	1.9 J	0.84 J	1.0 U
11/2/2017	**8,000**	200	18 U	23 U
12/15/2017	**7,200**	140	20 U	26 U
3/30/2018	**5,600**	92	4.4 J	13 U
6/20/2018	**6,600**	110	5.0 J	10 U
9/25/2018	2.7 U	2.1 U	0.79 U	1.0 U
12/13/2018	**2,500**	36	6.3 U	8.1 U

24-SG-38

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/22/2015	**32,000**	**41,000**	19,000	**1,200** U
11/19/2015	**21,000**	**29,000**	19,000	**830** U
11/19/2015	***20,000***	***29,000***	*19,000*	***810*** *U*
2/24/2016	**12,000**	**15,000**	8,400	**550** U
5/20/2016	**24,000**	**24,000**	11,000	**970** U
9/27/2016	**30,000**	**30,000**	13,000	**900** U
3/15/2017	**650**	85	22	**510**
6/14/2017	**830**	430	3,400	**6,100**
9/14/2017	230	25	13	1.5 J
11/2/2017	92	9.2	4.3	0.81 J
12/13/2017	83	6.0	1.6	1.0 U
3/30/2018	75	5.2	0.59 J	1.0 U
6/20/2018	100	4.8	0.84 J	1.0 U
9/25/2018	59	2.3 J	1.5 U	1.9 U
12/12/2018	30	1.9 J	2.8	1.0 U

24-SG-37

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/24/2015	**8,600**	470	31 U	28 U
11/23/2015	**5,700**	260	2.1	1.0 U
2/18/2016	**4,400**	200	21 U	21 U
5/20/2016	**6,300**	240	28 U	25 U
5/20/2016	***6,000***	*250*	*1.1 U*	*1.0 U*
9/28/2016	**4,700**	210	21 U	27 U
12/14/2017	**2,800**	110	7.3 U	9.4 U
12/13/2018	**1,100**	31	2.3 U	2.9 U

24-SG-46

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/24/2015	140	14	0.99 J	1.0 U
11/23/2015	140	6.3	1.1 U	1.0 U
5/17/2016	260	6.3	2.2 U	2.0 U
9/28/2016	260	9.4	1.2 U	1.6 U
6/14/2017	360	8.0	0.79 U	1.0 U
9/14/2017	270	12	0.79 U	1.0 U
12/13/2017	6.2	120	0.79 U	1.0 U
6/20/2018	290	6.2	0.79 U	1.0 U
9/25/2018	210	5.7	0.79 U	1.0 U

24-SG-01

DATE	PCE	TCE	*cis* -1,2-DCE	VC
7/20/2015	260	3.0	0.25 J	1.0 U
11/23/2015	160	2.1	1.1 U	1.0 U
2/24/2016	120	1.9	1.3 U	1.3 U
5/19/2016	200	2.9	1.1 U	1.0 U
9/27/2016	250	2.8 J	1.3 U	1.7 U
3/15/2017	150	4.0 J	3.0	1.0 U
6/14/2017	340	30	490	**47**
9/14/2017	130	5.4	0.53 J	0.52 J
12/13/2017	5.7	2.4 U	0.68 J	1.1 U
3/30/2018	110	1.9 J	0.74 J	1.1 U
6/20/2018	190	2.3 J	0.79 U	1.1 U
9/25/2018	170	7.7	0.79 U	1.1 U
12/13/2018	110	2.2 J	0.79 U	1.1 U

Soil Gas Monitoring Well
Building
Demolished Building
Fence
Road Curb
Site 24 Boundary

Notes:
1. All concentrations measured in µg/m^3.
2. Soil gas cleanup goals presented in the Final Record of Decision/Final Remedial Action Plan for Installation Restoration Site 24, Former Naval Station Treasure Island, San Francisco, California (DON 2015).
3. Duplicate sample are *italicized*.
4. Concentrations shaded **RED** exceeds the soil gas cleanup goal for residents.
5. Concentrations shaded **BLUE** exceeds the soil gas cleanup goal for commercial/industrial workers.
6. Results from 2015 through 2018 shown.

DCE dichloroethene
J validation flag signifying analyte reported between the reporting limit and method detection limit
µg/m^3 micrograms per cubic meter
PCE tetrachloroethene
TCE trichloroethene
U analyte not reported at or above the method detection limit
VC vinyl chloride

75 0 75 150
Feet

Screening Criteria

Chemical	Residential Soil Gas Cleanup Goal	Commercial/ Industrial Soil Gas Cleanup Goal
PCE	533	2,862
TCE	615	3,970
cis -1.2-DCE	46,408	209,217
VC	31	188

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-27
SITE 24
PERFORMANCE SOIL GAS MONITORING
Second Five-Year Review

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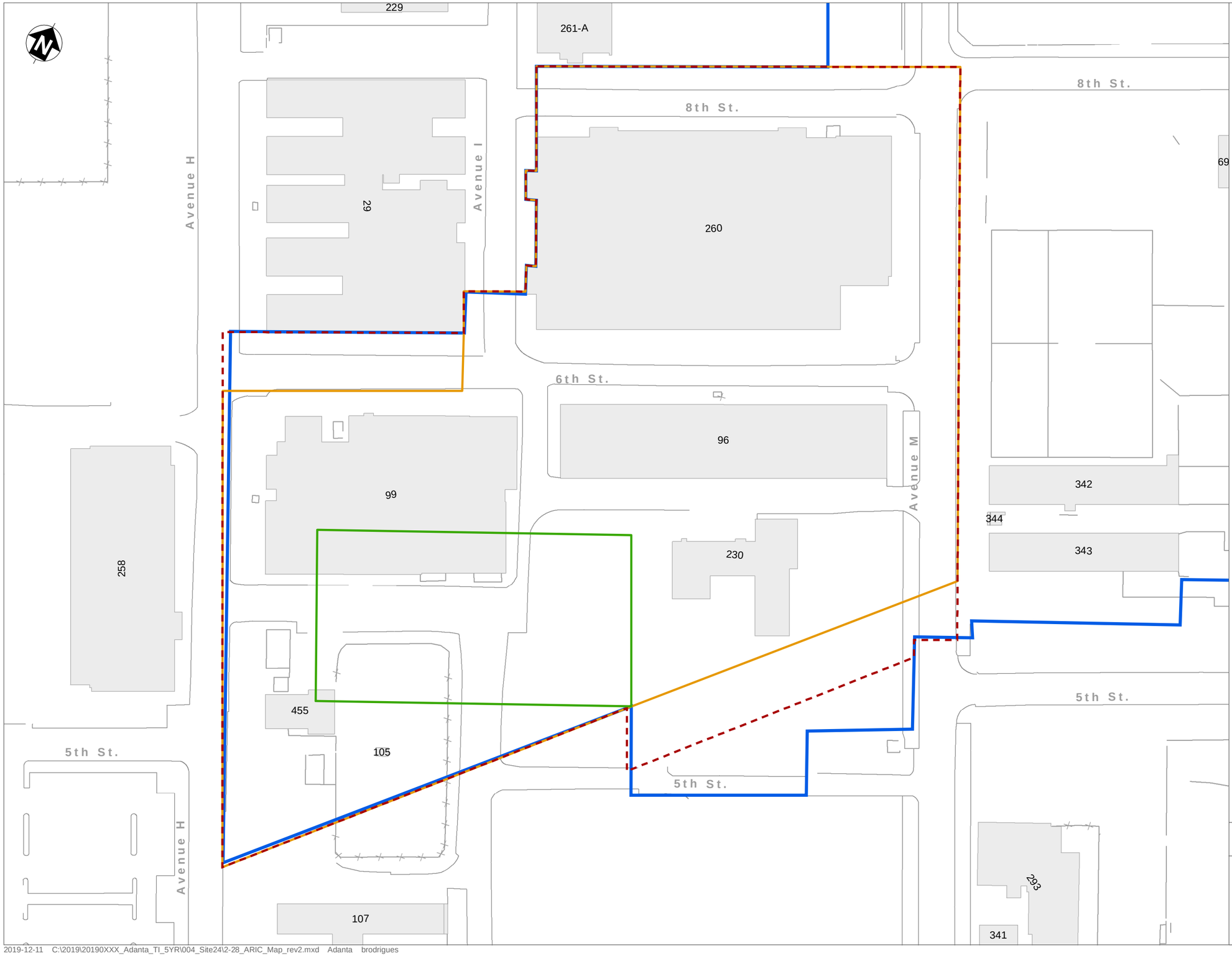

ARIC for Groundwater for Construction Workers

ARIC for Soil Gas for Commericial/Industrial Workers

ARIC for Soil Gas for Residential Use

Site 24 Boundary

Note:
ARIC Area requiring institutional controls

50 0 50 100
Feet

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-28
SITE 24
AREAS REQUIRING INSTITUTIONAL CONTROLS
Second Five-Year Review

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SITE 24 TABLES

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Table 2-32: Site 24 Groundwater Cleanup Goals

Primary COC in Groundwater	ROD/Final RAP RG	Current USEPA Criteria [1]	Current DTSC Criteria [2]	DTSC Regulation Based Criteria - Toxicity Criteria for HHRA [7]
		Construction Worker [3,4,5,6]	Construction Worker [3,4,5,6]	
cis-1,2-DCE	230	417	198	Not Applicable
PCE	210	336	8.3	8.3
TCE	42	51	51	Not Applicable
VC	15	26	15	15

Notes:

All criteria are based on cancer risk of 1E-06 and noncancer hazard of 1. All values shown in units of microgram per liter (µg/L).

1. USEPA RSLs. Dated November 2019. Available online at: https://www.epa.gov/risk/regional-screening-levels-rsls
2. OEHHA Toxicity Criteria from Cal/EPA HERO Note Number 10, Toxicity Criteria. Dated February 2019. Available online at: https://dtsc.ca.gov/human-health-risk-hero/
3. Construction worker includes dermal and inhalation exposures.
4. Construction worker cleanup goals based on OEHHA toxicity criteria taken from Cal/EPA HERO Note Number 10, Toxicity Criteria. Dated February 25, 2019. Available online at: https://dtsc.ca.gov/human-health-risk-hero/
5. Revised construction worker cleanup goals based current exposure parameters: body weight = 80 kilograms, skin surface area = 6,032 square centimeters.
6. Volatilization Factor based on trench dimensions from Site 24 ROD/Final RAP (trench is 10-feet long, 8-feet wide, 4-feet deep; 360 air exchanges per hour).
7. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.

Cal/EPA	California Environmental Protection Agency
COC	Contaminant of concern
DCE	Dichloroethene
DTSC	Department of Toxic Substances Control
HERO	Human and Ecological Risk Office
HHRA	Human health risk assessment
OEHHA	California Office of Environmental Health Hazard Assessment
PCE	Tetrachloroethene
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
RSL	Regional screening level
TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
VC	Vinyl chloride

Table 2-33: Site 24 Soil Gas Cleanup Goals

Primary COC in Soil Gas	ROD/Final RAP RG		USEPA SG SL [1]		Regional Water Board ESL Sub-slab/SG ESL [2]		DTSC Regulation Based Criteria - Toxicity Criteria for HHRA [3]	
	Resident	Comm/Ind Worker	Resident	Comm/Ind Worker	Resident	Comm/Ind Worker	Resident	Comm/Ind Worker
cis-1,2-DCE	46,408	209,217	NA [4]	NA [4]	278	1,168	Not Applicable	Not Applicable
PCE	533	2,862	360	1,573	15	67	15	67
TCE	615	3,970	16	100	16	100	Not Applicable	Not Applicable
VC	31	188	5.6	93	0.32	5.2	0.32	5.2

Notes:

All criteria are based on cancer risk of 1E-06 and noncancer hazard of 1. All values shown in units of microgram per cubic meter (µg/m^3).

1. USEPA VISL. Updated November 2019. Calculator available online at: https://epa-visl.ornl.gov/cgi-bin/visl_search.
2. San Francisco Bay Regional Water Quality Control Board ESLs. Dated July 2019. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html.
3. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.
4. Not available; USEPA toxicity criteria are not available for the inhalation exposure route.

COC	Contaminant of concern
Comm/Ind	Commercial/industrial
DCE	Dichloroethene
DTSC	Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
NA	Not available
PCE	Tetrachloroethene
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
SG	Soil gas
SL	Screening level
TCE	Trichloroethene
USEPA	U.S. Environmental Protection Agency
VC	Vinyl chloride

Table 2-34: Site 24 Radiological Goals

Radioisotope of Concern	ROD/Final RAP RG		USEPA	DTSC
	All Receptors Radioisotope Surface Release Criteria [1] (dpm/100 cm^2)	**All Receptors** Radioisotope Soil and Sediment Release Criteria [2] (pCi/g)	**All Receptors**	**All Receptors**
Ra-226	100	1.0 above background	NA	NA
Cs-137	5,000	NA	NA	NA

Notes:

1. Radioisotope surface release criteria obtained from "Final Radiological Management Plan, Former Naval Station Treasure Island, San Francisco, California" prepared by ITSI Gilbane Company, July 2013. Criteria are selected based on annual peak dose of 5 millirem per year using RESRAD-Build Version 3.5 or Regulatory Guide 1.86 ("Termination of Operating Licenses for Nuclear Reactors" from the Atomic Energy Commission, June 1974), whichever value is lower.
2. Radioisotope soil and sediment release criteria obtained from "Final Radiological Management Plan, Former Naval Station Treasure Island, San Francisco, California" prepared by ITSI Gilbane Company, July 2013. The screening criterion for Ra-226 is 1 pCi/g above background. A screening criterion for Cs-137 has not been established for Former Naval Station Treasure Island.

cm^2	Square centimeter
Cs	Cesium
dpm	Disintegrations per minute
DTSC	Department of Toxic Substances Control
NA	Not available
pCi/g	Picocurie per gram
Ra	Radium
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
USEPA	U.S. Environmental Protection Agency

2.5 SITE 27 – CLIPPER COVE SKEET RANGE

2.5.1 Site Description and Background

Site 27 is a former naval skeet range and consists of approximately 19 offshore acres located between TI and YBI in an area known as Clipper Cove (Figure 2-29). The majority of the site consists of open water and sediment. The site was the former location of two adjacent naval skeet ranges until 1989. At the skeet range, naval personnel would shoot at clay targets with lead shot. The clay targets would be launched from the shore over the water. The positions of the shooters and the angles the skeet targets were thrown resulted in a fan-shaped shot fall zone that defines the site boundary. The site forms a rough semicircle out into the bay with a radius of about 700- to 750-feet. During past site activities, lead shot was detected within the top two feet of sediment within 75-feet of the shoreline and at depths greater than two feet below the sediment surface at distances greater than 75-feet from the shoreline (Langan, 2018a).

The final remedy consisted of dredging lead-impacted sediment and backfilling with clean fill within 75-feet of the shoreline. Following sediment removal, a filter layer consisting of sand and gravel and then a protective armor layer consisting of rock were installed within the dredged area. The filter and armor layers were installed to eliminate the lead ingestion pathway for ecological receptors (diving ducks). The implemented remedy also included ICs and sediment monitoring to provide on-going environmental protection from lead shot (DON, 2012).

2.5.1.1 Land and Resource Use

Site 27 consists of offshore property in Clipper Cove. A portion of the Treasure Island Marina overlaps the western boundary of Site 27. Most of the site is open water and sediment, and the site was used as a former naval skeet range.

Ownership of Site 27 was transferred from the DON to TIDA on September 20, 2016. Current and future site users include the Treasure Island Marina, which includes three piers and numerous docked watercraft; Treasure Island Enterprises, an intended long-term lessee to redevelop the existing marina into a larger marina facility, then operate the redeveloped marina; and the Treasure Island Sailing Club, a non-profit organization that is expected to relocate to the TI shoreline and provide the public with access to sailing and watersports activities, including rental, boat storage, and educational opportunities (TIDA, 2017).

2.5.2 Response Action Summary

This section provides the framework for the response actions that have been undertaken at Site 27. The following text discusses the basis for taking action, summarizes the previous investigations that have occurred, the RAOs and components of the selected remedy, describes the implementation status of the selected remedy.

2.5.2.1 Basis for Taking Action

The response action selected in the ROD/Final RAP is necessary to protect public health, welfare, or the environment from actual or potential releases of hazardous substances into the environment. The response action specifically addresses ecological receptors because no unacceptable risk for humans was identified in the RI. The DON, in partnership with DTSC, the Regional Water Board, and USEPA, considered all pertinent factors in accordance with CERCLA and the NCP remedy selection criteria and concluded that RA is necessary to address lead shot in sediment at Site 27. This decision was made because:

- Lead shot in sediment is buried under as little as one foot of sediment within 75-feet of the shoreline posing a current potential risk to diving ducks from ingestion of lead shot.
- Lead shot buried beneath 2-feet of sediment in the rest of the site poses a potential future risk to diving ducks, if exposed by dredging or other sediment-disturbing activities.

2.5.2.2 Previous Investigations

In 1993, the Regional Water Board issued Order No. 93-130, requiring the DON to investigate and manage contamination attributable to the skeet range in the Clipper Cove area of former NAVSTA TI. The order set forth specific compliance requirements and tasks. The DON subsequently conducted sampling investigations at Site 27 to comply with the substantive requirements of the order.

Chemicals thought to be associated with the former skeet range included lead shot, lead, and PAHs (a component of the skeet targets), which were targeted as chemicals of potential ecological concern (COPECs) at Site 27. A complete assessment of contamination and risk at Site 27 is provided in the Final RI for the Offshore Sediments OU, which includes an ERA, and the Feasibility Study, which presents the results of the 2008 lead shot investigation in the nearshore area. The Final FS Report summarized the results of both the RI and the lead shot investigation and provides the basis for the ROD/Final RAP.

Table 2-35: Previous Investigations Summary – Site 27

Previous Investigations	Date	Investigation Summary
Phase I RI for Offshore Sampling	1992	Sediment and stormwater within the Site 27 boundary as well as in other offshore areas of NAVSTA TI were sampled. Samples were analyzed for metals, pesticides, PCBs, and PAHs. None of the samples collected within the Site 27 boundary contained concentrations of lead or PAHs above screening values.
Site 27 Clipper Cove Skeet Range Offshore Investigation	1996	As a direct result of a Regional Water Board order, sediment, pore water, and bay water samples were collected and analyzed to define the vertical and horizontal extent of lead, lead shot, and PAHs in offshore sediments and overlying surface water that may have resulted from the skeet range operations. Sediment core samples were collected at 12 sampling locations based on the estimated shot fall zone, and additional samples were collected to assure the horizontal extent of contamination was defined. Lead (excluding lead shot) was detected in every 1-foot section of sediment core. The highest concentrations of lead were generally detected at depths of 3- to 5-feet. Sediment in each 1-foot section of 10 sediment cores was sieved for lead pellets, which were counted and weighed. Lead shot was detected in nine out of 10 locations and was most prevalent in the 3- to 4-foot depth interval. Four pore water and four grab surface water samples were collected. Lead and PAHs were not detected in any of the samples. Sediment surface grab samples were collected for bioassays and chemical and physicochemical analysis. Toxicity

Previous Investigations	Date	Investigation Summary
		was observed in the bioassays; however, it was concluded that toxicity was attributable to chemicals other than lead or PAHs, or to physicochemical factors because no or low concentrations of lead and PAHs were detected in sediment and water samples.
Phase II RI for Offshore Sediments	1997	Sediment sampling focused on further characterization of Clipper Cove and tracking contaminants from onshore sources to offshore sediments through stormwater outfalls. Surface sediment and sediment core samples were collected in Clipper Cove. Sediment core samples were collected to a depth of 8-feet below the sediment surface. Lead concentrations in sediment were below screening values in all but three samples. One of these samples was collected between 6- and 8-feet below the sediment surface within Site 27. The two other samples were located outside of Site 27. Concentrations of PAHs did not exceed screening values at any location. Sediment from two sampling locations within the Site 27 boundary was used in bioassays. Although toxicity was observed, low survival rates were attributed to other factors (slow acclimation to salinity changes, longer holding times, and sediment grain size). It was concluded that risk to benthic invertebrates and avian receptors from exposure to the sediment was minimal based on chemical and toxicity data.
Evaluation of Sediment Deposition	2005	Hydrographic surveys were reviewed to obtain a better understanding of sediment deposition rates in Clipper Cove. The evaluation found that the nearshore area of Clipper Cove within 150-feet of the shoreline is a dynamic area where sediment both accretes and erodes, resulting in limited sediment accumulation; and the remainder of Clipper Cove is a depositional environment, where sediment accumulates at a rate of about 1- to 2-inches each year. A layer of sediment more than 2-feet thick has been deposited in Clipper Cove since skeet range operations ceased in 1989. This sediment deposition has effectively covered the lead shot, eliminating the ingestion exposure pathway to diving ducks over most of the site.
Lead Shot Investigation in the Nearshore Area of Site 27 (conducted during FS)	2008	The DON investigated the nearshore area in 2008 to characterize the extent of lead shot in the top 2-feet of nearshore sediments and evaluate whether there was a potential risk to diving ducks. Lead shot was detected within the top 2-feet of sediment within 75-feet of the shoreline. No lead shot was found in the samples collected in the top 2-feet of sediment from 75-feet to 150-feet from the shoreline. Therefore, there is a potentially complete exposure pathway for diving ducks within 75-feet of the shoreline. The concentrations of total lead in sediment, not including the lead shot, were consistent with other offshore samples collected at TI and San Francisco Bay ambient values. The investigation concluded that lead shot was a COEC at Site 27, but total lead was not. Benthic organisms were recovered from the grab

Previous Investigations	Date	Investigation Summary
		samples, indicating that there is a food source for diving ducks in the nearshore area, and diving ducks were observed at Site 27 during the field investigation.
FS	2001 – 2010	The results of previous investigations were used to identify RAOs and remedial alternatives to address potential risks to diving ducks associated with lead shot in sediment. Three remedial alternatives were evaluated: (1) no action; (2) focused dredging and backfill, off-site disposal of sediment, ICs, and sediment monitoring; and (3) site-wide dredging and off-site disposal of sediment.
Proposed Plan/Draft RAP	2011	The Proposed Plan/Draft RAP identified the DON's preferred alternative for lead shot in sediment at Site 27 and invited the public to review and comment on the preferred alternative prior to selection of the final remedy. The preferred alternative is Alternative 2b, focused dredging and backfill, off-site disposal of sediment at a beneficial reuse site, ICs, and sediment monitoring. Alternative 2b would be implemented by removing sediment located within 75-feet from the shoreline to a depth of at least 2.5-feet, eliminating a complete exposure pathway to diving ducks. ICs would be implemented site-wide to restrict activities that might disturb sediment and re-suspend lead shot currently buried at the site. Post-construction sediment monitoring would confirm a consistent sediment profile against erosion.
ROD/Final RAP	2012	The selected RA addresses lead shot in sediment, which poses a risk to diving ducks. The remedy consists of focused dredging of the area within 75-feet of the shoreline to remove a potentially complete exposure pathway to diving ducks, off-site disposal of sediment at a beneficial reuse site, construction of protective backfill consisting of a filter layer and a protective armor layer, site-wide ICs to minimize sediment-disturbing activity that could expose lead shot currently buried at the site, and sediment monitoring to ensure the effectiveness of ICs and the integrity of the backfill material.
RD	2013	The RD provide the basis of the engineering design for the remedy. The design dredge depth was revised from 2.5-feet listed in the ROD/Final RAP to 1.5-feet based on the results of a bathymetric survey completed for the RD. The RD included an evaluation of armor sizing and erosion potential, an evaluation of bathymetric changes between 2005 and 2013, technical specifications, and design drawings. The RD also included the LUC RD that established performance objectives for ICs.

Previous Investigations	Date	Investigation Summary
RAWP	2013	The RAWP presented the procedures for implementing the remedy of focused dredging, construction of the engineered backfill, and the ICs. The IC performance objectives required preparation of an SMP that identified specific restrictions necessary to ensure the integrity of the remedy, including signage, restrictions on vessel speed, controls on dredging within the boundary of Site 27, and long-term monitoring of the protective backfill (Tetra Tech EC, Inc. 2013). Applicable project plans were appended to the RAWP, including the post-remedy monitoring plan.
RACR	2014	The RACR addressed remediation activities at Site 27. Lead shot was the only COEC, with the ingestion of lead shot by diving ducks considered the pathway of concern. No unacceptable human health risks were identified. The ROD/Final RAP identified sediment removal and backfilling of an area approximately 75-feet from the shoreline and 1,400-feet long. Approximately 8,700 yd^3 of sediment was dredged and removed, and a protective cover consisting of 7,190 tons of sand and 8,519 tons of rock was placed over the remaining sediment. A total of 1,208 tons of dredged material was classified as California hazardous waste and transported to Clean Harbors Buttonwillow Landfill in Buttonwillow, California. The remedy also included transporting and disposing of the dredged sediment at a beneficial reuse site, ICs, and monitoring.
LUC RD Addendum	2015	This LUC RD Addendum reiterated the performance objectives identified in the 2013 RD and RAWP and included an IC objective of allowing development of a new marina in accordance with the City's approved Reuse Plan and the Economic Development Conveyance Agreement. In addition, post-remedy monitoring of the protective backfill will consist of bathymetric surveys. Future monitoring will be accomplished by comparing the results of the previous bathymetric surveys completed during the RA to results of a one-year baseline bathymetric survey completed in November 2014. Repeated surveys will occur every five years beginning November 2018 (which allows for the survey data to be collected in 2018 prior to the preparation of this Five-Year Review document in 2019) (MMEC 2015).

Previous Investigations	Date	Investigation Summary
FOST	2016	Site 27 was found suitable for transfer subject to requirements necessary to maintaining the integrity of the remedy. The FOST required the deed transferring Parcel 27 to prohibit the following activities unless conducted in accordance with an SMP approved by DTSC: • Alteration, placement, or construction of structures, permanent or otherwise, that will result in the disturbance of the sediment or installed protective rock armor layer on the property and result in less than 2-feet of cover above the lead shot; • Dredging or otherwise disturbance of the sediment on the property that will result in less than two feet of cover above the lead shot, or any disturbance of the filter or armor layer in a nearshore location that will result in disturbance of the protective rock armor layer in a manner that will result in less than 2-feet of cover above the lead shot; • Elimination of the "No wake" zone on the property, which limits disturbance to the sediment and protective rock armor layer caused by water turbulence from excessive boat speeds. [As a No Wake Zone, no speed above 5 miles per hour is permitted]. The FOST also required the transfer deed to require the transferee to conduct annual LUC inspections and compliance reporting and to complete the bathymetric surveys.
SMP	2017	The SMP identifies the restrictions and implementation actions necessary to maintain the integrity of the remedy. Restrictions were placed on construction of structures that would impact the remedy, boat speeds within the "No Wake Zone," and mooring and anchoring within the "No Mooring Zone." Implementation actions include notifications to site users, signage showing "No Wake Zone" and "No Mooring Zone," annual site inspections and reporting, bathymetric surveys, and measures to maintain and repair the protective armor layer. The SMP also includes the Clipper Cove Special-Use Area Rules and Regulations promulgated in October 2016, which include provisions on Clipper Cove being designated a "No Wake Zone" limiting vessel speeds (Langan 2017).

Notes:

COEC	Contaminant of ecological concern	PCB	Polychlorinated biphenyl
DON	United States Department of the Navy	RA	Remedial action
DTSC	California Department of Toxic Substances Control	RACR	Remedial action completion report
		RAO	Remedial action objective
FOST	Finding of Suitability to Transfer	RAP	Remedial action plan
FS	Feasibility study	RD	Remedial design
IC	Institutional control	RI	Remedial investigation
LUC	Land use control	ROD	Record of decision
MMEC	Multimedia Environmental Compliance Group	SMP	Site management plan
PAH	Polycyclic aromatic hydrocarbon	yd^3	Cubic yard

2.5.2.3 Remedial Action Objectives

The ROD/Final RAP for Site 27 was finalized in March 2012 (DON, 2012). The RAOs for Site 27 are as follows:

- Prevent or minimize ingestion of lead shot by diving ducks within 75-feet of the shoreline, where there is a complete exposure pathway under current conditions.
- Prevent or minimize ingestion of lead shot by diving ducks site-wide, where there is a potentially complete exposure pathway for diving ducks under future conditions where lead shot is currently buried below at least 2-feet of sediment.

2.5.2.4 Selected Remedy

The selected remedy for Site 27, as presented in the Site 27 ROD/Final RAP, includes conducting focused dredging, backfilling, and implementing ICs as follows:

- The focused dredging proposed in the ROD/Final RAP would remove sediment located within 75-feet from the shoreline to a depth of 1.5-feet. However, the design dredge depth was revised from 2.5-feet listed in the ROD/Final RAP based on a bathymetric survey completed for the RD. (This minor change to the remedy was recorded in a memorandum to the administrative record file [DON, 2013b].)
- Backfill the dredged area with cover material to protect it from marina use and associated activity.
- Transport dredged material by barge to an upland beneficial reuse site.
- Conduct confirmation bathymetric surveys after completion of the RA, one year after completion, five years after completion, and at successive five-year intervals.
- Implement ICs to restrict disturbance of the remaining sediment, which will prevent or minimize re-suspension of lead shot from deeper sediments in the undredged portion of the site. ICs may include restrictions on vessel speed, controls on dredging within the boundary of Site 27, and long-term monitoring of the backfill using periodic bathymetric surveys. Legal instruments known as restrictive covenants in quitclaim deed(s) between the DON and the property recipient and in a CRUP between the DON and DTSC were implemented at the time of transfer of the property to establish land use and activity restrictions to limit exposure to contaminated sediment to achieve IC performance objectives.

2.5.2.5 Implementation Status

Table 2-36: Demonstration of Completion – Site 27

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Prevent or minimize ingestion of lead shot by diving ducks within 75-feet of the shoreline, where there is a complete exposure pathway under current conditions	Focused dredging within 75-feet of the shoreline removed lead shot within the top 1.5-feet of sediment where diving ducks could be exposed. Backfill will prevent exposure to lead shot that may be buried deeper than 1.5-feet beneath the sediment surface.	Yes

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Prevent or minimize ingestion of lead shot by diving ducks site-wide, where there is a potentially complete exposure pathway for diving ducks under future conditions where lead shot is currently buried below at least 2-feet of sediment	ICs implemented after focused dredging and backfill restrict activities site-wide that could disturb sediment and re-suspend lead shot. Bathymetric surveys immediately post-construction, one-year post-construction, and every five years thereafter, will confirm the integrity of the backfill material and sediment profile. During the 2018 bathymetry survey (Langan, 2019), no decreases in sediment elevation were observed in the area outside the backfilled area, which indicates that the required two feet of coverage remains above the lead-impacted sediment in these areas.	Yes

Notes:

IC Institutional control
RAO Remedial action objective

Focused dredging of sediment and backfilling (filter layer and rock armor layer) at Site 27 began in July 2013 and was completed in November 2013. Approximately 8,677 yd^3 of sediment was removed. Bathymetric surveys conducted after dredging and after backfilling indicated specifications for thickness of sediment removed and thickness of the backfill installed (Tetra Tech EC, Inc., 2013) were met. Dredged sediment was transferred by barge from TI to Alameda Point, where the sediment was dried and profiled for chemical content. The DON authorized collection of an additional 20 waste characterization samples of the sediment after the sediment had been transferred to the dewatering pad at Alameda Point. Those data confirmed that most of the material was suitable for beneficial reuse at Alameda Point. Of 20 stockpiles, 17 were suitable for use as subgrade material for the Site 1 landfill at Alameda Point and three were disposed of off-site as hazardous waste based on their lead content. As described in the RACR (Tetra Tech EC, Inc., 2014), a total of approximately 10,070 tons was reused as subgrade material at Site 1 at Alameda Point and 1,208 tons was disposed of off-site. After dredging was complete, engineered backfill was installed by placing 7,190 tons of sand followed by placing 8,519 tons of protective rock.

The first post-remediation bathymetric survey occurred one year after remediation was completed in November 2014. The LUC RD (TriEco-Tt, 2013) summarizes the ICs related to protection of the integrity of the rock armor layer. An addendum to the LUC RD (MMEC, 2015) was completed in 2015 to address other aspects of the ICs at Site 27 to protect the remedy, which included signage, limits on vessel speed, and restrictions on dredging within the boundary of Site 27 (Figure 2-30). LUC inspections have occurred annually since the LUC RD Addendum (TriEco-Tt, 2015, 2016; Adanta Inc., 2017; Langan, 2018, 2019b). The 5-year bathymetry survey is discussed in Section 2.5.4.1.

Table 2-37: ICs for Site 27

Status	2015	2016	2017	2018	2019
In-compliance?	Yes	Yes	Yes	Yes	Yes
Resolved	No Issues	No Issues	No Issues	No Issues	No Issues

2.5.2.6 Systems Operations/Operation & Maintenance

No significant O&M costs have been incurred for Site 27. Minor costs are expected for maintenance of the engineered backfill and enforcement of administrative ICs.

2.5.3 Site 27 Progress Since Last Five-Year Review

The 2014 Five-Year Review made the following protectiveness statement for Site 27:

> *The remedy for Site 27 is protective of human health and the environment. The rock armor layer is preventing exposure of diving ducks to lead shot in sediment within 75 feet of the shoreline. Site 27 does not pose a risk to human health because there is no pathway for exposure to humans. The IC performance objectives specified in the ROD/Final RAP are being met by access restrictions created by natural conditions (shallow water near shore) that minimize access by vessels that could potentially damage the rock armor layer. The effective implementation of IC performance objectives through land use and activity restrictions incorporated into deeds and CRUPs at the time of transfer will effectively prevent exposure to COECs and provide controls for the continued protectiveness of the remedy.*

The Final FOST 5 report that included Site 27 was submitted in August 2016.

2.5.4 Site 27 Five-Year Review Process

This section discusses the activities performed during the Five-Year Review process for Site 27. Section 1.3 outlines the general Five-Year Review process, which was applied to each site evaluated in this Five-Year Review.

2.5.4.1 Data Review

Table 2-38: Site 27 Remedy Summary

Medium	Risk Basis for Action/ COCs	RAOs	Remedy/ Cleanup Goal	Performance Metric
Sediment	Ecological/ Lead	Prevent ingestion of lead shot by diving ducks within 75-feet of shoreline	Dredging and backfill within 75-feet of shoreline to remove complete exposure pathway and ICs	Bathymetric surveys and annual IC inspections
Sediment	Ecological/ Lead	Prevent ingestion of lead shot by diving ducks site-wide where lead shot is buried below at least 2 feet of sediment	Maintain at least 2 feet of cover sediment over lead shot in remaining areas and ICs	Bathymetric surveys and annual IC inspections

Notes:

COC Chemical of concern
IC Institutional control
RAO Remedial action objective

Construction of the remedy at Site 27 was completed in November 2013. The first post-remediation bathymetric survey was conducted in November 2014 to provide a baseline survey for subsequent 5-year monitoring events and was conducted in accordance with the RAWP

(Tetra Tech EC, Inc., 2013). The RAWP identified the performance objective for the engineered backfill area: if a decrease of more than 0.33 foot over 20 percent of the backfilled area or approximately 20,000 square feet is identified, then measures will be taken to ensure the remedy remains protective. The performance objective is contained in the decision rules in the RAWP (Tetra Tech EC, Inc. 2013).

The first post-RA bathymetric survey conducted over the protective armor layer was completed in November 2013 (considered to be the Year 0 survey) (Tetra Tech EC, Inc., 2013). The second in the series, completed in November 2014, was considered to be Year 1 survey (MMEC, 2015). The Year 0 survey provided the baseline against which the Year 1 survey data were compared. The observed settlement is as expected following backfilling activities and the backfilled area is within design elevation tolerance. Additionally, no abnormalities or concerns with adherence to the RA ICs were observed. Because the Year 1 survey is the baseline for all other surveys to be conducted in the future and because there were no issues discovered in the backfill areas, there were no apparent issues to address. The remedy was determined to be stable and remained in compliance with RAOs.

The Year 5 bathymetric survey was conducted on May 13, 2018 (Langan, 2019). Survey results were compared to the pre-dredge and Year 1 bathymetric surveys to evaluate whether the remedy is within the design elevation tolerance and still protective of ecological receptors (Figure 2-31 through Figure 2-33). Comparing the Year 5 results to the pre-dredge bathymetric survey results indicates that the remedy is still within the design elevation tolerance range. Comparing the Year 5 to the Year 1 bathymetric survey results indicates a combination of minor to no sediment surface elevation differences and decreases in sediment surface elevation of greater than 0.26-foot that are uniformly distributed throughout the backfilled area. The areas indicating an elevation decrease of greater than 0.26-foot are limited to the approximate bounds of the backfilled area. [Note that the 0.26-foot comparison value is less than the 0.33-foot performance objective. A comparison with the 0.33-foot performance objective did not show a decrease over 20 percent of the engineered backfilled area, indicating the area is in compliance with the decision rules (Langan, 2020).] Elevation decreases are attributed to the dense backfill material and rock armor layer causing continued settlement of the less dense Bay mud materials beneath the backfilled area.

The uniform distribution of the low-elevation areas and their location within the backfilled area indicate settlement is the likely cause of the surface elevation change. If the apparent thickness of the backfill were decreasing for reasons other than settlement, then similar elevation differences would be expected outside of the backfilled area, but none were observed. The gradual settlement of the entire 1.5-foot thick backfill layer is the likely cause of the elevation decreases noted in the Year 5 bathymetric survey. The evaluation of the bathymetric survey did not identify any external causes that could displace the armor layer (such as mooring, anchor dragging, motor scouring, or ship grounding). The filter layer and protective armor layer were both constructed using sand, gravel, and cobbles that settle slightly during and after placement but would not be expected to continue to consolidate over time. The clay and organic material composing the underlying Bay mud would, however, be expected to slowly consolidate beneath the filter and armor layers as water is expelled and organic material decomposes over time. The initial bathymetric survey (Year 1) indicated adequate thicknesses of the filter and armor layers were placed as specified in the remedial design. Although the surface elevation of the backfill layer may be decreasing, the backfill remains protective.

No decreases in sediment elevation were observed in the area outside the backfilled area, which indicates that the required two feet of coverage remains above the lead-impacted sediment in these areas. The next 5-year bathymetric survey is scheduled for November 2023 (Langan, 2019a).

2.5.4.2 Site Inspection

The DON and Adanta, Inc. conducted a site inspection at Site 27 for this Five-Year Review on January 8, 2019. The purpose of the site inspection was to review and document current site conditions and evaluate visual evidence on the protectiveness of the remedial systems. Site access and general site conditions were also evaluated during the inspection. Appendix A contains the site inspection checklist, and Appendix B contains the photographic log, which documents observations made during the inspection.

Observations made during the site inspection indicated that no structures had been emplaced within the armor layer. However, the site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."

2.5.5 Site 27 Technical Assessment

2.5.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Table 2-39: Technical Evaluation – Question A (Site 27)

Question	Summary
RA Performance	**Yes.** A comparison of the Year 1 and Year 5 Bathymetric Surveys, site inspections, and interviews with personnel knowledgeable about the site indicates that the remedy as outlined in the ROD/Final RAP is functioning as intended. The 1.5-foot thick engineered backfill is in place within most of the backfill area. In the areas where the engineered backfill may be less than 1.5-feet, there is still 1.0- to 1.25-feet of engineered backfill across the backfill area. Two feet of sediment coverage is in place in the remaining offshore area of Site 27.
System Operations/O&M	**No.** Site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."
Implementation of Institutional Controls	**Yes.** The ROD/Final RAP selected ICs, including post-remedy monitoring, as a component of the remedy. The ICs and post-remedy monitoring are described in the LUC RD and LUC RD Addendum and are contained in the transfer deed and CRUP dated September 20, 2016, transferring Site 27 to TIDA. In accordance with these documents, the IC objectives associated with Site 27 are to allow for the development of a new marina, restrict the disturbance of the sediment, restrict the disturbance of the filter and armor layers that will adversely impact the integrity of the remedy, and prepare an SMP describing specific implementation actions. The post-remedy monitoring includes completion of bathymetric surveys in Year 1, after the protective armor layers were constructed, and every five years thereafter. The DON completed the Year 1 Bathymetric Survey (MMEC 2015) and conducted the annual LUC inspections in 2015, 2016 and 2017. TIDA completed the SMP, the Year 5 Bathymetric Survey, and conducted the annual LUC inspections in 2018 and 2019 (Langan, 2017, 2018, 2019a, 2019b). As of the 2019 LUC inspection, no structures had been emplaced within the armor layer. The IC performance objectives are currently being met. However, IC implementation actions identified in the SMP have not been completed

Question	Summary
	(signage for the "No Wake Zone" and "No Mooring Zone") and may not be enforced. These are identified in the System Operations/O&M section of this table.

Notes:

CRUP	Covenant to restrict use of property	RA	Remedial action
DON	United States Department of the Navy	RAP	Remedial action plan
IC	Institutional control	RD	Remedial design
LUC	Land use control	ROD	Record of decision
O&M	Operation and maintenance	TIDA	Treasure Island Development Authority

2.5.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of Remedy Selection Still Valid?

USEPA's guidance document for Five-Year Reviews identifies several areas for consideration in evaluating whether the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid (USEPA, 2001). Areas of consideration include changes in standards identified as ARARs and TBC criteria in the ROD/Final RAP, changes in exposure pathways, changes in toxicity and other contaminant characteristics, changes in risk assessment methods, and expected progress toward meeting RAOs.

The DON reviewed the ARARs, exposure assumptions, toxicity data, derivation of the cleanup levels used in development the RAOs for Site 27. There have not been any changes to the ARARs identified in ROD/Final RAP that would affect the protectiveness of the remedy. The response to Question B is Yes, the assumptions made at the time of remedy selection remain valid.

Table 2-40: Technical Evaluation – Question B (Site 27)

Question	Summary
Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria	There were no changes to ARARs selected in the ROD/Final RAP that affect the protectiveness of the remedy.
Changes in Toxicity and Other Contaminant Characteristics	The remedy is based on preventing exposure of the lead fragments and shot to diving ducks and not on a risk-based screening level; therefore, any change in toxicity or risk methods is not relevant.
Changes in Risk Assessment Methods	No change in risk assessment methods were noted.
Changes in Exposure Pathways	This Five-Year Review identified no changes in exposure pathways, physical site conditions, or land use since the remedy was selected. Following sediment removal, a filter layer consisting of sand and gravel and then a protective armor layer consisting of rock were installed within the dredged area. The filter and armor layers were installed to eliminate the lead ingestion pathway for ecological receptors (diving ducks).

Question	Summary
	This Five-Year Review identified no new contaminants not previously addressed by the selected remedy. Land use at Site 27 has not changed since the ROD/Final RAP was signed; however, redevelopment of the marina immediately adjacent to Site 27 is planned in the future. Exposure assumptions developed in the Site 27 ERA considered the potential future exposures. The future redevelopment plan (CCSF, 2011) did not introduce any new exposure scenarios that were not already taken into account by the Site 27 ERA and ROD/Final RAP. There have been no changes to toxicity or other contaminant characteristics that would affect the protectiveness of the remedy.
Expected Progress Towards Meeting RAOs	The remedy is progressing as expected and the RAOs are being met through implementation of ICs. No decreases in sediment elevation were observed in the area outside the backfilled area within Site 27, indicating that the required 2-feet of coverage remains above the lead-impacted sediment in these areas. As a result, the remedy in the areas outside of the backfilled area appears to remain protective of ecological receptors at Site 27 (Langan, 2019).

Notes:

§	Section	RAO	Remedial action objective
ARAR	Applicable or relevant and appropriate requirement	RAP	Remedial action plan
		ROD	Record of decision
ERA	Ecological risk assessment	TBC	To be considered
IC	Institutional control		

2.5.5.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No new human health or ecological risks have been identified. No other information has been identified to suggest that the remedies may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have affected the protectiveness of the remedy.

2.5.6 Site 27 Issues, Recommendations, and Follow-Up Actions

Issue	Affects Protectiveness (Yes/No)		Recommendation and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date
	Current	Future				
Site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."	No	Yes	Erect necessary signage and revise the IC compliance checklist to verify the presence of signage and to evaluate the condition of the signage.	TIDA	DTSC	May 2021
Information indicates boats violating "No Wake Zone" speed limit requirements.	No	Yes	Identify specific enforcement provisions for speed limits in a revised Clipper Cove SMP and improve enforcement of speed limits.	TIDA	DTSC	May 2022

Notes:

DTSC California Department of Toxic Substances Control
IC Institutional control
SMP Site management plan
TIDA Treasure Island Development Authority

2.5.7 Site 27 Protectiveness Statement

Site(s): Site 27	**Protectiveness Determination:** Protective
Protectiveness Statement: The remedy for Site 27 is protective of human health and the environment. RAOs have been met, focused dredging is complete, the 1.5-foot thick engineered backfill was installed within 75-feet of the shoreline, is in place, and is functioning as intended to prevent exposure. There have been no decreases in sediment elevation in the area outside the backfilled area, indicating that the required two feet of coverage remains in place above the lead-impacted sediment. In addition, the LUC RD has been finalized, the ICs and the SMP are in place to restrict disturbance of the engineered backfill area and the sediment, annual LUC inspections are occurring, and bathymetric surveys are being completed every five years.	

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SITE 27 FIGURES

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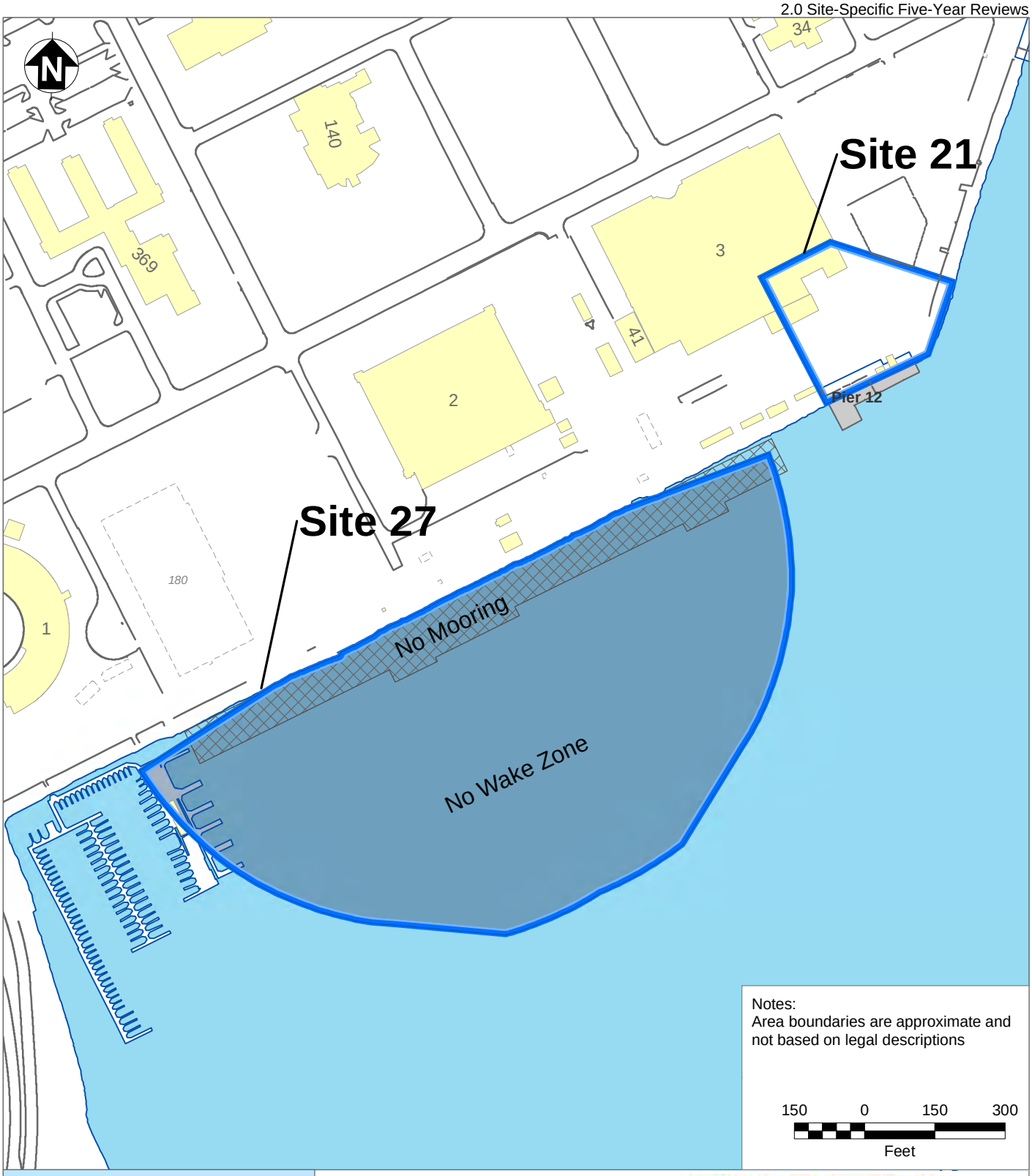
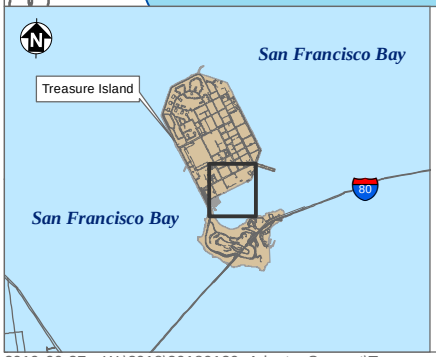


Notes:
Area boundaries are approximate and not based on legal descriptions

150 0 150 300
Feet



Dredge Footprint
Land Use Restriction Area
Site 27 Boundary
Building
Road

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-29
SITE 27
GENERAL LOCATION MAP

Second Five-Year Review

2019-06-27 W:\2018\20180120_Adanta_Support\Treasure_Island\10_IR27_5YR\2.5-1_GeneralLocMap.mxd Adanta brodrigues

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Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-30

SITE 27
LAND USE RESTRICTION AREA

Second Five-Year Review

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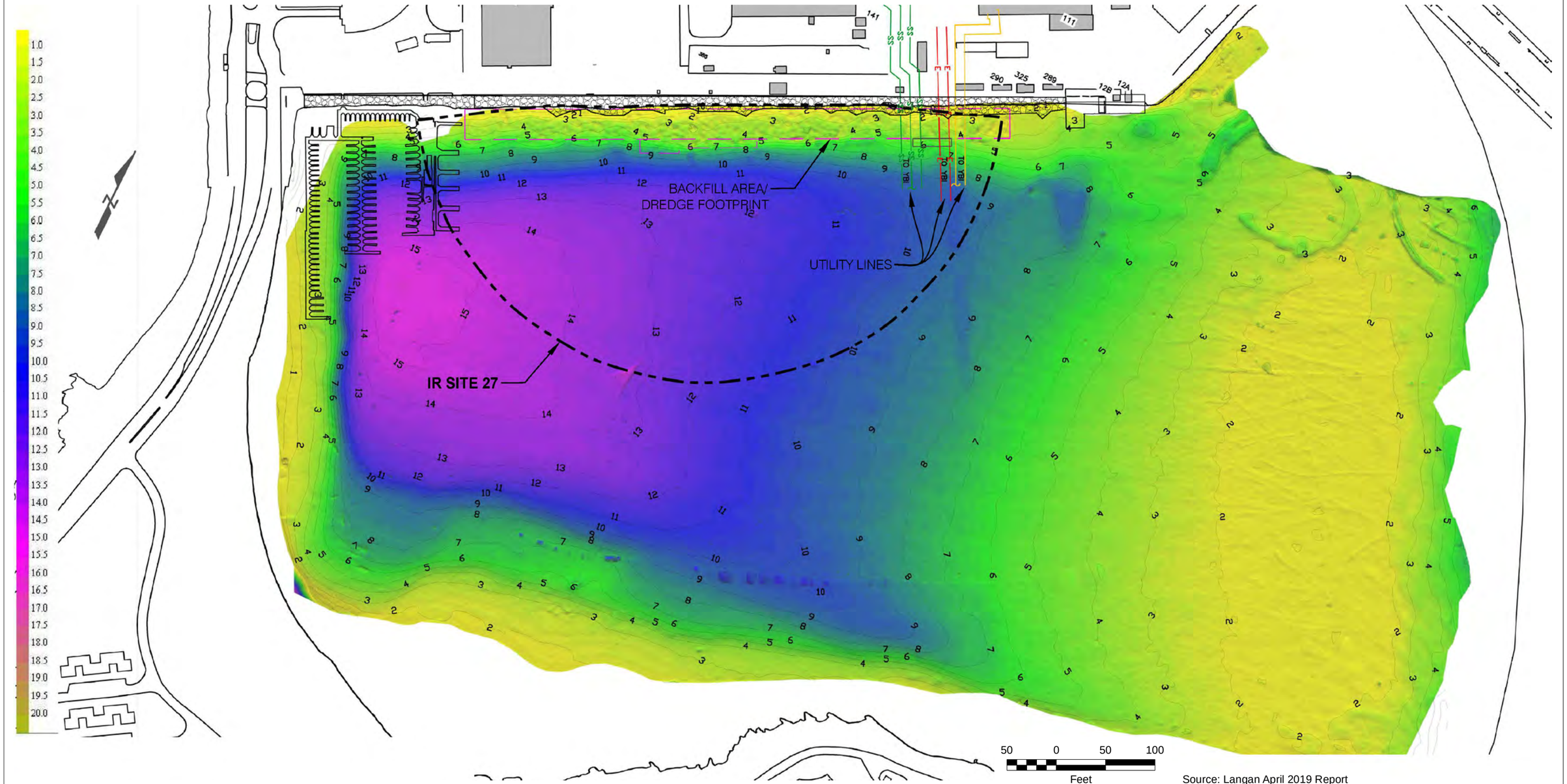
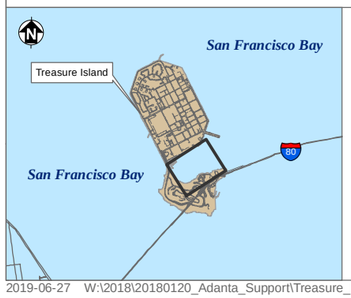


Source: Langan April 2019 Report



NOTES:
1. MLLW = MEAN LOWER-LOW WATER LINE.
2. BATHYMETRIC SURVEY OF CLIPPER COVE BY BAY MARINE SERVICES ON 13 AND 15 NOVEMBER 2018.
3. DEPTH TO SEDIMENT SURFACE CONTOUR LINES SHOWN IN FEET BELOW MLLW.
4. SURVEY DATA SHOWS 1 FT CONTOURS DERIVED FROM 1X1 AVERAGE DATA SET.
5. SURVEY DATA OBTAINED ON NOVEMBER 12, 2018 USING KONGSBURG EM-3002 SONAR, CODA F-180 RTK BASED ATTITUDE AND POSITIONING SYSTEM, AND LEICA SPIDERNET BASE.
6. BACKGROUND DATA AND LAND FEATURES PROVIDED BY Ttec.
7. DUE TO CHANGING BOTTOM CONDITIONS DATA SHOULD ONLY BE CONSIDERED VALID FOR THE DATES LISTED AND SHOULD NOT BE USED FOR NAVIGATION.

OPERATOR / CONDITIONS	
SURVEY DATE:	181112
ENGINEER / SURVEYOR:	D. GEWANT
SURVEY VESSEL:	LILLY T.
VESSEL OPERATOR:	K TWEED
WEATHER:	OVERCAST
TEMPERATURE:	60
WIND:	5 VARIABLE
SEA:	0

ELECTRONIC EQUIPMENT	
SOUNDER	RESON 8101 ER
FREQ	240
HEAVE COMP.:	SBG APOGEE
SOS (AVG):	1497.8
POSITIONING:	RTK
USCG BEACON:	PIDGON PT
TIDE GAUGE:	POINT 11 IN HARBOR
	BMS ELECTRONIC

NAVFAC Naval Facilities Engineering Command

Naval Station Treasure Island
Department of the Navy, BRAC PMO West, San Diego, CA

FIGURE 2-31

SITE 27
CLIPPER COVE SURVEY CONTOURS

Second Five-Year Review

2019-06-27 W:\2018\20180120_Adanta_Support\Treasure_Island\10_IR27_5YR\2.5-3_ClipperCove_SurveyCntrs.mxd Adanta brodrigues

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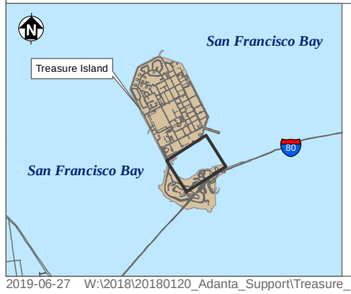
Source: Langan April 2019 Report



NOTES:
1. MLLW = MEAN LOWER-LOW WATER LINE.
2. YEAR 1 BATHYMETRIC SURVEY RESULTS PRESENTED IN THE YEAR 1 MONITORING REPORT
IR SITE 27 PREPARED BY TETRA TECH EC, INC. DATED FEBRUARY 2015.
3. BATHYMETRIC SURVEY CONDUCTED BY BAY MARINE SERVICES ON 13 NOVEMBER 2018.
4. SURVEY DATA SHOWS CHANGE BETWEEN THE 2014 SURVEY AND THE 2018 CONDITIONAL SURVEY
5. SURVEY DATA OBTAINED ON NOVEMBER 17, 2014 AND NOVEMBER 13, 2018 USING KONGSBURG EM-3002 OF RESON 8101 SONAR, CODA F-180 RTK BASED ATTITUDE AND POSITIONING SYSTEM, AND LEICA SPIDERNET BASE
6. BACKGROUND DATA AND LAND FEATURES PROVIDED BY Ttec.
7. NEGATIVE VALUES INDICATES ELEVATIONS BELOW THE 2014 SURVEY

OPERATOR / CONDITIONS	
SURVEY DATE:	181112
ENGINEER / SURVEYOR:	D. GEWANT
SURVEY VESSEL:	LILLY T,
VESSEL OPERATOR:	K TWEED
WEATHER:	OVERCAST
TEMPERATURE:	60
WIND:	5 VARIABLE
SEA:	0

ELECTRONIC EQUIPMENT	
SOUNDER	RESON 8101 ER
FREQ	240
HEAVE COMP.:	SBG APOGEE
SOS (AVG):	1497.8
POSITIONING:	RTK
USCG BEACON:	PIDGON PT
TIDE GAUGE:	POINT 11 IN HARBOR
	BMS ELECTRONIC

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FIGURE 2-32
SITE 27
YEAR 5 VS PRE-DREDGE SURVEY DIFFERENCES

Second Five-Year Review

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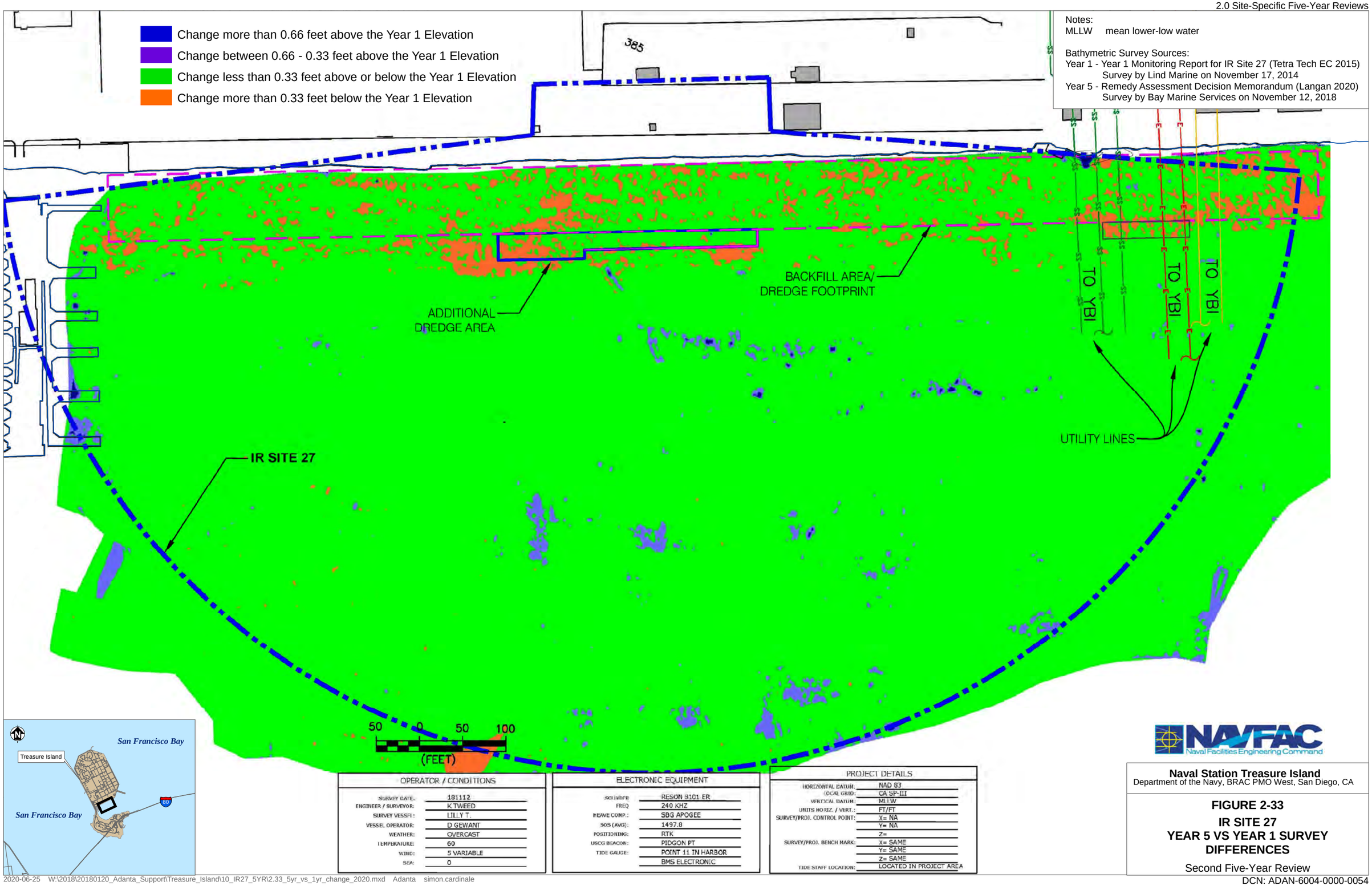

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FIGURE 2-33
IR SITE 27
YEAR 5 VS YEAR 1 SURVEY DIFFERENCES

Second Five-Year Review

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2.6 SITE 30 – DAYCARE CENTER

2.6.1 Site Description and Background

Site 30, Daycare Center (Building 502), is located south of the Treasure Island Elementary School, east of the corner of Avenue D and 11th Street (Figure 2-34). The site was undeveloped until the DON's former daycare center was built in 1985. After NAVSTA TI closed, the Treasure Island Daycare Center was leased to CCSF under a finding of suitability to lease (FOSL) on July 29, 1997 (ERM-West, 1995a). The current daycare center was remodeled into its current configuration (Figure 2-35) and reopened on March 17, 2003.

In April 2002, a 1989 as-built drawing was discovered indicating that the DON Public Works Center installed an 8-inch water line down the middle of 11th Street. A note on the as-built drawing for the water line project identified an "old trash dump" within the western portion of the water line excavation along 11th Street between Avenues D and E (Shaw, 2003). Subsequently, a multiphase investigation and removal action was conducted beginning in May 2002 to determine the nature and extent of the buried debris (Shaw, 2003; 2004). Based on the findings of the early phases of this investigation, the DON designated a portion of Environmental Baseline Survey (EBS) Parcel T094 as Site 30 on September 6, 2002 (Shaw, 2003).

The remedy selected in the July 2009 ROD/Final RAP was engineering controls and ICs to address the principal threats by preventing exposure to potentially contaminated soils beneath the building and allow the site to be used currently and in the future as a daycare center. The LUC RD/RAWP was finalized on November 24, 2010. Annual LUC inspections and reporting are ongoing by the non-Navy property owner and have observed that no violations to the LUCs have occurred. Site 30 was also included in the first basewide Five-Year Review that was finalized December 15, 2014.

2.6.1.1 Land and Resource Use

Currently, Site 30 is used as the Treasure Island Daycare Center. The 2011 Final EIR (CCSF, 2011) and 2011 TIDA Design for Development (TIDA, 2011) lists the proposed future use of Site 30 as residential.

There are no perennial surface water bodies located at Site 30. As discussed in Section 1.2.5.3, groundwater is not currently used as a source of drinking water and is not planned to be used as such in the future.

2.6.2 Response Action Summary

This section provides the framework for the response actions undertaken at Site 30. The following text discusses the basis for taking action, summarizes the initial (pre-ROD/Final RAP) response actions that have occurred, the RAOs and components of the selected remedy, and describes the implementation status of the selected remedy.

2.6.2.1 Basis for Taking Action

The response action selected in the ROD/Final RAP was necessary to protect human health. Specifically, the response action addressed risk posed by dioxin in soil to potential residential and commercial/industrial receptors.

2.6.2.2 Previous Investigations

Table 2-41: Previous Investigations Summary – Site 30

Previous Investigations	Date	Investigation Summary
Exploratory Trenching Investigations	May – September 2002	A series of exploratory trenching investigations identified various types of wastes, including burned debris that contained lead and dioxins at levels exceeding the site soil screening levels.
TCRA	July 2002	About 200 yd^3 of soil and debris were removed on the south side of 11th Street. A 6-inch-thick concrete pad with a 2-inch thick asphalt layer (jointly termed the "Site 30 concrete pad") was installed over a 1,400-square foot area adjacent and west of Building 502 where soil samples had indicated higher concentrations of dioxins. Although the Site 30 concrete pad was installed as an interim measure to prevent exposure to dioxins in soil, the results of the subsequent HHRA determined the risk to daycare center receptors to be below the risk management range. Therefore, the Site 30 concrete pad is not needed as an exposure prevention barrier for the daycare center receptors.
Groundwater Monitoring	May 2004	Two groundwater monitoring wells were installed and sampled for analysis of VOCs, SVOCs (including pesticides, PCBs, and dioxins), TPH, and metals. No chemicals were detected at concentrations exceeding groundwater screening criteria.
RI	2006	Based on the information and data evaluated as part of the RI for Site 30, the site does not pose an unacceptable risk for the current and future use as a daycare center.
FS	2006	A comparative analysis of RAs to address potential concentrations of dibenzo-*p*-dioxins and polychlorinated furans (dioxins) beneath the daycare center building slab that pose a potential risk to human health under alternative land use scenarios.
Proposed Plan/Draft RAP	2008	Provided information on the environmental investigations, the remedial alternatives (the options for cleaning up the site) that were evaluated and identifies the DON's preferred remedial alternative. The preferred alternative is ECs combined with ICs, which is the most cost-effective alternative that will provide adequate protection to human health and the environment.

Previous Investigations	Date	Investigation Summary
ROD/Final RAP	2009	The DON, with the concurrence of the State of California, selected ECs combined with ICs as the selected remedy for Site 30. The remedy addresses the principal threats by preventing exposure to potentially contaminated soils beneath the Daycare Center building slab and would allow Site 30 to be used in its current and future use as a daycare center.
LUC RD/RAWP	2010	ECs specify maintaining the Building 502 foundation slab to prevent contact with potential dioxin contamination beneath the slab. Periodic inspections are required to verify its ongoing integrity. The Site 30 ICs address risk from soil beneath the Building 502 slab and the adjacent Site 30 concrete pad to potential future industrial/commercial or residential users. ICs restrict any removal or penetration of the Building 502 slab or the Site 30 concrete pad.

Notes:

DON	United States Department of the Navy
EC	Engineering control
FS	Feasibility study
HHRA	Human health risk assessment
IC	Institutional control
LUC	Land use control
PCB	Polychlorinated biphenyl
RA	Remedial action
RAP	Remedial action plan
RAWP	Remedial action work plan
RD	Remedial design
RI	Remedial investigation
ROD	Record of decision
SVOC	Semi-volatile organic compound
TCRA	Time-critical removal action
TPH	Total petroleum hydrocarbons
VOC	Volatile organic compound
yd^3	Cubic yard

2.6.2.3 Remedial Action Objectives

The ROD/Final RAP for Site 30 was finalized in August 2009 (DON, 2009). The RAOs for Site 30 are as follows:

- Protect potential future commercial/industrial and potential future residential receptors by preventing the ingestion and direct contact with soils containing dioxin TEQs above the previously established ambient dioxin TEQ of 12 nanograms per kilogram (ng/kg) beneath and adjacent to Building 502.
- Protect the current daycare center receptor by preventing the ingestion of and direct contact with soils containing unknown concentrations above the previously established ambient dioxin TEQ of 12 ng/kg beneath Building 502.

2.6.2.4 Selected Remedy

The selected remedy for Site 30, as presented in the Site 30 ROD/Final RAP, consists of the following components:

- ECs to maintain the building foundation slab to prevent contact with potential dioxin contamination beneath the slab. The existing slab of the daycare center building would be maintained as an exposure prevention barrier. The existing slab is not likely to require maintenance to continue serving as an exposure prevention barrier; however, periodic inspections would be required to verify its integrity. The Site 30 concrete pad adjacent to

Building 502 would not be maintained as an EC because contaminants beneath the pad do not pose a risk to current use of the site as a daycare center.

- ICs to address risk from soil beneath the Site 30 concrete pad to potential future users. ICs will restrict any removal or penetration of the Building 502 slab, except when specific guidelines have been followed to prevent exposure to potentially contaminated soil. If utility repairs (such as water or sewer repairs) are required, measures would be implemented to prevent exposure of the occupants and workers to potentially contaminated soil. The ICs would require inspection, maintenance, and reporting of the Site 30 concrete pad and Building 502 building slab to ensure remedy compliance.

In January 2003, as part of the TCRA that was performed to reduce potential exposure to subsurface debris and contaminated soil, the DON installed a 6-inch concrete pad adjacent to the daycare center to cover the 1,400 ft^2 area around and between the locations that contain elevated concentrations of dioxin in the subsurface soil. Dioxins were not detected in groundwater samples collected at Site 30.

Although the concrete pad had been installed as an interim measure to prevent exposure when the TCRA was conducted, the results of a risk assessment completed subsequent to the installation of the concrete pad and presented in the 2006 RI Report evaluated risk to receptors should the concrete pad be removed and determined the risk to current daycare center receptors, including the daycare center child, was at or below the risk management range. No COCs were identified for the current and planned use of Site 30 as a daycare center or for the future construction worker scenario. Therefore, the exterior Site 30 concrete pad was not necessary as an exposure prevention barrier for the daycare center receptors (SulTech, 2006). ICs are necessary and are implemented as part of the remedy for the exterior Site 30 concrete pad to require that excavation below the concrete pad be conducted according to specific guidelines. Under the alternative land use scenarios for commercial/industrial or residential receptors, dioxin is the only designated COC for Site 30.

Table 2-42: RGs for Site 30

Contaminant of Concern	RG	Receptor	Basis
Soil			
Dioxins	12 ng/kg	Current daycare children, staff, and construction workers	Ambient level
		Future residential and/or commercial/industrial users	

Notes:

ng/kg Nanograms per kilogram
RG Remediation goal

2.6.2.5 Implementation Status

Table 2-43: Demonstration of Completion – Site 30

RAO	Demonstration of Completion	RAO Met? (Yes/No)
Protect potential future commercial/industrial and potential future residential receptors by preventing the ingestion and direct contact with soils containing TEQ above the previously established ambient dioxin TEQ of 12 ng/kg beneath and adjacent to Building 502	Continued annual LUC inspections ensure the ICs and ECs detailed in the LUC RD remain in place and no violations have occurred	Yes
Protect the current daycare center receptor by preventing the ingestion of and direct contact with soils containing unknown concentrations above the previously established ambient dioxin TEQ of 12 ng/kg beneath Building 502	Continued annual LUC inspections ensure the ICs and ECs detailed in the LUC RD remain in place and no violations have occurred	Yes

Notes:

EC	Engineering control	RAO	Remedial action objective
IC	Institutional control	RD	Remedial design
LUC	Land use control	TEQ	Toxicity equivalent
ng/kg	Nanograms per kilogram		

The DON finalized the LUC RD in November 2010 (Trevet, 2010). The DON conducted annual LUC inspections at Site 30 from 2011 through 2018 (Adanta, 2018). TIDA conducted the annual LUC inspection in 2019 (Langan, 2019). The site inspections involved a visual assessment of the interior and exterior of Building 502 to identify cracks, holes, penetrations, or removal of the building foundation (Figure 2-36). The site inspections also reviewed Building 502 and the Site 30 concrete pad for unauthorized changes in land use, including utility repairs and removals, and to determine if contaminated soil has been brought to the surface. No violations of the ICs were identified during any of the site inspections. Findings from those LUC inspections are summarized in Table 2-44.

Table 2-44: ICs for Site 30

Status	2015	2016	2017	2018	2019
In-compliance?	Yes	Yes	Yes	Yes	Yes
Resolved?	No Issues	No Issues	No Issues	No Issues	No Issues

2.6.2.6 Systems Operations/Operations & Maintenance

No significant O&M costs have been incurred for Site 30. Minor costs are expected for maintenance of the building slab and for enforcement of administrative ICs.

2.6.3 Site 30 Progress Since Last Five-Year Review

The 2014 Five-Year Review made the following protectiveness statement for Site 30:

> *The remedy for Site 30 is protective of human health and the environment. The building foundation slab is preventing exposure to dioxins in soil. The IC performance objectives specified in the ROD/Final RAP are being met by access controls until the time of transfer to prevent potential exposure. The effective implementation of IC performance objectives through land use and activity restrictions incorporated into deeds and CRUPs at the time of transfer will effectively prevent exposure to COCs and prevent activities that could damage the integrity of the remedy following transfer of the property.*

Continued inspections of the foundation slab and other impervious covers ensure that exposure to dioxins in soils is not occurring.

2.6.3.1 Status of Recommendations and Follow-up Actions

No recommendations or follow-up actions were identified during the 2014 Five-Year Review for Site 30.

2.6.4 Site 30 Five-Year Review Process

This section discusses the activities performed during the Five-Year Review process for Site 30. Section 1.3 outlines the general Five-Year Review process, which was applied to each site evaluated in this Five-Year Review.

2.6.4.1 Data Review

The most recent investigation of dioxins in soil is reported in the 2009 ROD/Final RAP (DON, 2009). The dioxin TEQ exposure point concentration (EPC) used in the risk assessment was 32.1 ng/kg. The EPC was largely driven by two concentrations, 27.7 and 34.1 ng/kg, in samples collected from locations beneath the Site 30 concrete and asphalt pad at depths of 4- and 5-feet bgs, respectively. Only four of the dioxin TEQ concentrations for the remaining 17 samples in the combined surface and subsurface soil data set exceeded the USEPA 2004 Region IX PRG for residential soil of 3.9 ng/kg, but these concentrations were below the ambient soil dioxin TEQ level for NAVSTA TI of 12 ng/kg (DTSC, 2004). Dioxin concentrations beneath Building 502 are unknown. Dioxins were not detected in groundwater samples collected at Site 30.

Table 2-45: Site 30 Remedy Summary

Medium	Risk Basis for Action/COCs	RAOs	Remedy	Performance Metric
Soil	Human Health Exposure – Ingestion or Direct Contact/Dioxin	Prevent exposure for current daycare center receptors	ECs/ICs	Annual LUC inspections
Soil	Human Health Exposure – Ingestion or Direct Contact/Dioxin	Prevent exposure for future commercial/ industrial and residential receptors	ECs/ICs	Annual LUC inspections

Notes:

COC Contaminant of concern
EC Engineering control
IC Institutional control
LUC Land use control
RAO Remedial action objective

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2.6.4.2 Site Inspection

The DON and Adanta, Inc. conducted a site inspection at Site 30 for this Five-Year Review on January 8, 2019. The purpose of the site inspection was to review and document current site conditions and evaluate visual evidence on the protectiveness of the remedy. Site access and general site conditions were also evaluated during the inspection. Appendix A contains the site inspection checklist, and Appendix B contains the photographic log, which documents observations made during the inspection.

Observations made during the site inspection indicated that the remedies were in place are functioning as intended and are effective at preventing exposure. The site inspection did not identify any issues with the Building 502 foundation slab, did not identify any unauthorized changes in land use, and did not identify any indication that contaminated soil had been brought to the surface of the site or was accessible. The site inspection noted minor weathering, erosion, and vegetation growth along the edges of the exterior Site 30 concrete slab, minor cracking near the utility cover, and signs of wear on interior wood floor panels, including minor separation between the floor panels in some areas, and signs of wear on rubber surface tiles within the children's outside playground area. These are not issues that affect the protectiveness of the remedy. The exterior Site 30 concrete pad is not an exposure prevention barrier, so weathering and erosion of the concrete pad do not affect exposure. Wear and tear on the interior floor panels and separation between the floor panels also does not affect exposure because the Building 502 foundation slab is still in place and no signs of cracks, holes, or penetrations in the foundation slab were noted. In addition, normal wear and tear on the children's outside playground area does not affect exposure. There are no groundwater wells on Site 30, so cracks identified near the utility cover are not related to Site 30 and do not affect the protectiveness of the Site 30 remedy. No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP.

2.6.5 Site 30 Technical Assessment

2.6.5.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Table 2-46: Technical Evaluation – Question A (Site 30)

Question	Summary
RA Performance	**Yes.** A review of documents, site inspections, and interviews with personnel knowledgeable about the site indicates that the remedy as outlined in the ROD/Final RAP is functioning as designed. The building foundation slab has achieved the RAO of preventing exposure to dioxins in soil.
System Operations/O&M	**Yes.** No O&M issues have been identified for Site 30.

Question	Summary
Implementation of Institutional Controls	**Yes.** The LUC RD (Trevet, 2010) summarizes the ICs related to protection of the integrity of the remedy at Site 30. ICs are in place to prevent penetration or removal of the foundation slab, except when following specific requirements to prevent exposure to potentially contaminated soil. The IC performance objectives specified in the ROD/Final RAP and LUC RD are being met. The DON conducts annual LUC inspections; The most recent annual LUC inspection was conducted in February 2019. The DON concluded conclusions of the inspection indicated that the slab is intact and continues to prevent exposure to subsurface contamination. No violations of the LUCs were identified during the site inspection (Langan, 2019).

Notes:

EC	Engineering control	RAO	Remedial action objective
DON	United States Department of the Navy	RAP	Remedial action plan
IC	Institutional control	RD	Remedial design
LUC	Land use control	ROD	Record of decision
O&M	Operations and maintenance		
RA	Remedial action		

2.6.5.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Objectives Used at the Time of Remedy Selection Still Valid?

USEPA's guidance document for Five-Year Reviews identifies several areas for consideration in evaluating whether the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection remain valid (USEPA, 2001). Areas of consideration include changes in standards identified as ARARs and TBC criteria in the ROD, changes in exposure pathways, changes in toxicity and other contaminant characteristics, changes in risk assessment methods, and expected progress toward meeting RAOs.

The DON reviewed the ARARs, exposure assumptions, toxicity data, derivation of the cleanup levels used in development the RAOs for Site 30. There have not been any changes to the ARARs identified in ROD/Final RAP that would affect the protectiveness of the remedies. The response to Question B is Yes, the assumptions made at the time of remedy selection remain valid.

Table 2-47: Technical Evaluation – Question B (Site 30)

Question	Summary
Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria	There were no changes to ARARs selected in the ROD/Final RAP that affect the protectiveness of the remedy.
Changes in Toxicity and Other Contaminant Characteristics	The remedial goal of 12 ng/kg for dioxins and furans is based on an ambient concentration established for NAVSTA TI (DTSC, 2004). Changes in toxicity and other contaminant characteristics have no effect on protectiveness of the remedy, which focuses on

Question	Summary
	preventing exposure to contaminated subsurface soil beneath clean fill and a concrete foundation. The current ESL from the July 2019 San Francisco Bay Regional Water Control Broad is shown on Table 2-48 along with other current risk-based cleanup levels.
Changes in Risk Assessment Methods	No changes in risk assessment methods were noted.
Changes in Exposure Pathways	The exposure potential has not changed as the integrity of the concrete and asphalt soil cover has been maintained. Both the cleanup level based on an ambient concentration and RAOs used at the time of the remedy selection are still valid. Some exposure assumptions have been revised since the Site 30 risk assessment was completed, such as adult body weight increasing from 70 kg to 80 kg or the skin surface area exposed to groundwater in the trench by a construction worker increasing from 5,700 cm^2 to 6,032 cm^2. However, the RG for dioxin is based on an ambient concentration and is not affected by these exposure assumptions. Land use at Site 30 has not changed since the ROD/Final RAP was signed; however, land use at NAVSTA TI is expected to change as parcels are transferred and the land is redeveloped. Exposure assumptions developed in the HHRA considered the current use of Site 30 as a daycare. Risk calculations for the daycare child were deemed to be protective of the daycare worker. Potential future exposures based on the expected reuses. The future redevelopment plan (CCSF, 2011) did not introduce any new exposure scenarios that were not already considered by the HHRA and ROD/Final RAP.
Expected Progress Towards Meeting RAOs	The remedy is progressing as expected. The RAOs are being met through the implementation of LUCs. The building foundation slab and concrete pad adjacent to Building 502 is preventing exposure to dioxins in soil and the ICs control access to the soil.

Notes:

ARAR	Applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm^2	Square centimeter
ESL	Environmental screening level
HHRA	Human health risk assessment
IC	Institutional control
kg	Kilogram
LUC	Land use control
NAVSTA TI	Former Naval Station Treasure Island
ng/kg	Nanograms per kilograms
RAO	Remedial action objective
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
TBC	To be considered

2.6.5.3 Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

No new human health or ecological risks have been identified. No other information has been identified to suggest that the remedies may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have affected the protectiveness of the remedies. No other information has been identified to suggest that the remedies may not be protective of human health and the environment.

2.6.6 Site 30 Issues, Recommendations, and Follow-Up Actions

No issues have been identified for Site 30 that would affect current or future protectiveness of the remedy. No recommendations or follow-up actions have been identified.

2.6.7 Site 30 Protectiveness Statement

Site(s): Site 30	**Protectiveness Determination:** Protective
Protectiveness Statement: The remedy for Site 30 is protective of human health and the environment. RAOs have been met, the LUC RD has been finalized, LUCs are in place to prevent exposure to potentially contaminated soil, and annual LUC inspections are occurring.	

SITE 30 FIGURES

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Note:
Area boundaries are approximate and not based on legal descriptions
LUC Land Use Control

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FIGURE 2-34
SITE 30 GENERAL LOCATION MAP
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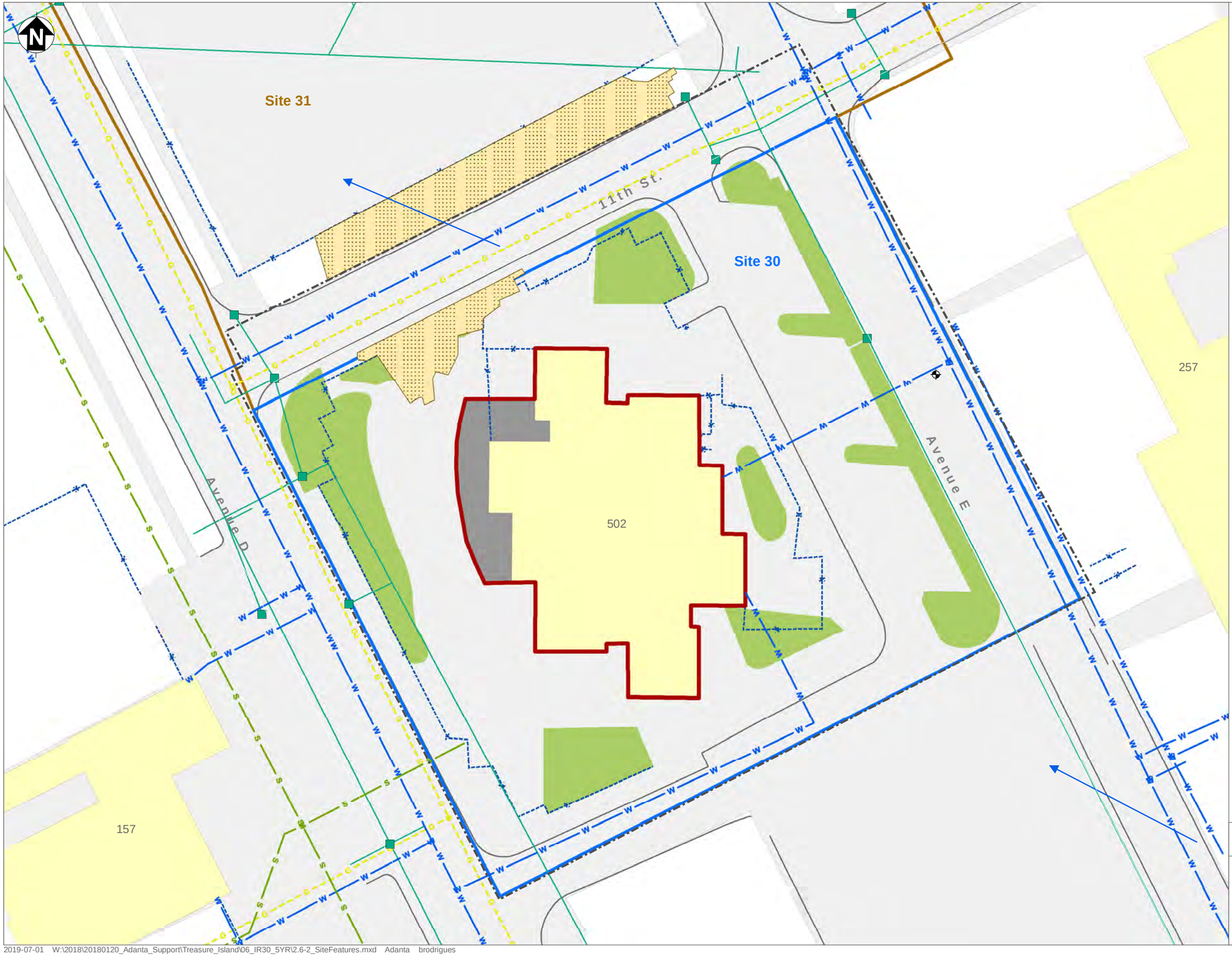

- Sanitary Sewer Pipeline
- Water Pipeline
- Gas Pipeline
- Storm Drain Line
- Storm Drain
- Fence
- Groundwater Flow Direction
- Road Curb
- Monitoring Well Location
- Environmental Baseline Survey Parcel T094 Boundary
- Site 30 Boundary
- Site 31 Boundary
- Site 30 Concrete Pad
- Vegetated Areas, Site 30
- Building
- Paved Area
- Unpaved Area
- Proposed Remedial Action Area

20 0 20 40
Feet

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FIGURE 2-35
SITE 30
FEATURES MAP

Second Five-Year Review

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Land Use Control
25 X 25 Foot Sampling Grid
Site 30 Concrete Pad
Road
Building
Site 30 Boundary

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FIGURE 2-36

SITE 30
BUILDING 502 FIELD INSPECTION MAP

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SITE 30 TABLES

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Table 2-48: Site 30 Soil Cleanup Goals

Primary COC in Soil	ROD/ Final RAP RG	Current USEPA RSL [1]		Current Regional Water Board ESL [2]			Current DTSC SL [3]		DTSC Regulation Based Criteria Toxicity Criteria for HHRA [4]
		Residential	Commercial/ Industrial Worker	Residential	Commercial/ Industrial	Commercial/ Industrial Worker	Residential	Commercial/ Industrial Worker	
Dioxin TEQ	1.2E-05 (Ambient)	4.8E-06	2.2E-05	4.8E-06	2.2E-05	1.5E-04	4.8E-06	1.8E-05	NA

Notes:

All criteria are based on a cancer risk of 1E-06 and noncancer hazard of 1, unless otherwise noted as a NAVSTA TI ambient concentration. All values shown in units of milligram per kilogram (mg/kg).

1. USEPA RSLs. Dated May 2019. Available online at: https://www.epa.gov/risk/regional-screening-levels-rsls
2. San Francisco Bay Regional Water Quality Control Board ESLs. Dated July 2019. Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html
3. Cal/EPA DTSC-SLs presented in "Human Health Risk Assessment (HHRA) Note: HERO Note Number 3, DTSC-Modified Screening Levels (DTSC-SLs)." Dated April 2019. Available online at: https://dtsc.ca.gov/human-health-risk-hero/
4. California Code of Regulations title 22, section 69021(a), Appendix I, Tables A and B.

Cal/EPA	California Environmental Protection Agency
COC	Contaminant of concern
DTSC	Department of Toxic Substances Control
ESL	Environmental screening level
HHRA	Human health risk assessment
NA	Not available
RAP	Remedial action plan
RG	Remediation goal
ROD	Record of decision
RSL	Regional screening level
SL	Screening level
TEQ	Toxicity equivalent
USEPA	U.S. Environmental Protection Agency

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APPENDIX A: SITE INSPECTION CHECKLISTS

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Five-Year Review Site Inspection Checklist – Site 6

I. SITE INFORMATION

Site Name:	Naval Station Treasure Island, Site 6	**Date of Inspection:**	01/10/2019
Location and Region:	San Francisco, California	**EPA ID:**	CA7170023330
Agency, Office or Company Leading the Five-Year Review:	U.S. Department of Navy	**Weather:**	Overcast
		Temperature:	55° F

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment	☐ Monitored natural attenuation	☐ Institutional controls
☐ Access controls	☐ Groundwater containment	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Surface water collection and treatment	☒ Groundwater monitoring
☐ Other		

Attachments: ☐ Inspection Team Roster Attached ☒ Site Map Attached (see Figure 2-1 of Main Report)

II. INTERVIEWS (check all that apply)

O&M Site Manager

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, regulations or policy changes, suggestions:
No active, on-going O&M activities for Site 6 for this Five-Year Review

O&M Staff

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, suggestions:

Local regulatory authorities and response agencies (that is, State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Treasure Island Development Authority
Contact:

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached: See Appendix C

Problems, suggestions:

Other interviews (optional)

Community residents, DTSC, and Water Board (see Appendix C)

☒ Report attached: See Appendix C

Problems, suggestions:

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

A. O&M Documents

☐ O&M manual	☒ Readily available	☐ Up-to-date	☐ N/A
☐ As-built drawings	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Maintenance logs	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Documents are available in the Administrative Record and the information repositories. Ongoing routine O&M beyond inspection and repairs (if necessary) is not required at Site 6.

B. Site-Specific Health and Safety Plan

	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Contingency plan/emergency response plan	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Health and safety plans confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, and TtEC)

C. O&M and OSHA Training Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: OSHA training records confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, TtEC)

D. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water disposal, POTW	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Other permits	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

E. Gas Generation Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

F. Settlement Monument Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

G. Groundwater Monitoring Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Historical groundwater monitoring records are readily available in the Administrative Record and the information repositories.

H. Leachate Extraction Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

I. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

J. Daily Access/Security Logs

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

IV. O&M COSTS ☐ Applicable ☐ N/A

A. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: _____

Remarks: O&M activities are applicable only for Site 6.

B. O&M Cost Records

☐ Readily available ☐ Up-to-date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☒ N/A
Total annual cost by year or review period: N/A
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached

C. Unanticipated or Unusually High O&M Costs During Review Period

Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

A. Fencing

☐ Fencing damaged ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks: Fencing ok.

B. Other Access Restrictions

☒ Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Signage present to direct public away from area.

C. Institutional Controls (IC):

1. Implementation and Enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive-by): Drive-by
Frequency: Annual
Responsible party/agency: _____
Contact: _____
Name Title Date Phone Number
Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A
Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions ☐ Report attached
ICs are in compliance, except for one missing well cover bolt on wells 06-MW30 and 06-MW31. Also, an uncapped structure resembling a former monitoring well is present near 06-MW36.

2. Adequacy

☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks:

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

D. General

1. Vandalism/Trespassing ☐ Location shown on site map ☐ No vandalism evident

Remarks: Graffiti present on adjacent buildings.

2. Land use changes on-site ☒ N/A

Remarks:

3. Land use changes off-site ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks: Access roads in adequate condition

B. Other Site Conditions

Site is vacant and accessible through the northeast entry point

VII. COVERS ☐ Applicable ☒ N/A

A. Cover Surface

1. Settlement (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____

Remarks: Settlement not evident

2. Cracks ☐ Location shown on site map ☐ Cracking not evident
Lengths _____ Widths _____ Depths _____

Remarks: There are no cracks evident in the slab

3. Erosion ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____

Remarks: Erosion from storm events is not evident

4. Holes ☐ Location shown on site map ☐ Holes not evident
Areal extent _____ Depth _____

Remarks: No holes were observed in the slab

5. Vegetative Cover ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)

Remarks: Not applicable

6. Alternative Cover (armored rock, concrete, etc.) ☐ N/A

Remarks: Building slab appears to be in good condition

7. Bulges ☐ Location shown on site map ☐ Bulges not evident
Areal extent _____ Depth _____

Remarks: Not applicable

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

8. Wet Areas/Water Damage ☐ Wet areas/water damage not evident

☒ Wet areas	☐ Location shown on site map	Areal extent	
☐ Ponding	☐ Location shown on site map	Areal extent	
☐ Seeps	☐ Location shown on site map	Areal extent	
☐ Soft subgrade	☐ Location shown on site map	Areal extent	

Remarks: No water damage observed

9. Slope Instability ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability

Areal extent _____

Remarks: Not applicable

B. Benches ☐ Applicable ☒ N/A

1. Flow Bypass Bench ☐ Location shown on site map ☒ N/A or okay

Remarks:

2. Bench Breached ☐ Location shown on site map ☒ N/A or okay

Remarks:

3. Bench Overtopped ☐ Location shown on site map ☒ N/A or okay

Remarks:

C. Letdown Channels ☐ Applicable ☒ N/A

Remarks:

1. Settlement ☐ Location shown on site map ☒ No evidence of settlement

Areal extent _____ Depth _____

Remarks:

2. Material Degradation ☐ Location shown on site map ☒ No evidence of degradation

Material type _____ Areal extent _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ No evidence of erosion

Areal extent _____ Depth _____

Remarks:

4. Undercutting ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent _____ Depth _____

Remarks:

5. Obstructions ☐ Location shown on site map ☒ No obstructions

Type _____ Areal extent _____ Size _____

Remarks:

6. Excessive Vegetation Growth ☐ Location shown on site map ☒ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

Type _____ Areal extent _____

Remarks:

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

D. Cover Penetrations	☐ Applicable	☐ N/A	
1. Gas Vents	☐ Active	☐ Passive	
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
2. Gas Monitoring Probes			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
3. Monitoring Wells (within surface area of cover)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
4. Leachate Extraction Wells			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
5. Settlement Monuments	☐ Located	☐ Routinely surveyed	☒ N/A
Remarks:			
E. Gas Collection and Treatment	☐ Applicable	☒ N/A	
1. Gas Treatment Facilities			
☐ Flaring	☐ Thermal destruction	☐ Collection for reuse	
☐ Good condition	☐ Needs maintenance		
Remarks:			
2. Gas Collection Wells, Manifolds, and Piping			
☐ Good condition	☐ Needs maintenance		
Remarks:			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
☐ Good condition	☐ Needs maintenance	☒ N/A	
Remarks:			
F. Cover Drainage Layer	☐ Applicable	☒ N/A	
1. Outlet Pipes Inspected	☐ Functioning	☒ N/A	
Remarks:			
2. Outlet Rock Inspected	☐ Functioning	☒ N/A	
Remarks:			

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

G. Detention/Sedimentation Ponds	☐ Applicable	☒ N/A	
1. Siltation	☐ Siltation not evident	☒ N/A	
Areal extent _____	Depth _____		
Remarks:			
2. Erosion	☐ Erosion not evident	☒ N/A	
Areal extent _____	Depth _____		
Remarks:			
3. Outlet Works	☐ Functioning	☒ N/A	
Remarks:			
4. Dam	☐ Functioning	☒ N/A	
Remarks:			
H. Retaining Walls	☐ Applicable	☒ N/A	
1. Deformations	☐ Location shown on site map	☐ Deformation not evident	
Horizontal displacement _____	Vertical displacement _____		
Rotational displacement _____			
Remarks:			
2. Degradation	☐ Location shown on site map	☐ Degradation not evident	
Remarks:			
I. Perimeter Ditches/Off-Site Discharge	☐ Applicable	☒ N/A	
1. Siltation	☐ Location shown on site map	☒ Siltation not evident	
Areal extent _____	Depth _____		
Remarks:			
2. Vegetation Growth	☐ Location shown on site map	☒ N/A	
	☐ Vegetation in channels does not impede flow		
Areal extent _____	Depth _____		
Remarks:			
3. Erosion	☐ Location shown on site map	☒ Erosion not evident	
Areal extent _____	Depth _____		
Remarks:			
4. Discharge Structure	☐ Functioning	☒ N/A	
Remarks:			

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. Settlement ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Performance Monitoring ☐ Performance not monitored ☐ Evidence of breaching
Type of monitoring _____
Frequency _____
Head differential _____

Remarks:

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A (Groundwater Monitoring Applicable to Site 6)

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☒ N/A

1. Pumps, Wellhead Plumbing, and Electrical
☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks:

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☒ Needs maintenance

Remarks: Missing well cover bolt on wells 06-MW30 and 06-MW31. Also, an uncapped structure resembling a former monitoring well is present near well 06-MW36.

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Collection Structures, Pumps, and Electrical
☒ Good condition ☐ Needs maintenance

Remarks:

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☐ Needs maintenance

Remarks: Missing well cover bolt on wells 06-MW30 and 06-MW31. Also, an uncapped structure resembling a former monitoring well is present near well 06-MW36.

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment/Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculant) _____
☐ Others _____
☐ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up-to-date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually

Remarks:

2. Electrical Enclosures and Panels (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

3. Tanks, Vaults, Storage Vessels

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks:

4. Discharge Structure and Appurtenances

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

5. Treatment Building(s)

☒ N/A ☐ Good condition ☐ Needs maintenance
☐ Chemicals and equipment properly stored

Remarks:

D. Monitoring Data

1. Monitoring Wells – Site 6

☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☐ Good condition
☒ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Missing well cover bolt on wells 06-MW30 and 06-MW31. Also, an uncapped structure resembling a former monitoring well is present near well 06-MW36.

2. Monitoring Data

☐ Is routinely submitted on time ☐ Is of acceptable quality

Remarks:

3. Monitoring Data Suggest

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks: Refer to Section 2.1.4.1 of the main report for evaluation of Site 6 groundwater monitoring data.

E. Monitored Natural Attenuation

1. Monitoring Wells

☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled ☐ Good condition
☒ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Missing well cover bolt on wells 06-MW30 and 06-MW31. Also, an uncapped structure resembling a former monitoring well is present near well 06-MW36.

Five-Year Review Site Inspection Checklist – Site 6 (Continued)

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: No other remedies

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

B. Adequacy of O&M

Describe issues and observations relating to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Inspections at Site 6 found all remedy components in good condition, except for missing well cover bolt on wells 06-MW30 and 06-MW31. Also, an uncapped structure resembling a former monitoring well is present near well 06-MW36.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost of scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

No early indicators of potential problems were identified.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Five-Year Review Site Inspection Checklist – Site 12

I. SITE INFORMATION

Site Name:	Naval Station Treasure Island, Site 12	**Date of Inspection:**	01/10/2019
Location and Region:	San Francisco, California	**EPA ID:**	CA7170023330
Agency, Office or Company Leading the Five-Year Review:	U.S. Department of Navy	**Weather:**	Overcast
		Temperature:	55° F

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment	☐ Monitored natural attenuation	☐ Institutional controls
☒ Access controls	☐ Groundwater containment	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Surface water collection and treatment	☒ Groundwater monitoring
☐ Other		

Attachments: ☐ Inspection Team Roster Attached ☒ Site Map Attached (see Figure 2-10 of Main Report)

II. INTERVIEWS (check all that apply)

O&M Site Manager

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, regulations or policy changes, suggestions:
No active, on-going O&M activities for the Five-Year Review

O&M Staff

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, suggestions:

Local regulatory authorities and response agencies (that is, State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Treasure Island Development Authority
Contact:

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☒ Report attached: See Appendix C

Problems, suggestions:

Other interviews (optional)

Community residents, DTSC, and Water Board (see Appendix C)

☒ Report attached: See Appendix C

Problems, suggestions:

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

A. O&M Documents

☐ O&M manual	☒ Readily available	☐ Up-to-date	☐ N/A
☐ As-built drawings	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Maintenance logs	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Documents are available in the Administrative Record and the information repositories.

B. Site-Specific Health and Safety Plan

	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Contingency plan/emergency response plan	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Health and safety plans confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, and TtEC)

C. O&M and OSHA Training Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: OSHA training records confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, TtEC)

D. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water disposal, POTW	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Other permits	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

E. Gas Generation Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

F. Settlement Monument Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

G. Groundwater Monitoring Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Historical groundwater monitoring records are readily available in the Administrative Record and the information repositories.

H. Leachate Extraction Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

I. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

J. Daily Access/Security Logs

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Access/security logs available from Battelle for access into RAD-controlled areas.

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

IV. O&M COSTS ☐ Applicable ☐ N/A

A. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: _____

Remarks:

B. O&M Cost Records

☐ Readily available ☐ Up-to-date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☒ N/A
Total annual cost by year or review period: N/A
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached

C. Unanticipated or Unusually High O&M Costs During Review Period

Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

A. Fencing

☐ Fencing damaged ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks:

B. Other Access Restrictions

☒ Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: RAD-controlled areas secured by signage and locked fencing

C. Institutional Controls (IC):

1. Implementation and Enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive-by): Drive-by
Frequency: Annual
Responsible party/agency: _____
Contact: _____
Name Title Date Phone Number
Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A
Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions ☐ Report attached

2. Adequacy

☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: ICs are in compliance, except for the following: missing one or both well cover bolts on wells 12-MW33, 12-MW34, 12-MW35, 12-MW36, 12-MW37, and 12-MW07. Damaged well box apron on 12-MW30. Exposed and/or uncovered well piping on wells 12-MW20R and 12-MW29. Unable to locate 12-MW09 and 12-MW08.

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

D. General

1. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. Land use changes on-site ☒ N/A

Remarks:

3. Land use changes off-site ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

SWDA Westside contains RAD-controlled portions, parts of which require level C PPE for entry. These areas were not surveyed during these site visits.

VII. COVERS ☒ Applicable ☐ N/A

A. Cover Surface

1. Settlement (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks: Settlement not evident

2. Cracks ☐ Location shown on site map ☒ Cracking not evident
Lengths _____ Widths _____ Depths _____

Remarks: There are no cracks evident in the slab

3. Erosion ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____

Remarks: Erosion from storm events is not evident

4. Holes ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____

Remarks: No holes were observed in the slab

5. Vegetative Cover ☒ Grass ☒ Cover properly established ☒ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)

Remarks: Vegetative cover established following excavation events at SWDA's Bayside, Westside, and Northpoint.

6. Alternative Cover (armored rock, concrete, etc.) ☒ N/A

Remarks:

7. Bulges ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Depth _____

Remarks: Not applicable

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

8. Wet Areas/Water Damage ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent	_____
☐ Ponding	☐ Location shown on site map	Areal extent	_____
☐ Seeps	☐ Location shown on site map	Areal extent	_____
☐ Soft subgrade	☐ Location shown on site map	Areal extent	_____

Remarks: No water damage observed.

9. Slope Instability ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent _____

Remarks: Not applicable

B. Benches ☐ Applicable ☒ N/A

1. Flow Bypass Bench ☐ Location shown on site map ☒ N/A or okay

Remarks:

2. Bench Breached ☐ Location shown on site map ☒ N/A or okay

Remarks:

3. Bench Overtopped ☐ Location shown on site map ☒ N/A or okay

Remarks:

C. Letdown Channels ☐ Applicable ☒ N/A

Remarks:

1. Settlement ☐ Location shown on site map ☒ No evidence of settlement

Areal extent _____ Depth _____

Remarks:

2. Material Degradation ☐ Location shown on site map ☒ No evidence of degradation

Material type _____ Areal extent _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ No evidence of erosion

Areal extent _____ Depth _____

Remarks:

4. Undercutting ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent _____ Depth _____

Remarks:

5. Obstructions ☐ Location shown on site map ☒ No obstructions

Type _____ Areal extent _____ Size _____

Remarks:

6. Excessive Vegetation Growth ☐ Location shown on site map ☒ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

Type _____ Areal extent _____

Remarks:

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

D. Cover Penetrations	☐ Applicable	☐ N/A	
1. Gas Vents	☐ Active	☐ Passive	
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
2. Gas Monitoring Probes			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
3. Monitoring Wells (within surface area of cover)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☒ Needs maintenance	☐ N/A	
Remarks: Missing one or both well cover bolts on wells 12-MW33, 12-MW34, 12-MW35, 12-MW36, 12-MW37, and 12-MW07. Damaged well box apron on 12-MW30. Exposed and/or uncovered well piping on wells 12-MW20R and 12-MW29. Unable to locate 12-MW09 and 12-MW08.			
4. Leachate Extraction Wells			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
5. Settlement Monuments	☐ Located	☐ Routinely surveyed	☒ N/A
Remarks:			
E. Gas Collection and Treatment	☐ Applicable	☒ N/A	
1. Gas Treatment Facilities			
☐ Flaring	☐ Thermal destruction	☐ Collection for reuse	
☐ Good condition	☐ Needs maintenance		
Remarks:			
2. Gas Collection Wells, Manifolds, and Piping			
☐ Good condition	☐ Needs maintenance		
Remarks:			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
☐ Good condition	☐ Needs maintenance	☒ N/A	
Remarks:			
F. Cover Drainage Layer	☐ Applicable	☒ N/A	
1. Outlet Pipes Inspected	☐ Functioning	☒ N/A	
Remarks:			
2. Outlet Rock Inspected	☐ Functioning	☒ N/A	
Remarks:			

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

G. Detention/Sedimentation Ponds		☐ Applicable	☒ N/A
1. Siltation	☐ Siltation not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
2. Erosion	☐ Erosion not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
3. Outlet Works	☐ Functioning		☒ N/A
Remarks:			
4. Dam	☐ Functioning		☒ N/A
Remarks:			
H. Retaining Walls	☐ Applicable		☒ N/A
1. Deformations	☐ Location shown on site map		☒ Deformation not evident
Horizontal displacement _____		Vertical displacement _____	
Rotational displacement _____			
Remarks:			
2. Degradation	☐ Location shown on site map		☒ Degradation not evident
Remarks:			
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable	☒ N/A
1. Siltation	☐ Location shown on site map		☒ Siltation not evident
Areal extent _____		Depth _____	
Remarks:			
2. Vegetation Growth	☐ Location shown on site map		☒ N/A
	☐ Vegetation does not impede flow		
Areal extent _____		Depth _____	
Remarks:			
3. Erosion	☐ Location shown on site map		☒ Erosion not evident
Areal extent _____		Depth _____	
Remarks:			
4. Discharge Structure	☐ Functioning		☒ N/A
Remarks:			

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☐ N/A

1. Settlement ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Performance Monitoring ☐ Performance not monitored ☐ Evidence of breaching
Type of monitoring _____
Frequency _____
Head differential _____

Remarks:

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A (Groundwater Monitoring Applicable to Site 12)

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Pumps, Wellhead Plumbing, and Electrical
☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks:

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☒ Needs maintenance

Remarks: Missing one or both well cover bolts on wells 12-MW33, 12-MW34, 12-MW35, 12-MW36, 12-MW37, and 12-MW07. Damaged well box apron on 12-MW30. Exposed and/or uncovered well piping on wells 12-MW20R and 12-MW29. Unable to locate 12-MW09 and 12-MW08.

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Collection Structures, Pumps, and Electrical
☐ Good condition ☐ Needs maintenance

Remarks:

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☐ Needs maintenance

Remarks:

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks:

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment/Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculant) _____
☐ Others _____
☐ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up-to-date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually

Remarks:

2. Electrical Enclosures and Panels (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

3. Tanks, Vaults, Storage Vessels

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks:

4. Discharge Structure and Appurtenances

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

5. Treatment Building(s)

☒ N/A ☐ Good condition ☐ Needs maintenance
☐ Chemicals and equipment properly stored

Remarks:

D. Monitoring Data

1. Monitoring Wells – Site 12

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Missing one or both well cover bolts on wells 12-MW33, 12-MW34, 12-MW35, 12-MW36, 12-MW37, and 12-MW07. Damaged well box apron on 12-MW30. Exposed and/or uncovered well piping on wells 12-MW20R and 12-MW29. Unable to locate 12-MW09 and 12-MW08.

2. Monitoring Data

☐ Is routinely submitted on time ☐ Is of acceptable quality

Remarks:

3. Monitoring Data Suggest

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks: Refer to Section 2.2.4.1 of the main report for evaluation of Site 12 groundwater monitoring data.

Five-Year Review Site Inspection Checklist – Site 12 (Continued)

E. Monitored Natural Attenuation

1. Monitoring Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Missing one or both well cover bolts on wells 12-MW33, 12-MW34, 12-MW35, 12-MW36, 12-MW37, and 12-MW07. Damaged well box apron on 12-MW30. Exposed and/or uncovered well piping on wells 12-MW20R and 12-MW29. Unable to locate 12-MW09 and 12-MW08.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: No other remedies

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

Recommend conducting maintenance on wells as described above.

B. Adequacy of O&M

Describe issues and observations relating to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost of scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Five-Year Review Site Inspection Checklist – Site 21

I. SITE INFORMATION

Site Name:	Naval Station Treasure Island, Site 21	**Date of Inspection:**	01/08/2019
Location and Region:	San Francisco, California	**EPA ID:**	CA7170023330
Agency, Office or Company Leading the Five-Year Review:	U.S. Department of Navy	**Weather:**	Overcast
		Temperature:	54° F

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment	☒ Monitored natural attenuation	☐ Institutional controls
☒ Access controls	☐ Groundwater containment	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Surface water collection and treatment	☒ Groundwater monitoring
☐ Other		

Attachments: ☐ Inspection Team Roster Attached ☒ Site Map Attached (see Figure 2-16 of Main Report)

II. INTERVIEWS (check all that apply)

O&M Site Manager

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, regulations or policy changes, suggestions:
No active, on-going O&M activities for this Five-Year Review

O&M Staff

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, suggestions:

Local regulatory authorities and response agencies (that is, State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Treasure Island Development Authority
Contact:

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☒ Report attached: See Appendix C

Problems, suggestions:

Other interviews (optional)

Community residents, DTSC, and Water Board (see Appendix C)

☒ Report attached: See Appendix C

Problems, suggestions:

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (check all that apply)			
A. O&M Documents			
☐ O&M manual	☒ Readily available	☐ Up-to-date	☐ N/A
☐ As-built drawings	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Maintenance logs	☒ Readily available	☐ Up-to-date	☐ N/A
Remarks: Documents are available in the Administrative Record and the information repositories. Ongoing, routine O&M beyond inspection and repairs (if necessary) is not required at Sites 21, 27, and 30. As-built drawings are available in remedial action completion report for Site 27.			
B. Site-Specific Health and Safety Plan			
	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Contingency plan/emergency response plan	☒ Readily available	☐ Up-to-date	☐ N/A
Remarks: Health and safety plans confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, and TtEC)			
C. O&M and OSHA Training Records			
	☐ Readily available	☐ Up-to-date	☐ N/A
Remarks: OSHA training records confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, TtEC)			
D. Permits and Service Agreements			
☐ Air discharge permit	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water disposal, POTW	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Other permits	☐ Readily available	☐ Up-to-date	☒ N/A
Remarks:			
E. Gas Generation Records			
	☐ Readily available	☐ Up-to-date	☒ N/A
Remarks:			
F. Settlement Monument Records			
	☐ Readily available	☐ Up-to-date	☒ N/A
Remarks:			
G. Groundwater Monitoring Records			
	☒ Readily available	☐ Up-to-date	☐ N/A
Remarks: Historical groundwater monitoring records are readily available in the Administrative Record and the information repositories.			
H. Leachate Extraction Records			
	☐ Readily available	☐ Up-to-date	☒ N/A
Remarks:			
I. Discharge Compliance Records			
☐ Air	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up-to-date	☒ N/A
Remarks:			
J. Daily Access/Security Logs			
	☐ Readily available	☐ Up-to-date	☒ N/A
Remarks:			

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

IV. O&M COSTS ☐ Applicable ☐ N/A

A. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: _____

Remarks:

B. O&M Cost Records

☐ Readily available ☐ Up-to-date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☒ N/A
Total annual cost by year or review period: No costs incurred yet
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached

C. Unanticipated or Unusually High O&M Costs During Review Period

Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

☐ Fencing damaged ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks:

B. Other Access Restrictions

☒ Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Most wells behind fencing or within secured buildings

C. Institutional Controls (IC):

1. Implementation and Enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive-by): Drive-by
Frequency: Annual
Responsible party/agency: _____
Contact: _____

Name	Title	Date	Phone Number

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A
Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions ☐ Report attached

2. Adequacy

☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: ICs are in compliance except for one missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

D. General

1. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. Land use changes on-site ☒ N/A

Remarks:

3. Land use changes off-site ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

Site is accessible by permission of TI Sailing Center and through secure building entry points.

VII. COVERS ☐ Applicable ☒ N/A

A. Cover Surface

1. Settlement (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Cracks ☐ Location shown on site map ☒ Cracking not evident
Lengths _____ Widths _____ Depths _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____

Remarks:

4. Holes ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____

Remarks:

5. Vegetative Cover ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)

Remarks: Not applicable

6. Alternative Cover (armored rock, concrete, etc.) ☒ N/A

Remarks:

7. Bulges ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Depth _____

Remarks: Not applicable

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

8. Wet Areas/Water Damage ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent	_____
☐ Ponding	☐ Location shown on site map	Areal extent	_____
☐ Seeps	☐ Location shown on site map	Areal extent	_____
☐ Soft subgrade	☐ Location shown on site map	Areal extent	_____

Remarks:

9. Slope Instability ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent _____

Remarks: Not applicable

B. Benches ☐ Applicable ☒ N/A

1. Flow Bypass Bench ☐ Location shown on site map ☒ N/A or okay

Remarks:

2. Bench Breached ☐ Location shown on site map ☒ N/A or okay

Remarks:

3. Bench Overtopped ☐ Location shown on site map ☒ N/A or okay

Remarks:

C. Letdown Channels ☐ Applicable ☒ N/A

Remarks:

1. Settlement ☐ Location shown on site map ☒ No evidence of settlement

Areal extent _____ Depth _____

Remarks:

2. Material Degradation ☐ Location shown on site map ☒ No evidence of degradation

Material type _____ Areal extent _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ No evidence of erosion

Areal extent _____ Depth _____

Remarks:

4. Undercutting ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent _____ Depth _____

Remarks:

5. Obstructions ☒ Location shown on site map ☐ No obstructions

Type _____ Areal extent _____ Size _____

Remarks: TI Sailing Center office trailer placed on top of several monitoring wells

6. Excessive Vegetation Growth ☒ Location shown on site map ☒ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

Type _____ Areal extent _____

Remarks:

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

D. Cover Penetrations ☐ Applicable ☒ N/A

1. Gas Vents ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks:

2. Gas Monitoring Probes
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks:

3. Monitoring Wells (within surface area of cover)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☒ Needs maintenance ☐ N/A

Remarks: Missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

4. Leachate Extraction Wells
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs maintenance ☒ N/A

Remarks:

5. Settlement Monuments ☐ Located ☐ Routinely surveyed ☒ N/A

Remarks:

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. Gas Treatment Facilities
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs maintenance

Remarks:

2. Gas Collection Wells, Manifolds, and Piping
☐ Good condition ☒ Needs maintenance
Remarks: Missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)
☐ Good condition ☐ Needs maintenance ☒ N/A

Remarks:

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. Outlet Pipes Inspected ☐ Functioning ☒ N/A

Remarks:

2. Outlet Rock Inspected ☐ Functioning ☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

G. Detention/Sedimentation Ponds		☐ Applicable	☒ N/A
1. Siltation	☐ Siltation not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
2. Erosion	☐ Erosion not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
3. Outlet Works	☐ Functioning		☒ N/A
Remarks:			
4. Dam	☐ Functioning		☒ N/A
Remarks:			
H. Retaining Walls	☐ Applicable		☒ N/A
1. Deformations	☐ Location shown on site map		☒ Deformation not evident
Horizontal displacement _____		Vertical displacement _____	
Rotational displacement _____			
Remarks:			
2. Degradation	☐ Location shown on site map		☒ Degradation not evident
Remarks:			
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable	☒ N/A
1. Siltation	☐ Location shown on site map		☒ Siltation not evident
Areal extent _____		Depth _____	
Remarks:			
2. Vegetation Growth	☐ Location shown on site map		☒ N/A
	☐ Vegetation does not impede flow		
Areal extent _____		Depth _____	
Remarks:			
3. Erosion	☐ Location shown on site map		☒ Erosion not evident
Areal extent _____		Depth _____	
Remarks:			
4. Discharge Structure	☐ Functioning		☒ N/A
Remarks:			

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. Settlement ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Performance Monitoring ☐ Performance not monitored ☐ Evidence of breaching
Type of monitoring _____
Frequency _____
Head differential _____

Remarks:

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A (Groundwater Monitoring Applicable to Site 21)

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Pumps, Wellhead Plumbing, and Electrical
☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks:

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☒ Needs maintenance

Remarks: Missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Collection Structures, Pumps, and Electrical
☐ Good condition ☒ Needs maintenance

Remarks: Missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☐ Needs maintenance

Remarks:

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment/Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculant) _____
☐ Others _____
☐ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up-to-date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually

Remarks:

2. Electrical Enclosures and Panels (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

3. Tanks, Vaults, Storage Vessels

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks:

4. Discharge Structure and Appurtenances

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

5. Treatment Building(s)

☒ N/A ☐ Good condition ☐ Needs maintenance
☐ Chemicals and equipment properly stored

Remarks:

D. Monitoring Data

1. Monitoring Wells – Site 21

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

2. Monitoring Data

☐ Is routinely submitted on time ☐ Is of acceptable quality

Remarks:

3. Monitoring Data Suggest

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks: Refer to Section 2.3.4.1 of the main report for evaluation of Site 21 groundwater monitoring data.

Five-Year Review Site Inspection Checklist – Site 21 (Continued)

E. Monitored Natural Attenuation

1. Monitoring Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Missing well cover bolt on wells 21-SG01, 21-SG04, 21-SG05, and raised well cover bolts on 21-SG03. Also, wells 21-SG26, 21-IP27, 21-IP33, and 21-IP34 inaccessible beneath TI Sailing Center office trailer.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: No other remedies

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

Recommend replacing missing and raised well cover bolts on wells 21-SG01, 21-SG04, 21-SG05, and 21-SG03. Also recommend establishing access to wells 21-SG26, 21-IP26, 21-IP27, 21-IP33, and 21-IP34 currently inaccessible beneath the TI Sailing Center office trailer.

B. Adequacy of O&M

Describe issues and observations relating to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost of scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Five-Year Review Site Inspection Checklist – Site 24

I. SITE INFORMATION

Site Name:	Naval Station Treasure Island, Site 24	**Date of Inspection:**	01/08/2019
Location and Region:	San Francisco, California	**EPA ID:**	CA7170023330
Agency, Office or Company Leading the Five-Year Review:	U.S. Department of Navy	**Weather:**	Overcast
		Temperature:	55° F

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment	☒ Monitored natural attenuation	☐ Institutional controls
☒ Access controls	☐ Groundwater containment	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Surface water collection and treatment	☒ Groundwater monitoring
☐ Other		

Attachments: ☐ Inspection Team Roster Attached ☒ Site Map Attached (see Figure 2-24 of Main Report)

II. INTERVIEWS (check all that apply)

O&M Site Manager

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, regulations or policy changes, suggestions:
No active, on-going O&M activities for this Five-Year Review

O&M Staff

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, suggestions:

Local regulatory authorities and response agencies (that is, State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Treasure Island Development Authority
Contact:

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached: See Appendix C

Problems, suggestions:

Other interviews (optional)

Community residents, DTSC, and Water Board (see Appendix C)

☒ Report attached: See Appendix C

Problems, suggestions:

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

A. O&M Documents

☐ O&M manual	☒ Readily available	☐ Up-to-date	☐ N/A
☐ As-built drawings	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Maintenance logs	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Documents are available in the Administrative Record and the information repositories. Ongoing, routine O&M beyond inspection and repairs (if necessary) is not required at Sites 21, 27, and 30. As-built drawings are available in remedial action completion report for Site 27.

B. Site-Specific Health and Safety Plan

	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Contingency plan/emergency response plan	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Health and safety plans confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, and TtEC)

C. O&M and OSHA Training Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: OSHA training records confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, TtEC)

D. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water disposal, POTW	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Other permits	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

E. Gas Generation Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

F. Settlement Monument Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

G. Groundwater Monitoring Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Historical groundwater monitoring records are readily available in the Administrative Record and the information repositories.

H. Leachate Extraction Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

I. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

J. Daily Access/Security Logs

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

IV. O&M COSTS ☐ Applicable ☐ N/A

A. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: _____

Remarks:

B. O&M Cost Records

☐ Readily available ☐ Up-to-date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ N/A
Total annual cost by year or review period: No costs incurred yet
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached

C. Unanticipated or Unusually High O&M Costs During Review Period

Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

☐ Fencing damaged ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks:

B. Other Access Restrictions

☒ Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Entry points to buildings on site locked. Signage present.

C. Institutional Controls (IC):

1. Implementation and Enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive-by): Drive-by
Frequency: Annual
Responsible party/agency: _____
Contact: _____

Name	Title	Date	Phone Number

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A
Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions ☐ Report attached

2. Adequacy

☐ ICs are adequate ☒ ICs are inadequate ☐ N/A

Remarks: ICs are in compliance except for the following: shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

D. General

1. Vandalism/Trespassing ☐ Location shown on site map ☐ No vandalism evident

Remarks: Some graffiti present on sides of buildings.

2. Land use changes on-site ☐ N/A

Remarks: Much of site is currently being used as a shipping container staging area.

3. Land use changes off-site ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

Current site activities prevent access to some wells, mostly due to being covered by shipping containers. Buildings are accessible by appointment with Navy CSO office. Site is otherwise accessible.

VII. COVERS ☒ Applicable ☐ N/A

A. Cover Surface

1. Settlement (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____

Remarks: Settlement is not evident

2. Cracks ☐ Location shown on site map ☐ Cracking not evident
Lengths _____ Widths _____ Depths _____

Remarks: There are no cracks evident in the slab

3. Erosion ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____

Remarks: Erosion from storm events is not evident

4. Holes ☐ Location shown on site map ☐ Holes not evident
Areal extent _____ Depth _____

Remarks: No holes were observed in the slab

5. Vegetative Cover ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)

Remarks: Vegetation is overgrown in some cases, preventing access to wells

6. Alternative Cover (armored rock, concrete, etc.) ☐ N/A

Remarks: Building slab appears to be in good condition

7. Bulges ☐ Location shown on site map ☐ Bulges not evident
Areal extent _____ Depth _____

Remarks: Not applicable

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

8. Wet Areas/Water Damage ☐ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent	
☒ Ponding	☐ Location shown on site map	Areal extent	
☐ Seeps	☐ Location shown on site map	Areal extent	
☐ Soft subgrade	☐ Location shown on site map	Areal extent	

Remarks: Temporary ponding observed in several locations due to recent weather events

9. Slope Instability ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability

Areal extent _____

Remarks: Not applicable.

B. Benches ☐ Applicable ☒ N/A

1. Flow Bypass Bench ☐ Location shown on site map ☒ N/A or okay

Remarks:

2. Bench Breached ☐ Location shown on site map ☒ N/A or okay

Remarks:

3. Bench Overtopped ☐ Location shown on site map ☒ N/A or okay

Remarks:

C. Letdown Channels ☐ Applicable ☒ N/A

Remarks:

1. Settlement ☐ Location shown on site map ☒ No evidence of settlement

Areal extent _____ Depth _____

Remarks:

2. Material Degradation ☐ Location shown on site map ☒ No evidence of degradation

Material type _____ Areal extent _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ No evidence of erosion

Areal extent _____ Depth _____

Remarks:

4. Undercutting ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent _____ Depth _____

Remarks:

5. Obstructions ☒ Location shown on site map ☐ No obstructions

Type _____ Areal extent _____ Size _____

Remarks: Shipping containers and other materials placed over wells prevent access in several locations

6. Excessive Vegetation Growth ☒ Location shown on site map ☒ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

Type _____ Areal extent _____

Remarks: Overgrown vegetation present at some well locations

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

D. Cover Penetrations	☐ Applicable	☐ N/A	
1. Gas Vents	☐ Active	☐ Passive	
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
2. Gas Monitoring Probes			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
3. Monitoring Wells (within surface area of cover)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
4. Leachate Extraction Wells			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
5. Settlement Monuments	☐ Located	☐ Routinely surveyed	☒ N/A
Remarks:			
E. Gas Collection and Treatment	☐ Applicable	☒ N/A	
1. Gas Treatment Facilities			
☐ Flaring	☐ Thermal destruction	☐ Collection for reuse	
☐ Good condition	☐ Needs maintenance		
Remarks:			
2. Gas Collection Wells, Manifolds, and Piping			
☐ Good condition	☒ Needs maintenance		
Remarks: One well damaged by heavy vehicle. Others inaccessible due to items placed over them.			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
☐ Good condition	☐ Needs maintenance	☒ N/A	
Remarks:			
F. Cover Drainage Layer	☐ Applicable	☒ N/A	
1. Outlet Pipes Inspected	☐ Functioning	☒ N/A	
Remarks:			
2. Outlet Rock Inspected	☐ Functioning	☒ N/A	
Remarks:			

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

G. Detention/Sedimentation Ponds		☐ Applicable	☒ N/A
1. Siltation	☐ Siltation not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
2. Erosion	☐ Erosion not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
3. Outlet Works	☐ Functioning		☒ N/A
Remarks:			
4. Dam	☐ Functioning		☒ N/A
Remarks:			
H. Retaining Walls	☐ Applicable		☒ N/A
1. Deformations	☐ Location shown on site map		☐ Deformation not evident
Horizontal displacement _____		Vertical displacement _____	
Rotational displacement _____			
Remarks:			
2. Degradation	☐ Location shown on site map		☐ Degradation not evident
Remarks:			
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable	☒ N/A
1. Siltation	☐ Location shown on site map		☐ Siltation not evident
Areal extent _____		Depth _____	
Remarks:			
2. Vegetation Growth	☒ Location shown on site map		☒ N/A
	☐ Vegetation does not impede flow		
Areal extent _____		Depth _____	
Remarks: Overgrown vegetation present at some well locations			
3. Erosion	☐ Location shown on site map		☒ Erosion not evident
Areal extent _____		Depth _____	
Remarks:			
4. Discharge Structure	☐ Functioning		☒ N/A
Remarks:			

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. Settlement ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Performance Monitoring ☐ Performance not monitored ☐ Evidence of breaching
Type of monitoring _____
Frequency _____
Head differential _____

Remarks:

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A (Groundwater Monitoring Applicable to Site 24)

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Pumps, Wellhead Plumbing, and Electrical
☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks:

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☒ Needs maintenance

Remarks: Shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Collection Structures, Pumps, and Electrical
☐ Good condition ☒ Needs maintenance

Remarks: Shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☒ Needs maintenance

Remarks:

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☒ Needs to be provided

Remarks:

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment/Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculant) _____
☐ Others _____
☐ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up-to-date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually

Remarks:

2. Electrical Enclosures and Panels (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

3. Tanks, Vaults, Storage Vessels

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks:

4. Discharge Structure and Appurtenances

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

5. Treatment Building(s)

☒ N/A ☐ Good condition ☐ Needs maintenance
☐ Chemicals and equipment properly stored

Remarks:

D. Monitoring Data

1. Monitoring Wells – Site 24

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

2. Monitoring Data

☐ Is routinely submitted on time ☐ Is of acceptable quality

Remarks:

3. Monitoring Data Suggest

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks: Refer to Section 2.4.4.4 of the main report for evaluation of Site 24 groundwater monitoring data.

Five-Year Review Site Inspection Checklist – Site 24 (Continued)

E. Monitored Natural Attenuation

1. Monitoring Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☒ Needs maintenance ☐ N/A

Remarks: Shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks:

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

B. Adequacy of O&M

Describe issues and observations relating to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost of scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

Shipping containers placed on top of wells 24-SG36, 24-SG46, 24-IW21, 24-EW29, 24-BB82, and 24-BB80. Commercial packing crates placed on top of 24-SG26 and 24-SG47 is covered by a soil pile. Top of 24-SG40 damaged by heavy vehicle and no longer flush with ground. 24-SG40 and 24-IW12 are overgrown with vegetation. 24-IW9, 24-EW15, and 24-IW4 missing one or more well cover bolts. In addition, wells 24-BB76 and 24-SG34 are placed in low areas and were flooded at time of site visit.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Ensure all wells are accessible at all times. Conduct repairs as needed (exp.: replace missing well cover bolts, etc.).

Five-Year Review Site Inspection Checklist – Site 27

I. SITE INFORMATION

Site Name:	Naval Station Treasure Island, Site 27	**Date of Inspection:**	01/08/2019
Location and Region:	San Francisco, California	**EPA ID:**	CA7170023330
Agency, Office or Company Leading the Five-Year Review:	U.S. Department of Navy	**Weather:** / **Temperature:**	Overcast / 53° F

Remedy Includes: (Check all that apply)

☒ Landfill cover/containment	☐ Monitored natural attenuation	☒ Institutional controls
☒ Access controls	☐ Groundwater containment	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Surface water collection and treatment	☐ Groundwater monitoring

☒ Other: Cover/containment remedies apply at Site 27. The cover at Site 27 is an undersea cover (filter layer and rock armor layer) over sediment.

Attachments: ☐ Inspection Team Roster Attached ☒ Site Map Attached (see Figure 2-27 of Main Report)

II. INTERVIEWS (check all that apply)

O&M Site Manager

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, regulations or policy changes, suggestions:
No active, on-going O&M activities for this Five-Year Review

O&M Staff

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, suggestions:

Local regulatory authorities and response agencies (that is, State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Treasure Island Development Authority
Contact:

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached: See Appendix C

Problems, suggestions:

Other interviews (optional)

Community residents, DTSC, and Water Board (see Appendix C)

☒ Report attached: See Appendix C

Problems, suggestions:

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

A. O&M Documents

☐ O&M manual	☒ Readily available	☐ Up-to-date	☐ N/A
☐ As-built drawings	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Maintenance logs	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Documents are available in the Administrative Record and the information repositories. As-built drawings are available in remedial action completion report for Site 27.

B. Site-Specific Health and Safety Plan

	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Contingency plan/emergency response plan	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Health and safety plans confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, and TtEC)

C. O&M and OSHA Training Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: OSHA training records confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, TtEC)

D. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water disposal, POTW	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Other permits	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

E. Gas Generation Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

F. Settlement Monument Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

G. Groundwater Monitoring Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

H. Leachate Extraction Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

I. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

J. Daily Access/Security Logs

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

IV. O&M COSTS ☐ Applicable ☒ N/A

A. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: _____

Remarks: O&M activities are applicable only for Site 27 and only include routine bathymetric surveys

B. O&M Cost Records

☐ Readily available ☐ Up-to-date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: $10,000 every 5-years ☐ Breakdown attached

Routine O&M costs were included in the feasibility study for monitoring and inspection at $10,000 per event and one event every 5 years.

From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached

C. Unanticipated or Unusually High O&M Costs During Review Period

Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☒ N/A

A. Fencing

☐ Fencing damaged ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks:

B. Other Access Restrictions

☒ Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Site is underwater and protected by rock layer

C. Institutional Controls (IC):

1. Implementation and Enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive-by): Drive-by
Frequency: Annual
Responsible party/agency: _____
Contact: _____
Name Title Date Phone Number

Reporting is up-to-date	☐ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	☐ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	☐ Yes	☐ No	☐ N/A
Violations have been reported	☐ Yes	☐ No	☐ N/A
Other problems or suggestions	☐ Report attached		

2. Adequacy

☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: Site is underwater and protected by rock layer

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

D. General

1. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. Land use changes on-site ☒ N/A

Remarks:

3. Land use changes off-site ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

VII. COVERS ☐ Applicable ☒ N/A

A. Cover Surface

1. Settlement (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Cracks ☐ Location shown on site map ☒ Cracking not evident
Lengths _____ Widths _____ Depths _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____

Remarks:

4. Holes ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____

Remarks:

5. Vegetative Cover ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)

Remarks: Not applicable

6. Alternative Cover (armored rock, concrete, etc.) ☐ N/A

Remarks: Site is underwater and protected by rock layer

7. Bulges ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Depth _____

Remarks: Not applicable

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

8. Wet Areas/Water Damage ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent	_____
☐ Ponding	☐ Location shown on site map	Areal extent	_____
☐ Seeps	☐ Location shown on site map	Areal extent	_____
☐ Soft subgrade	☐ Location shown on site map	Areal extent	_____

Remarks: No water damage observed. Site is underwater and protected by rock layer.

9. Slope Instability ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent _____

Remarks: Not applicable

B. Benches ☐ Applicable ☒ N/A

1. Flow Bypass Bench ☐ Location shown on site map ☒ N/A or okay

Remarks:

2. Bench Breached ☐ Location shown on site map ☒ N/A or okay

Remarks:

3. Bench Overtopped ☐ Location shown on site map ☒ N/A or okay

Remarks:

C. Letdown Channels ☐ Applicable ☒ N/A

Remarks:

1. Settlement ☐ Location shown on site map ☒ No evidence of settlement

Areal extent _____ Depth _____

Remarks:

2. Material Degradation ☐ Location shown on site map ☒ No evidence of degradation

Material type _____ Areal extent _____

Remarks:

3. Erosion ☐ Location shown on site map ☒ No evidence of erosion

Areal extent _____ Depth _____

Remarks:

4. Undercutting ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent _____ Depth _____

Remarks:

5. Obstructions ☐ Location shown on site map ☒ No obstructions

Type _____ Areal extent _____ Size _____

Remarks:

6. Excessive Vegetation Growth ☐ Location shown on site map ☒ No evidence of excessive growth

☐ Vegetation in channels does not obstruct flow

Type _____ Areal extent _____

Remarks: Site is underwater and protected by rock layer

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

D. Cover Penetrations	☐ Applicable	☒ N/A	
1. Gas Vents	☐ Active	☐ Passive	
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
2. Gas Monitoring Probes			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
3. Monitoring Wells (within surface area of cover)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
4. Leachate Extraction Wells			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
5. Settlement Monuments	☐ Located	☐ Routinely surveyed	☒ N/A
Remarks:			
E. Gas Collection and Treatment	☐ Applicable	☒ N/A	
1. Gas Treatment Facilities			
☐ Flaring	☐ Thermal destruction	☐ Collection for reuse	
☐ Good condition	☐ Needs maintenance		
Remarks:			
2. Gas Collection Wells, Manifolds, and Piping			
☐ Good condition	☐ Needs maintenance		
Remarks:			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
☐ Good condition	☐ Needs maintenance	☒ N/A	
Remarks:			
F. Cover Drainage Layer	☐ Applicable	☒ N/A	
1. Outlet Pipes Inspected	☐ Functioning	☒ N/A	
Remarks:			
2. Outlet Rock Inspected	☐ Functioning	☒ N/A	
Remarks:			

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

G. Detention/Sedimentation Ponds		☐ Applicable	☒ N/A
1. Siltation	☐ Siltation not evident		☒ N/A
Areal extent _____		Depth _____	
Remarks:			
2. Erosion	☐ Erosion not evident		☐ N/A
Areal extent _____		Depth _____	
Remarks:			
3. Outlet Works	☐ Functioning		☒ N/A
Remarks:			
4. Dam	☐ Functioning		☒ N/A
Remarks:			
H. Retaining Walls	☐ Applicable		☒ N/A
1. Deformations	☐ Location shown on site map		☒ Deformation not evident
Horizontal displacement _____		Vertical displacement _____	
Rotational displacement _____			
Remarks:			
2. Degradation	☐ Location shown on site map		☒ Degradation not evident
Remarks:			
I. Perimeter Ditches/Off-Site Discharge	☐ Applicable		☒ N/A
1. Siltation	☐ Location shown on site map		☒ Siltation not evident
Areal extent _____		Depth _____	
Remarks:			
2. Vegetation Growth	☐ Location shown on site map		☒ N/A
	☐ Vegetation does not impede flow		
Areal extent _____		Depth _____	
Remarks: Overgrown vegetation present at some well locations.			
3. Erosion	☐ Location shown on site map		☒ Erosion not evident
Areal extent _____		Depth _____	
Remarks:			
4. Discharge Structure	☐ Functioning		☒ N/A
Remarks:			

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☐ N/A

1. Settlement ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Performance Monitoring ☐ Performance not monitored ☐ Evidence of breaching
Type of monitoring _____
Frequency _____
Head differential _____

Remarks:

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A (Groundwater Monitoring Not Applicable to Site 27)

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Pumps, Wellhead Plumbing, and Electrical
☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks:

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☐ Needs maintenance

Remarks: Site is underwater and protected by rock layer. No extraction systems present.

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks:

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

1. Collection Structures, Pumps, and Electrical
☐ Good condition ☐ Needs maintenance

Remarks:

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances
☐ Good condition ☐ Needs maintenance

Remarks:

3. Spare Parts and Equipment
☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks:

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment/Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculant) _____
☐ Others _____
☐ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up-to-date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually

Remarks:

2. Electrical Enclosures and Panels (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

3. Tanks, Vaults, Storage Vessels

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks:

4. Discharge Structure and Appurtenances

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

5. Treatment Building(s)

☒ N/A ☐ Good condition ☐ Needs maintenance
☐ Chemicals and equipment properly stored

Remarks:

D. Monitoring Data

1. Monitoring Wells – Site 27

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: No monitoring wells on site

2. Monitoring Data

☐ Is routinely submitted on time ☐ Is of acceptable quality

Remarks:

3. Monitoring Data Suggest

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks:

Five-Year Review Site Inspection Checklist – Site 27 (Continued)

E. Monitored Natural Attenuation

1. Monitoring Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: No monitoring wells on site

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: No other remedies

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

Established remedy for site appears to be working as designed

B. Adequacy of O&M

Describe issues and observations relating to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Established remedy for site appears to be working as designed

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost of scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

Established remedy for site appears to be working as designed

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

None

Five-Year Review Site Inspection Checklist – Site 30

I. SITE INFORMATION

Site Name:	Naval Station Treasure Island, Site 30	**Date of Inspection:**	01/08/2019
Location and Region:	San Francisco, California	**EPA ID:**	CA7170023330
Agency, Office or Company Leading the Five-Year Review:	U.S. Department of Navy	**Weather:**	Overcast
		Temperature:	54° F

Remedy Includes: (Check all that apply)

☒ Landfill cover/containment	☐ Monitored natural attenuation	☒ Institutional controls
☒ Access controls	☐ Groundwater containment	☐ Vertical barrier walls
☐ Groundwater pump and treatment	☐ Surface water collection and treatment	☐ Groundwater monitoring

☒ Other: Cover/containment remedies apply at Site 30. The Building 502 foundation slab provides the cover at Site 30.

Attachments: ☐ Inspection Team Roster Attached ☒ Site Map Attached (see Figure 2-34 of Main Report)

II. INTERVIEWS (check all that apply)

O&M Site Manager

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, regulations or policy changes, suggestions:
No active, on-going O&M activities for this Five-Year Review

O&M Staff

Not applicable

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached:

Problems, suggestions:

Local regulatory authorities and response agencies (that is, State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency: Treasure Island Development Authority
Contact:

Name Title Date

Interview: ☐ At site ☐ At office ☐ By phone Phone number

☐ Report attached: See Appendix C

Problems, suggestions:

Other interviews (optional)

Community residents, DTSC, and Water Board (see Appendix C)

☒ Report attached: See Appendix C

Problems, suggestions:

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (check all that apply)

A. O&M Documents

☐ O&M manual	☒ Readily available	☐ Up-to-date	☐ N/A
☐ As-built drawings	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Maintenance logs	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Documents are available in the Administrative Record and the information repositories.

B. Site-Specific Health and Safety Plan

	☒ Readily available	☐ Up-to-date	☐ N/A
☐ Contingency plan/emergency response plan	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Health and safety plans confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, and TtEC)

C. O&M and OSHA Training Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: OSHA training records confirmed by the ROICC for contractors with continuous site presence (CB&I, Gilbane, TtEC)

D. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water disposal, POTW	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Other permits	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

E. Gas Generation Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

F. Settlement Monument Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

G. Groundwater Monitoring Records

	☒ Readily available	☐ Up-to-date	☐ N/A

Remarks: Historical groundwater monitoring records are readily available in the Administrative Record and the information repositories. There are currently no monitoring wells at this site.

H. Leachate Extraction Records

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

I. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up-to-date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

J. Daily Access/Security Logs

	☐ Readily available	☐ Up-to-date	☒ N/A

Remarks:

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

IV. O&M COSTS ☐ Applicable ☒ N/A

A. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: _____

Remarks:

B. O&M Cost Records

☐ Readily available ☐ Up-to-date
☐ Funding mechanism/agreement in place
Original O&M cost estimate: _____ ☐ Breakdown attached
Total annual cost by year for review period: No costs incurred to-date
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached
From _____ To _____ ☐ Breakdown attached

C. Unanticipated or Unusually High O&M Costs During Review Period

Not applicable

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

A. Fencing

☐ Fencing damaged ☐ Location shown on site map ☒ Gates secured ☐ N/A

Remarks:

B. Other Access Restrictions

☒ Signs and other security measures ☐ Location shown on site map ☐ N/A

Remarks: Area is securely fenced and currently in use as a children's day care facility

C. Institutional Controls (IC):

1. Implementation and Enforcement

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A
Type of monitoring (e.g. self-reporting, drive-by): Drive-by
Frequency: Annual
Responsible party/agency: _____
Contact: _____
Name Title Date Phone Number

Reporting is up-to-date	☐ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	☐ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met	☐ Yes	☐ No	☐ N/A
Violations have been reported	☐ Yes	☐ No	☐ N/A
Other problems or suggestions	☐ Report attached		

2. Adequacy

☒ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: Minor weathering, erosion, and vegetation growth evident along edges of containment slab, and minor cracking near well cover box. Both issues noted in previous annual Land Use Control inspections. Wood floor panels show signs of wear and minor separation in some areas of building interior. Some rubber surface tiles within children's outside play area adjacent to slab show upturning or edges and other signs of wear.

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

D. General

1. Vandalism/Trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks:

2. Land use changes on-site ☒ N/A

Remarks:

3. Land use changes off-site ☒ N/A

Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks:

B. Other Site Conditions

Site is easily accessible by existing roads and overall in adequate condition

VII. COVERS ☒ Applicable ☐ N/A

A. Cover Surface

1. Settlement (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent _____ Depth _____

Remarks:

2. Cracks ☐ Location shown on site map ☐ Cracking not evident
Lengths Approx. 2-feet Widths Less than 1-inch Depths Less than 1-inch

Remarks: Minor crack observed adjacent to well box within slab. Issue noted in previous Land Use Control inspections.

3. Erosion ☐ Location shown on site map ☒ Erosion not evident
Areal extent North and south edges of exterior portion of slab Depth Approx. 1-inch

Remarks: Edges of exterior portion of slab show signs of weathering and erosion. Issue noted in previous Land Use Control inspections.

4. Holes ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____

Remarks:

5. Vegetative Cover ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)

Remarks: Not applicable

6. Alternative Cover (armored rock, concrete, etc.) ☐ N/A

Remarks: Concrete slab covers contaminated subterranean soil

7. Bulges ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Depth _____

Remarks: Not applicable

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

8. Wet Areas/Water Damage ☒ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	Areal extent	_____
☐ Ponding	☐ Location shown on site map	Areal extent	_____
☐ Seeps	☐ Location shown on site map	Areal extent	_____
☐ Soft subgrade	☐ Location shown on site map	Areal extent	_____

Remarks:

9. Slope Instability ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent _____

Remarks: Not applicable

B. Benches ☐ Applicable ☒ N/A

1. Flow Bypass Bench ☐ Location shown on site map ☒ N/A or okay

Remarks:

2. Bench Breached ☐ Location shown on site map ☒ N/A or okay

Remarks:

3. Bench Overtopped ☐ Location shown on site map ☒ N/A or okay

Remarks:

C. Letdown Channels ☐ Applicable ☒ N/A

Remarks:

1. Settlement ☐ Location shown on site map ☐ No evidence of settlement

Areal extent _____ Depth _____

Remarks:

2. Material Degradation ☐ Location shown on site map ☐ No evidence of degradation

Material type _____ Areal extent _____

Remarks:

3. Erosion ☐ Location shown on site map ☐ No evidence of erosion

Areal extent _____ Depth _____

Remarks:

4. Undercutting ☐ Location shown on site map ☐ No evidence of undercutting

Areal extent _____ Depth _____

Remarks:

5. Obstructions ☐ Location shown on site map ☐ No obstructions

Type _____ Areal extent _____ Size _____

Remarks:

6. Excessive Vegetation Growth ☐ Location shown on site map ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow

Type _____ Areal extent _____

Remarks:

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

D. Cover Penetrations	☐ Applicable	☒ N/A	
1. Gas Vents	☐ Active	☐ Passive	
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
2. Gas Monitoring Probes			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
3. Monitoring Wells (within surface area of cover)			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks: No monitoring wells associated with Site 30.			
4. Leachate Extraction Wells			
☐ Properly secured/locked	☐ Functioning	☐ Routinely sampled	☐ Good condition
☐ Evidence of leakage at penetration	☐ Needs maintenance	☒ N/A	
Remarks:			
5. Settlement Monuments	☐ Located	☐ Routinely surveyed	☒ N/A
Remarks:			
E. Gas Collection and Treatment	☐ Applicable	☒ N/A	
1. Gas Treatment Facilities			
☐ Flaring	☐ Thermal destruction	☐ Collection for reuse	
☐ Good condition	☐ Needs maintenance		
Remarks:			
2. Gas Collection Wells, Manifolds, and Piping			
☐ Good condition	☐ Needs maintenance		
Remarks:			
3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
☐ Good condition	☐ Needs maintenance	☐ N/A	
Remarks:			
F. Cover Drainage Layer	☐ Applicable	☒ N/A	
1. Outlet Pipes Inspected	☐ Functioning	☐ N/A	
Remarks:			
2. Outlet Rock Inspected	☐ Functioning	☐ N/A	
Remarks:			

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

G. Detention/Sedimentation Ponds		☐ Applicable	☒ N/A
1. Siltation	☐ Siltation not evident		☐ N/A
Areal extent _____		Depth _____	
Remarks:			
2. Erosion	☐ Erosion not evident		☐ N/A
Areal extent _____		Depth _____	
Remarks:			
3. Outlet Works	☐ Functioning		☐ N/A
Remarks:			
4. Dam	☐ Functioning		☐ N/A
Remarks:			
H. Retaining Walls	☐ Applicable		☒ N/A
1. Deformations	☐ Location shown on site map		☒ Deformation not evident
Horizontal displacement _____		Vertical displacement _____	
Rotational displacement _____			
Remarks:			
2. Degradation	☐ Location shown on site map		☐ Degradation not evident
Remarks:			
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable	☒ N/A
1. Siltation	☐ Location shown on site map		☐ Siltation not evident
Areal extent _____		Depth _____	
Remarks:			
2. Vegetation Growth	☐ Location shown on site map		☒ N/A
	☐ Vegetation does not impede flow		
Areal extent _____		Depth _____	
Remarks: Overgrown vegetation present at some well locations.			
3. Erosion	☐ Location shown on site map		☐ Erosion not evident
Areal extent _____		Depth _____	
Remarks:			
4. Discharge Structure	☐ Functioning		☒ N/A
Remarks:			

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A	
1. Settlement ☐ Location shown on site map ☒ Settlement not evident Areal extent _____ Depth _____ **Remarks:**	
2. Performance Monitoring ☐ Performance not monitored ☐ Evidence of breaching Type of monitoring _____ Frequency _____ Head differential _____ **Remarks:**	
IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A (Groundwater Monitoring Not Applicable to Site 30)	
A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A	
1. Pumps, Wellhead Plumbing, and Electrical ☐ Good condition ☐ All required wells located ☐ Needs maintenance ☒ N/A **Remarks:**	
2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ Good condition ☐ Needs maintenance **Remarks:**	
3. Spare Parts and Equipment ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided **Remarks:**	
B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A	
1. Collection Structures, Pumps, and Electrical ☐ Good condition ☐ Needs maintenance **Remarks:**	
2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ Good condition ☐ Needs maintenance **Remarks:**	
3. Spare Parts and Equipment ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided **Remarks:**	

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

C. Treatment System ☐ Applicable ☒ N/A

1. Treatment/Train (Check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
☐ Air stripping ☐ Carbon adsorbers
☐ Filters _____
☐ Additive (e.g., chelation agent, flocculant) _____
☐ Others _____
☐ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up-to-date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually _____
☐ Quantity of surface water treated annually

Remarks:

2. Electrical Enclosures and Panels (properly rated and functional)

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

3. Tanks, Vaults, Storage Vessels

☒ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks:

4. Discharge Structure and Appurtenances

☒ N/A ☐ Good condition ☐ Needs maintenance

Remarks:

5. Treatment Building(s)

☒ N/A ☐ Good condition ☐ Needs maintenance
☐ Chemicals and equipment properly stored

Remarks:

D. Monitoring Data

1. Monitoring Wells – Site 30

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: No active wells currently associated with Site 30.

2. Monitoring Data

☐ Is routinely submitted on time ☐ Is of acceptable quality

Remarks:

3. Monitoring Data Suggest

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Remarks:

E. Monitored Natural Attenuation

1. Monitoring Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: No active wells currently associated with Site 30

Five-Year Review Site Inspection Checklist – Site 30 (Continued)

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

Remarks: No other remedies

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.)

Observations during the inspection indicate the remedies at Site 30 are effective and are functioning as designed. However, the weathering/erosion issues noted during this inspection and in previous Land Use Control inspections should be addressed. Failure to do so could potentially compromise the remedy's effectiveness in the future.

B. Adequacy of O&M

Describe issues and observations relating to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Minor weathering, erosion, and vegetation growth evident along edges of containment slab, and minor cracking near well cover box. Both issues noted in previous annual Land Use Control inspections. Wood floor panels show signs of wear and minor separation in some areas of building interior. Some rubber surface tiles within children's outside play area adjacent to slab show upturning or edges and other signs of wear.

These issues should be addressed. Failure to do so could potentially compromise the remedy's effectiveness in the future.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost of scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

The weathering/erosion issues noted during this inspection and in previous Land Use Control inspections should be addressed. Failure to do so could potentially compromise the remedy's effectiveness in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

The weathering/erosion issues noted during this inspection and in previous Land Use Control inspections should be addressed. Failure to do so could potentially compromise the remedy's effectiveness in the future.

APPENDIX B: SITE INSPECTION PHOTOGRAPHS

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Site 6 Photographs

Photograph 1: View of Site 6 from south corner of Building 461, looking southeast (1/10/2019).

Photograph 2: View of Site 6 from south corner of Building 461, looking southwest (1/10/2019).

Site 6 Photographs

Photograph 3: View of Site 6 from south corner of Building 461, looking south (1/10/2019).

Photograph 4: View of former monitoring well locations near well 06-MW25 at Site 6 (1/10/2019).

Site 6 Photographs

Photograph 5: View of well 06-MW30 at Site 6. Note missing bolt (1/10/2019).

Photograph 6: View of well 06-MW25 at Site 6 (1/10/2019).

Site 6 Photographs

Photograph 7: View of well 06-MW26 at Site 6 (1/10/2019).

Photograph 8: View of south wall of Building 461, looking west (1/10/2019).

Site 6 Photographs

Photograph 9: View of well 06-MW33 at Site 6 (1/10/2019).

Photograph 10: View of well box interior of well 06-MW33 at Site 6 (1/10/2019).

Site 6 Photographs

Photograph 11: View of well 06-MW32 at Site 6 (1/10/2019).

Photograph 12: View of well 06-MW35 at Site 6 (1/10/2019).

Site 6 Photographs

Photograph 13: View of well 06-MW34 at Site 6 (1/10/2019).

Photograph 14: View of well 06-MW36 at Site 6 (1/10/2019).

Site 6 Photographs

Photograph 15: View of uncapped former well or similar structure adjacent to well 06-MW36 at Site 6 (1/10/2019).

Photograph 16: View of well 06-MW31 at Site 6. Note missing bolt (1/10/2019).

Site 6 Photographs

Photograph 17: View of vehicle accessway adjacent to Site 6 northeast boundary from northeast corner of Building 461, looking east (1/10/2019).

Photograph 18: View of Site 6 from northeast boundary, looking southwest (1/10/2019).

Site 6 Photographs

Photograph 19: View of vehicle accessway adjacent to Site 6 northeast boundary from northeast corner of Building 461, looking northwest (1/10/2019).

Site 12 Photographs

Photograph 1: View of well 12-MW21R at Site 12 Gateview Petroleum Area (1/10/2019).

Photograph 2: View of well 12-MW24R at Site 12 Gateview Petroleum Area (1/10/2019).

Site 12 Photographs

Photograph 3: View of well 12-MW23 at Site 12 Gateview Petroleum Area (1/10/2019).

Photograph 4: View of well 12-MW22R at Site 12 Gateview Petroleum Area (1/10/2019).

Site 12 Photographs

Photograph 5: View of well 12-MW33 at Site 12 Gateview Petroleum Area. Note missing bolt (1/10/2019).

Photograph 6: View of well 12-MW34 at Site 12 Gateview Petroleum Area. Note missing bolt (1/10/2019).

Site 12 Photographs

Photograph 7: View of well 12-MW35 at Site 12 Gateview Petroleum Area. Note missing bolt. Remaining bolt is damaged, preventing secure attachment of cover (1/10/2019).

Photograph 8: View of flooded well box of well 12-MW35 at Site 12 Gateview Petroleum Area (1/10/2019).

Site 12 Photographs

Photograph 9: View of well 12-MW36 at Site 12 Gateview Petroleum Area. Note missing bolts (1/10/2019).

Photograph 10: View of dry well box of well 12-MW36 at Site 12 Gateview Petroleum Area (1/10/2019).

Site 12 Photographs

Photograph 11: View of well 12-MW37 at Site 12 Gateview Petroleum Area. Note missing bolts (1/10/2019).

Photograph 12: View of flooded well box of well 12-MW37 at Site 12 Gateview Petroleum Area (1/10/2019).

Site 12 Photographs

Photograph 13: View of Perimeter Road at western boundary of Site 12 Gateview Petroleum Area, looking south (1/10/2019).

Photograph 14: View of Site 12 Gateview Petroleum Area from public footpath at western boundary, looking east (1/10/2019).

Site 12 Photographs

Photograph 15: View of well 12-MW20R at Site 12 Gateview Petroleum Area (1/10/2019).

Photograph 16: View of well 12-MW20R at Site 12 Gateview Petroleum Area (1/10/2019).

Site 12 Photographs

Photograph 17: View of well 12-MW38R at Site 12 Gateview Petroleum Area (1/10/2019).

Photograph 18: View of well 12-MW07 at Site 12 Gateview Petroleum Area. Note missing bolts (1/10/2019).

Site 21 Photographs

Photograph 1: View of well 21-SG20 at Site 21 (1/8/2019).

Photograph 2: View of well 21-SG06 at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 3: View of well 21-SG07 at Site 21 (1/8/2019).

Photograph 4: View of well 21-SG08 at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 5: View of former monitoring well location at Site 21 (1/8/2019).

Photograph 6: View of former monitoring well location at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 7: View of well 21-SG19 at Site 21 (1/8/2019).

Photograph 8: View of well 21-SG14 at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 9: View of Site 21 Building 3 hangar interior, looking northwest from approximate centerpoint (1/8/2019).

Photograph 10: View of Site 21 Building 3 hangar interior, looking southwest from approximate centerpoint (1/8/2019).

Site 21 Photographs

Photograph 11: View of well 21-SG09 at Site 21 (1/8/2019).

Photograph 12: View of well 21-SG10 at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 13: View of well 21-SG02 at Site 21 (1/8/2019).

Photograph 14: View of well 21-SG01 at Site 21. Note missing bolt (1/8/2019).

Site 21 Photographs

Photograph 15: View of well 21-IP10 at Site 21. Note raised bolts (1/8/2019).

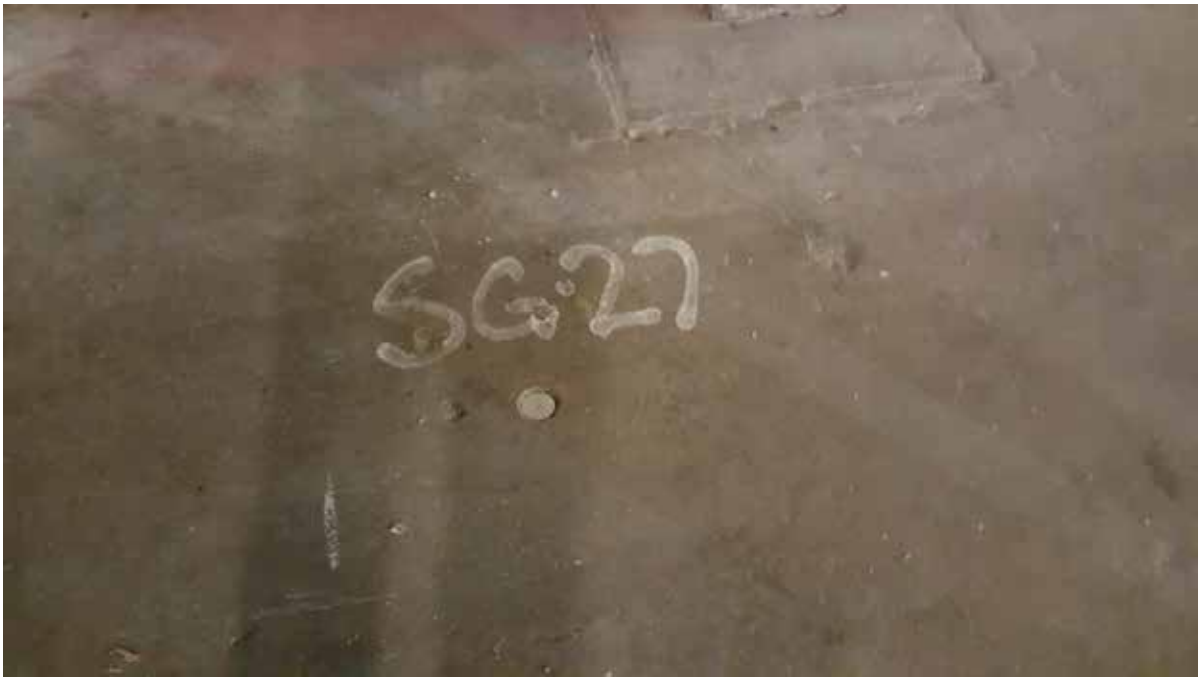
Photograph 16: View of well 21-IP11 at Site 21. Note missing bolt (1/8/2019).

Site 21 Photographs

Photograph 17: View of well 21-IP12 at Site 21. Note missing bolt (1/8/2019).

Photograph 18: View of well 21-SG31 at Site 21 (1/8/2019).

Site 21 Photographs



Photograph 19: View of well 21-SG27 at Site 21 (1/8/2019).

Photograph 20: View of well 21-SG30 at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 21: View of east end of TI Sailing Center administration trailer at Site 21, looking west (1/8/2019).

Photograph 22: View of front side of TI Sailing Center administration trailer at Site 21, looking north (1/8/2019).

Site 21 Photographs

Photograph 23: View of back of TI Sailing Center administration trailer at Site 21, looking southeast from entrance gate. Wells 21-IP26, 21-IP27, 21-IP33, and 21-IP34 are inaccessible beneath trailer (1/8/2019).

Photograph 24: View of TI Sailing Center main entrance gate, looking west (1/8/2019).

Site 21 Photographs

Photograph 25: View of TI Sailing Center yard from northwest corner of administration trailer, looking west. Note former monitoring well location in foreground (1/8/2019).

Photograph 26: View of TI Sailing Center yard from approximate centerpoint, looking east (1/8/2019).

Site 21 Photographs

Photograph 27: View of well 21-SG23 at Site 21 (1/8/2019).

Photograph 28: View of well 21-SG24 at Site 21 (1/8/2019).

Site 21 Photographs

Photograph 29: View of well 21-SG25 at Site 21 (1/8/2019).

Site 24 Photographs

Photograph 1: View of shipping containers covering wells 24-SG-36 and 24-IW21. Note marked well locations from previous monitoring event (1/8/2019).

Photograph 2: View of shipping containers stacked adjacent to south wall of Building 99 at Site 24, looking west (1/8/2019).

Site 24 Photographs

Photograph 3: View of shipping containers stacked adjacent to south wall of Building 99 at Site 24, looking east (1/8/2019).

Photograph 4: View of shipping containers placed adjacent to south wall of Building 99 at Site 24, looking east (1/8/2019).

Site 24 Photographs

Photograph 5: View of shipping containers stacked adjacent to north and east walls of Building 455 at Site 24, looking south (1/8/2019).

Photograph 6: View of shipping containers stacked adjacent to north and east walls of Building 455 and east wall of Building 99 at Site 24, looking southwest (1/8/2019).

Site 24 Photographs

Photograph 7: View of shipping containers stacked near Buildings 455 and 99 at Site 24, looking south. These containers cover wells 24-SG-46, 24-EW29, and 24-BB82 (1/8/2019).

Photograph 8: View of shipping containers stacked near Buildings 455 and 99 at Site 24, looking south. These containers cover wells 24-SG-46, 24-EW29, and 24-BB82 (1/8/2019).

Site 24 Photographs

Photograph 9: View of stored materials within Building 96 covering 24-SG-26 at Site 24 (1/10/2019).

Photograph 10: View of 24-SG-27 within Building 96 at Site 24 (1/10/2019).

Site 24 Photographs

Photograph 11: View of 24-IW9 within Building 96 at Site 24. Note missing bolt (1/10/2019).

Photograph 12: View of well 24-TW-11 at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 13: View of 24-SG-32 within Building 99 at Site 24 (1/10/2019).

Photograph 14: View of 24-EW28R within Building 99 at Site 24 (1/10/2019).

Site 24 Photographs

Photograph 15: View of 24-SG-33 within Building 99 at Site 24 (1/10/2019).

Photograph 16: View of 24-IW4 within Building 99 at Site 24. Note missing bolts (1/10/2019).

Site 24 Photographs

Photograph 17: View of 24-SG-21 at Site 24 (1/8/2019).

Photograph 18: View of 24-IW12 at Site 24. Note vegetation growth around well box (1/8/2019).

Site 24 Photographs

Photograph 19: View of 24-EW15 at Site 24. Note missing bolt (1/8/2019).

Photograph 20: View of 24-SG-22 at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 21: View of 24-EW11 at Site 24 (1/8/2019).

Photograph 22: View of 24-SG-24 at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 23: View of 24-SG-25 at Site 24 (1/8/2019).

Photograph 24: View of 24-SG-39 at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 25: View of 24-SG-40 at Site 24. Well not flush with ground, and likely damaged by heavy vehicle (1/8/2019).

Photograph 26: View of 24-SG-45 at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 27: View of 24-SG-01 at Site 24 (1/8/2019).

Photograph 28: View of 24-TW-47R at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 29: View of 24-SG-38R at Site 24 (1/8/2019).

Photograph 30: View of 24-TW-48R at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 31: View of flooded location of 24-BB76 at Site 24 (1/8/2019).

Photograph 32: View of stacked shipping containers blocking access to 24-BB80 at Site 24 (1/8/2019).

Site 24 Photographs

Photograph 33: View of former well location at Site 24 (1/8/2019).

Photograph 34: View of 24-TW-43 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 35: View of 24-SG-19 at Site 24 (1/17/2019).

Photograph 36: View of 24-SG-23 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 37: View of 24-SG-28 at Site 24 (1/17/2019).

Photograph 38: View of 24-SG-29 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 39: View of 24-SG-35 at Site 24 (1/17/2019).

Photograph 40: View of flooded location of 24-SG-34 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 41: View of 24-SG-30 at Site 24 (1/17/2019).

Photograph 42: View of overgrown location of 24-SG-44 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 43: View of 24-SG-48 at Site 24 (1/17/2019).

Photograph 44: View of 24-SG-05 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 45: View of 24-SG-50 at Site 24 (1/17/2019).

Photograph 46: View of 24-SG-02 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 47: View of soil covered location of 24-SG-47 at Site 24. Note stacked shipping containers in background (1/17/2019).

Photograph 48: View of 24-SG-43 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 49: View of 24-SG-42 at Site 24 (1/17/2019).

Photograph 50: View of 24-SG-03 at Site 24 (1/17/2019).

Site 24 Photographs

Photograph 51: View of 24-SG-49 at Site 24 (1/17/2019).

Site 27 Photographs

Photograph 1: View of shoreline from center of Site 27, looking east (1/8/2019).

Photograph 2: View of shoreline from center of Site 27, looking west (1/8/2019).

Site 27 Photographs

Photograph 3: View of shoreline from western portion of Site 27, looking west (1/8/2019).

Photograph 4: Looking south from center of Site 27 (1/8/2019).

Site 30 Photographs

Photograph 1: View of main (south side) entrance to daycare center on Site 30 (1/8/2019).

Photograph 2: View of children's playground at southern portion of Site 30, looking west (1/8/2019).

Site 30 Photographs

Photograph 3: View of Site 30 daycare center building interior from main entrance, looking east (1/8/2019).

Photograph 4: Looking south from center of Site 30 daycare center building interior (1/8/2019).

Site 30 Photographs

Photograph 5: Looking north from center of Site 30 daycare center building interior (1/8/2019).

Photograph 6: View of separating floor paneling at center of Site 30 daycare center building interior (1/8/2019).

Site 30 Photographs

Photograph 7: View of separating floor paneling at center of Site 30 daycare center building interior (1/8/2019).

Photograph 8: View of hallway at center of Site 30 daycare center building interior (1/8/2019).

Site 30 Photographs

Photograph 9: View of Site 30 daycare center building interior from north entrance (1/8/2019).

Photograph 10: View of Site 30 from daycare center building north entrance, looking northwest. Note entrance to playground area (black gate) at upper center (1/8/2019).

Site 30 Photographs

Photograph 11: View of play area adjacent to main playground area at Site 30 from entrance gate, looking south. Note edge of concrete slab covering subterranean soil contaminants at center (1/8/2019).

Photograph 12: View of Site 30 main playground area and daycare center building exterior from centerpoint of western fence line, looking east (1/8/2019).

Site 30 Photographs

Photograph 13: View of Site 30 main playground area and daycare center building exterior from centerpoint of western fence line, looking northeast. Note concrete slab (pale color) between building exterior and play area (1/8/2019).

Photograph 14: View of Site 30 main playground area and daycare center building exterior from centerpoint of western fenceline, looking northeast (1/8/2019).

Site 30 Photographs

Photograph 15: View of southern edge of Site 30 main playground and daycare center building exterior, looking north (1/8/2019).

Photograph 16: View of southern edge of Site 30 main playground and daycare center building exterior, looking south (1/8/2019).

Site 30 Photographs

Photograph 17: View of southern edge of Site 30 concrete slab covering subterranean soil contaminants, looking north. Note weathering and minor degradation of asphalt seam (1/8/2019).

Photograph 18: View of southern edge of Site 30 concrete slab covering subterranean soil contaminants. Note weathering and minor degradation of asphalt seam (1/8/2019).

Site 30 Photographs

Photograph 19: View of patched former soil sampling locations in playground area of Site 30 (1/8/2019).

Photograph 20: View of concrete slab covering subterranean soil contamination from centerpoint of Site 30, looking south. Note weather degradation and vegetation growth along asphalt seam (1/8/2019).

Site 30 Photographs

Photograph 21: View of concrete slab covering subterranean soil contamination from centerpoint of Site 30, looking north. Note weather degradation and vegetation growth along asphalt seam (1/8/2019).

Photograph 22: View of small crack within concrete slab at Site 30. Note weather degradation and vegetation growth along asphalt seam (1/8/2019).

Site 30 Photographs

Photograph 23: View of northern portion of Site 30 main playground and daycare center building exterior from western boundary fenceline, looking east. Note upturned rubber surface tiles adjacent to metal panel set within play area at right (1/8/2019).

Photograph 24: View of vegetation growth adjacent to metal panel within rubber tiled play area at Site 30. Note upturning of edges of several rubber tiles (1/8/2019).

Site 30 Photographs

Photograph 25: View of vegetation growth between rubber tiles forming surface of play area at Site 30. Note replacement tile at center (1/8/2019).

APPENDIX C: INTERVIEW RECORD AND INTERVIEW DOCUMENTATION FORMS

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INTERVIEW DOCUMENTATION FORM			
The following is a list of individuals interviewed for this Five-Year Review. See the following contact records for a detailed summary of the interviews.			
Name	**Title/Position**	**Organization**	**Date**
Matthew Wright	Remedial Project Manager	CDPH EMB	June 05, 2019
Dr. Sheetal Singh	Senior Health Physicist	CDPH EMB	June 05, 2019
Dale Smith	TI RAB Member	TI RAB	June 10, 2019
Carol Harvey	Journalist	Public	June 10, 2019
Nathan Brennan	TI RAB Member	TI RAB	June 17, 2019
Kimberly Walsh	Remedial Project Manager	DTSC	June 24, 2019
John Gee	TI RAB Member	TI RAB	June 24, 2019
Katrina Kaiser	Remedial Project Manager	Regional Water Board	June 25, 2019
Alice Pilram	TI RAB Member, TI Resident	TI RAB	June 25, 2019
Anonymous	TI Resident	Public	July 03, 2019

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Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 0920	Date: June 05, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Matthew Wright	Title: Remedial Project Manager	Organization: CDPH EMB	
Telephone: (916) 449-5687	Address: PO Box 997377		
Fax: (916) 449-5665	City: Sacramento	State: CA	Zip: 95899
E-mail address: matthew.wright@cdph.ca.gov			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

Overall, the Navy did not expect the size and extent of the contamination. This has meant they needed to conduct catch-up work, which they have done a good job with.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

There is some concern about Tetra Tech, and whether individuals from this organization who were involved with wrongdoings at Hunter's Point also participated in the efforts at TI. CDPH has taken steps, including confirmation and structure surveys, to ensure that all data collected at TI is correct.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

No.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Yes and no.

Yes, because the Navy's weekly work-in-progress report is highly effective.

No, because the Navy does not provide information about which contractor does what work on TI. Also, I agree with Dr. Sheetal Singh in that information is sometimes not shared as promptly as it should be. A good example of this is the roadwork that accidently strayed into a controlled area of Site 12, and the regulatory agencies were not informed until four weeks later.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

No.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 0920	Date: June 05, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Dr. Sheetal Singh	Title: Senior Health Physicist	Organization: CDPH EMB	
Telephone: (916) 449-0275	Address: PO Box 997377		
Fax: (916) 449-5665	City: Sacramento	State: CA	Zip: 95899
E-mail address: sheetal.singht@cdph.ca.gov			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

I am in agreement with Matthew Wright in that the Navy did not expect the size and extent of the contamination. The Navy needs more effort in characterization.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

I am in agreement with Matthew Wright about the concern regarding Tetra Tech individuals' wrongdoing at Hunter's Point and their possible involvement at TI. This is a serious matter, and I am also concerned about the volume of work and data collected during the time period in question.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

No.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Yes. However, when an anomaly is discovered, such as that found in building 1234, this information should be shared with the regulatory agencies more promptly.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

The Navy should be more vigilant about damaged signage, fencing, etc. This has been seen during confirmation surveys on TI, and there is concern about public accessibility to restricted areas as a result.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 1600	Date: June 10, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Kara Fincham	Title: Project Manager	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Dale Smith	Title: RAB Member	Organization:	
Telephone:	Address:		
Fax:	City:	State:	Zip:
E-mail address:			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

From the perspective as someone with a background of remediation, the federal government cleanup is slow, cumbersome, and extremely expensive.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

Fairly comfortable with Site 12 because it has been so thoroughly investigated.

Site 24 – Ms Smith is not happy with Site 24 because wells have been removed; contamination is left in the ground, but the cleanup target levels were made,

Site 27- She feels has been underserved because it creates a bunch of cost to whomever would want to build a marina. To save $$, she feels

Site 30 – never been really comfortable with the remedy, because there is covering over the concrete slab. Worried about soil gas vapor intrusion. Feels the tile floor is not adequate for a remedy.

Site 6 – apparently still problematic because the RAB has never been allowed to see the USTs/ASTs/Sumps and feels not informed.

Site 21 – Not as well evaluated and cleaned up as much as she thinks it should be. The City put a sailing school for disadvantaged kids and some of the wells are covered up and not ever sampled.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

No. Hard to know what is going to happen in the future with the ongoing development.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

The Navy's activities, but not the City's activities. What would be more effective – Maybe have more active participants on the City's side. More information to and from the CAB.

Who is Nathan? CAB?

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

Still not comfortable with Site 6 and Site 24 cleanups. But doesn't know what else to recommend, but we think we are past that point and in the Long-Term Monitoring.

Site 24: She read that waterproofing liquids (PFAS) were used at dry cleaners to waterproof garments. She acknowledges that the PFAS are the highly toxic to marine life and birds. She feels that the Navy has not acknowledged that it was going to be tested in during the Five-Year Review. She thinks PFAS was tested at Site 6 and found to not to be present but never investigated at Site 24 and she would like that to look of this chemical and where was it stored.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 1240	Date: June 10, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Kara Fincham	Title: Project Manager	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Carol Harvey	Title: Journalist	Organization:	
Telephone:	Address:		
Fax:	City:	State:	Zip:
E-mail address:			

SUMMARY OF CONVERSATION

Ms. Harvey said the reception on the call was bad and that the allotted 15 minutes was not enough time.

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

Shoddy

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

Ms. Harvey felt her concerns will go past way past the 15 minutes allotted during this interview. She feels this is not enough time.

Site 30 – Per Dave Clark, she said the Daycare Center is acting as a cap for the lead; worried about the infants and children being exposed to the lead

Multiple concerns about Site 12—people living within radiologically impacted areas; Tahirih said that those areas are not covered by the Five-Year Review and this interview is strictly intended for the areas covered in the Five-Year Review. Ms. Harvey stated that she is concerned about the people living closely to the areas of the discrete 41 sampling locations.

Site 24—Dry Cleaning plume. Ms. Harvey stated that it appears a low-cost affordable housing is going to be built over the plume and she doesn't think the plume has been cleaned up. She is worried about the monitoring wells that are being sampled.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

She thinks things could change in the future, due to possible earthquakes, and changes in the groundwater direction and that the soil can be moved around. She is concerned about soil gas building up. Not convinced that the Navy is not handling that well enough.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Ms. Harvey stated that she has been to every RAB meeting over the last 5 years and studied a lot of materials. She feels there are a lot of data gaps and statements are made that don't pair up with the previous statements or data.

The Navy team is trying to a good job, but one has the feeling that there is a lot of hidden information.

On a scale of 1-10, she feels like she is about a 5 on how well informed she is. She suggested that the Navy team needs to be more forthcoming.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

Strong concerns about people living on the island and being informed about what is going on in the island. The Navy says there are different languages but the only languages being covered are Spanish and English.

She pointed out that there is an ethnically diverse population on the island, including pacific islanders and French, people who can't read and people who don't have computers. She feels the Navy isn't talking to people in a broad-based way. She thinks that the coverage could include more languages. She said that she doesn't have time to air all of her concerns.

Tahirih offered more time to Carol to air her concerns, as there was another interview lined up right after this interview. Ms. Harvey wants Marsha Maloof to be interviewed as part of the Five-Year Review.

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Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 0940	Date: June 17, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Nathan Brennan	Title: TI RAB Member	Organization:	
Telephone:	Address:		
Fax:	City:	State:	Zip:
E-mail address:			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

It has gone on well overall, though the cleanup work has gone on longer than we originally thought it would. The setbacks at former Naval Station Hunter's Point were harmful to TI also, but things are still ok. The Site 24 bioremediation has been a high point at TI.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

None at this time. The best scenario would be no need for any Land Use Controls at TI, but those that are in place are reasonable. Site 30 is a good example. Overall they are working well.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

No, because the process has gone on long enough to allow TIDA and other developers to plan accordingly. There has been a lot of good coordination and communication, and the remedies should work as designed.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

As someone who tends to rely on information presented at RAB meetings and reports from regulatory agencies, the information communication methods seem effective.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

There has been a lot of work to find solutions. TIDA has put effort into this as well. No comments or concerns at this time beyond the projected effects of climate change, which are being addressed by the Navy and TIDA. When does the Navy's responsibility to conduct 5-year reviews such as this one end?

Tahirih Linz: Never. As long as Land Use Controls are in place, the Navy will conduct 5-year reviews on the areas affected by them.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 0800	Date: June 24, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Kimberly Walsh	Title: Remedial Project Manager	Organization: DTSC	
Telephone: (510) 540-3773	Address: 700 Heinz Ave., #200		
Fax:	City: Berkeley	State: CA	Zip: 94710
E-mail address: Kimberly.Walsh@dtsc.ca.gov			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

Very Good.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

No concerns about implementation.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

Not aware of site condition changes but do have some concern about regulatory framework changes. For example, the change of three attenuation factors for calculating risk at Sites 21 and 24 would bring cleanup goals down.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Yes, well informed. The most effective information methods are the BRAC team meetings and regular communication with the BEC.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

The Navy may want to consider more frequent inspections of transferred and/or leased properties with remedies in place. A recent visit to a leased area of Site 24 resulted in concerns about the monitoring network in this area.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five-Year Review Interview		Time: 0820	Date: June 24, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: John Gee	Title: TI RAB Member	Organization: TI RAB	
Telephone:	Address:		
Fax:	City:	State:	Zip:
E-mail address:			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

Pretty satisfied.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

Concerned about LUC's on sites where they are present. What will happen to the LUCs when the Navy releases the property? Worried about implementation at this point.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

At Site 30, the remedy consists of a concrete slab covering hazardous materials beneath the day care center. What happens if a future contractor removes this slab? What will ensure this will not happen?

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Yes, all methods are pretty effective. However, regarding the soil gas and groundwater monitoring, what happens if more contaminants come up after the Navy has transferred the property? Will the new owner be as diligent about information as the Navy has been?

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

The rock armor barrier at Site 27. What happens if re-dredging is done in this area? Will this disturb the armor rock?

Tahirih Linz: The new owner of the property will need to follow the remedy, in accordance with the terms of the Five-Year Review and inspections.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five-Year Review Interview		Time: 0950	Date: June 25, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Katrina Kaiser	Title: Remedial Project Manager	Organization: San Francisco Bay Regional Water Quality Control Board	
Telephone: (510) 622-2379	Address: 1515 Clay Street, Ste 1400		
Fax:	City: Oakland	State: CA	Zip: 94612
E-mail address: katrina.kaiser@waterboards.ca.gov			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

It has been an agreed upon implementation of remedies. No more is needed at Site 6. Site 12 remedies are moving forward. Site 24 remedy has been successful except for small hot spots. At Site 30 all work is done.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

Not of the top of my head. Only Site 24, but I understand it is being addressed.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

Site 21 indoor air intrusion. I understand the LUC RD was meant to prevent it.

I also have some concern about PFOS at Site 6, which is an emerging contaminant and there is not much information available. This may affect the remedy because it is specific to petroleum contaminants.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Yes. Communication has been really well done. Calling and discussing is the most effective method.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

Look at Sites 21 and 24 for soil gas due to changing conditions.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 1930	Date: June 25, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Alice Pilram	Title: TI RAB member, TI resident	Organization: TI RAB	
Telephone:	Address:		
Fax:	City:	State:	Zip:
E-mail address:			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

The Navy has done a very good and thorough job. The Navy has been very responsive to comments. Very happy.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

I am aware that some people are concerned, but I am not. The Site 30 cap is very thorough. There have been some objects found, but people make them into a big deal. Nothing has been found that represents a big risk and affects people. Everything has been disposed of properly. I have no concern.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

Clipper Cove will need to be dredged. With the cap rock, something will need to be done here. However, this will fall on the future property owner, not the Navy. For the rest of the sites, many will be wetlands. As long as they are cleaned up and no arsenic gets to the bay there is no concern. The bioremediation at Site 24 is working well. People are using the Gateway Avenue areas. I know there is one area in Site 12 that the Navy is waiting on funding for. Overall it is working well. I am satisfied.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

Yes. I have received all CDs and received emails about every step in the CERCLA process. No issues with communication.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

None, things are going well.

Interview Record

SITE IDENTIFICATION			
Site Name: Installation Restoration Sites 6, 12, 21, 24 27, and 30, Naval Station Treasure Island, San Francisco, California		EPA ID: CA7170023330	
Subject: Five Year Review Interview		Time: 1500	Date: July 03, 2019
Type: ☒ Telephone ☐ Visit ☐ Email ☐ Other			
Location of Visit:			
CONTACT MADE BY:			
Name: Tahirih Linz	Title: BRAC Environmental Coordinator	Organization: DON	
Name: Joe Schwennesen	Title: Environmental Scientist	Organization: Adanta, Inc.	
Name:	Title:	Organization:	
INDIVIDUAL CONTACTED:			
Name: Anonymous	Title: TI Resident	Organization: Public	
Telephone:	Address:		
Fax:	City:	State:	Zip:
E-mail address:			

SUMMARY OF CONVERSATION

What is your overall impression of the cleanup work conducted at each of the Naval Station Treasure Island sites named above?

I am glad it's being done, and I am glad there have been strong intentions to communicate with the residents. But I wish there were more clarity in the messages and the signage about what is being done, and what the health risks truly are. Especially with the signage. The information is good, but it is so hard to understand sometimes, and it can easily give the wrong impression.

Are you aware of any concerns regarding implementation of the remedies at each of the Naval Station Treasure Island sites named above? If so, please give details.

I have often wondered how you actually get the toxins out. I have concerns about my own experience over my time on TI. My skin is sometimes itchy, and I did not have asthma before living on TI, but I also understand this could be because of a combination of factors. It's still a concern though, for me and for others. I have never figured it out. The remedies are very cool and scientific though, and good for kids to know about.

Are you aware of any changes in site conditions that you feel may impact the protectiveness of the remedies selected in the Record of Decisions for each of Naval Station Treasure Island sites named above?

There is a lot of wind on TI. I have often seen tarps that were meant to cover soil stockpiles and bare ground come untethered in the wind. This has resulted in a lot of dust. I am quite concerned about this. The air quality is bad when this happens. Are there better ways of securing these tarps? Also, what is in this dust? I am surprised the daycare center stays open when this happens.

Do you feel well informed about the site's activities and progress? If yes, which information methods are most effective? If no, which methods would be most effective?

I feel well informed for me. But I work at it. I go to meetings. I read the signs and public notices. I appreciate the efforts by the Navy to communicate, but I do wish it were less formal and more open. The way it is now sometimes makes me feel like I often hear about things "after the fact", or in a manner that is very confusing to me. For example, the 41 discrete excavations are referred to as "41", and the former vessel waste oil storage area at Site 21 is referred to as "21." This is hard to understand, and I am just worried.

Also, I have seen notices taped to doors. I do not think this is effective because of the wind on TI that I mentioned earlier. Also, security is a concern on TI. Both of these mean that taped notices can and do disappear before they can be seen by their recipients.

Do you have any other comments, concerns, or suggestions regarding the effectiveness of the cleanup measures implemented so far in protecting human health and the environment at each of the Naval Station Treasure Island sites named above?

I have heard that mold and other things have been found at the firehouse area. Also, I have seen weird pipes in the ground and strange smelling dirt and mud near my residence. What are these? I would just like to know what's going on. I am always worried.

APPENDIX D: DATA TABLES

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Table D-1: Site 6 Confirmation Soil Sample Results – First Round Excavation

Location	Sample ID	Sample Date	Floor or Sidewall	Dioxin TEQ	Manganese	Sample Location Removed by Additional Excavation?	New Confirmation Sample ID
			Unit	µg/kg	mg/kg		
			Method	USEPA 8290A	USEPA 6020A		
			Remediation Goal	0.012	550[1]		
06-SC-01	06-SC-01-1.5	6/15/16	Sidewall	0.00067	--	No	
06-SC-02	06-SC-02-1.5	6/15/16	Sidewall	0.00065	--	No	
06-SC-03	06-SC-03-1.5	6/15/16	Sidewall	0.0052	--	No	
06-SC-04	06-SC-04-2.5	6/15/16	Floor	0.0041	--	No	
06-SC-05	06-SC-05-1.5	6/15/16	Sidewall	**0.035**	--	Yes	06-SC-102-1.5
06-SC-06	06-SC-06-1.5	6/15/16	Sidewall	**0.02**	--	Yes	06-SC-101-1.5
06-SC-07	06-SC-07-1.5	6/15/16	Sidewall	0.000025	--	No	
06-SC-08	06-SC-08-1.5	6/15/16	Sidewall	0.00031	--	No	
06-SC-09	06-SC-09-1.5	6/16/16	Sidewall	0.00024	--	No	
06-SC-10	06-SC-10-1.5	6/16/16	Sidewall	0.00059	--	No	
06-SC-11	06-SC-11-1.5	6/16/16	Sidewall	0.00025	--	No	
06-SC-12	06-SC-12-2.5	6/16/16	Floor	0.000025	--	No	
06-SC-13	06-SC-13-1.5	6/17/16	Sidewall	**0.16**	--	Yes	06-SC-96-1.5
06-SC-14	06-SC-14-1.5	6/17/16	Sidewall	0.0016	--	No	
06-SC-15	06-SC-15-1.5	6/17/16	Sidewall	0.0077	--	No	
06-SC-16	06-SC-16-1.5	6/17/16	Sidewall	0.00021	--	No	
06-SC-17	06-SC-17-1.5	6/17/16	Sidewall	**0.16**	--	Yes	06-SC-95-1.5
06-SC-18	06-SC-18-1.5	6/17/16	Sidewall	0.0012	--	No	
06-SC-19	06-SC-19-2.5	6/17/16	Floor	0.00032	--	No	
06-SC-20	06-SC-20-2.5	6/17/16	Floor	0.000091	--	No	
06-SC-21	06-SC-21-2.5	6/17/16	Floor	0.0035	--	No	
06-SC-22	06-SC-22-1.5	6/21/16	Sidewall	0.000019	--	No	
06-SC-23	06-SC-23-1.5	6/21/16	Sidewall	0.000084	--	No	
06-SC-24	06-SC-24-1.5	6/21/16	Sidewall	0.00011	--	No	
06-SC-25	06-SC-25-1.5	6/21/16	Sidewall	0.00046	--	No	
06-SC-26	06-SC-26-1.5	6/21/16	Sidewall	**0.51**	--	Yes	06-SC-90-1.5
06-SC-27	06-SC-27-1.5	6/21/16	Sidewall	0.00002	--	No	
06-SC-28	06-SC-28-1.5	6/21/16	Sidewall	0.0048	--	No	
06-SC-29	06-SC-29-1.5	6/21/16	Sidewall	0.0012	--	No	
06-SC-30	06-SC-30-1.5	6/21/16	Sidewall	0.0028	--	No	
06-SC-31	06-SC-31-1.5	6/21/16	Sidewall	0.0068	--	No	
06-SC-32	06-SC-32-1.5	6/21/16	Sidewall	0.00019	--	No	
06-SC-33	06-SC-33-1.5	6/21/16	Sidewall	0.00084	--	No	
06-SC-34	06-SC-34-1.5	6/21/16	Sidewall	0.000088	--	No	
06-SC-35	06-SC-35-1.5	6/21/16	Sidewall	0.0004	--	No	
06-SC-36	06-SC-36-2.0	6/21/16	Floor	0.0054	--	No	
06-SC-37	06-SC-37-1.5	6/21/16	Sidewall	0.0013	--	No	
06-SC-38	06-SC-38-1.5	6/21/16	Sidewall	**0.014**	--	Yes	06-SC-89-1.5
06-SC-39	06-SC-39-1.5	6/23/16	Sidewall	0.0065	--	No	
06-SC-40	06-SC-40-1.5	6/23/16	Sidewall	0.000025	--	No	
06-SC-41	06-SC-41-1.5	6/23/16	Sidewall	**0.07**	--	Yes	06-SC-88-1.5
06-SC-42	06-SC-42-1.5	6/23/16	Sidewall	0.0012	--	No	
06-SC-43	06-SC-43-1.5	6/23/16	Sidewall	0.0017	--	No	
06-SC-44	06-SC-44-1.5	6/23/16	Sidewall	**0.031**	--	Yes	06-SC-97-1.5
06-SC-45	06-SC-45-1.5	6/23/16	Sidewall	0.0038	403	No	
06-SC-46	06-SC-46-5.5	6/23/16	Sidewall	**0.014**	300	Yes	06-SC-86-1.5
06-SC-47	06-SC-47-6.5	6/23/16	Floor	**0.026**	384	Not Applicable [1]	06-SC-87-5.5

Table D-1: Site 6 Confirmation Soil Sample Results – First Round Excavation

Location	Sample ID	Sample Date	Floor or Sidewall	Dioxin TEQ	Manganese	Sample Location Removed by Additional Excavation?	New Confirmation Sample ID
			Unit	µg/kg	mg/kg		
			Method	USEPA 8290A	USEPA 6020A		
			Remediation Goal	0.012	550[1]		
06-SC-48	06-SC-48-1.5	6/23/16	Sidewall	0.00027	--	No	
06-SC-49	06-SC-49-2.0	6/23/16	Floor	0.00008	--	No	
06-SC-50	06-SC-50-2.0	6/23/16	Floor	0 U	--	No	
06-SC-51	06-SC-51-1.5	6/28/16	Sidewall	0.0013	--	No	
06-SC-52	06-SC-52-1.5	6/28/16	Sidewall	0 U	--	No	
06-SC-53	06-SC-53-1.5	6/28/16	Sidewall	0.000013	--	No	
06-SC-54	06-SC-54-1.5	6/28/16	Sidewall	0.000034	--	No	
06-SC-55	06-SC-55-2.5	6/28/16	Floor	0.00000081	--	No	
06-SC-56	06-SC-56-2.0	6/28/16	Floor	0.0000079	--	No	
06-SC-57	06-SC-57-3.0	6/28/16	Floor	0.00058	--	No	
06-SC-58	06-SC-58-2.0	6/28/16	Floor	**0.043**	--	Yes	06-SC-98-3.0
06-SC-59	06-SC-59-5.0	6/28/16	Floor	**0.030**	--	Yes	06-SC-99-6.5
06-SC-60	06-SC-60-2.5	6/28/16	Floor	0.0013	--	No	
06-SC-61	06-SC-61-2.5	6/28/16	Floor	0.000041	--	No	
06-SC-62	06-SC-62-2.5	06/28/16	Floor	0.0000009	--	No	
06-SC-63	06-SC-63-2.5	06/28/16	Floor	0.00062	--	No	
06-SC-64	06-SC-64-2.5	06/28/16	Floor	0.000024	--	No	
06-SC-65	06-SC-65-2.5	06/28/16	Floor	0.000003	--	No	
06-SC-66	06-SC-66-2.5	06/28/16	Floor	**0.012**	--	Yes	06-SC-94-3.5
06-SC-67	06-SC-67-1.5	06/28/16	Sidewall	0.0000051	--	No	
06-SC-68	06-SC-68-1.5	06/28/16	Sidewall	0.0045	--	No	
06-SC-69	06-SC-69-2.5	06/28/16	Floor	0.002	--	No	
06-SC-70	06-SC-70-1.5	06/28/16	Sidewall	**0.09**	--	Yes	06-SC-91-1.5
06-SC-71	06-SC-71-1.5	06/28/16	Sidewall	**0.019**	--	Yes	06-SC-100-1.5
06-SC-72	06-SC-72-1.5	06/28/16	Sidewall	0.00029	--	No	
06-SC-73	06-SC-73-1.5	06/28/16	Sidewall	0.0019	--	No	
06-SC-74	06-SC-74-1.5	06/28/16	Sidewall	0.0014	--	No	
06-SC-75	06-SC-75-1.5	06/28/16	Sidewall	0.0000025	--	No	
06-SC-76	06-SC-76-1.5	06/28/16	Sidewall	0.000013	--	No	
06-SC-77	06-SC-77-1.5	06/28/16	Sidewall	0.00083	--	No	
06-SC-78	06-SC-78-1.5	06/28/16	Sidewall	**0.024**	--	Yes	06-SC-93-1.5
06-SC-79	06-SC-79-1.5	06/28/16	Sidewall	0.011	--	No	
06-SC-80	06-SC-80-1.5	06/28/16	Sidewall	**0.017**	--	Yes	06-SC-92-1.5
06-SC-81	06-SC-81-1.5	06/28/16	Sidewall	0.00011	--	No	
06-SC-82	06-SC-82-1.5	06/28/16	Sidewall	0.00064	--	No	
06-SC-83	06-SC-83-1.5	06/28/16	Sidewall	0.0018	--	No	
06-SC-84	06-SC-84-1.5	06/28/16	Sidewall	0.000084	--	No	
06-SC-85	06-SC-85-1.5	06/28/16	Sidewall	0.0003	--	No	
Quality Control Samples			**Unit**	pg/L			
FQC (EB)	EB-061516	06/15/16		0 U			
FQC (EB)	EB-061616	06/17/16		0 U			
FQC (EB)	EB-061716	06/17/16		0 U			
FQC (EB)	EB-062116	06/21/16		0 U			
FQC (EB)	EB-062316	06/23/16		0.18			
FQC (EB)	EB-062816	06/28/16		0.017			

Table D-1: Site 6 Confirmation Soil Sample Results – First Round Excavation

Notes:

[1] Applicable only to Subarea 3

[2] In accordance with the work plan, maximum excavation depth is at groundwater. Groundwater was encountered at approximately 6.5-feet below ground surface on 06/23/16. Groundwater was encountered at 5.5-feet below ground surface on 08/23/16.

--	Not analyzed	pg/L	Picograms per liter
µg/kg	Micrograms per kilogram	TEQ	Toxicity equivalent
EB	Equipment blank	U	Not detected
FQC	Field quality control	USEPA	United States Environmental Protection Agency
mg/kg	Milligrams per kilogram		

Orange shading represents exceedance of remediation goal

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Table D-2: Site 6 Confirmation Soil Sample Results – Second Round Excavation

Location	Sample ID	Sample Date	Floor or Sidewall	Dioxin TEQ	Sample Location Removed by Additional Excavation?	New Confirmation Sample ID	Comment
			Unit	µg/kg			
			Method	USEPA 8290A			
			Remediation Goal	0.012			
06-SC-86	06-SC-86-1.5	08/23/16	Sidewall	**0.026**	Yes	06-SC-103-2.5	
06-SC-87	06-SC-87-5.5	08/23/16	Floor	**0.018**	Not Applicable [1]		Excavated into groundwater
06-SC-88	06-SC-88-1.5	08/23/16	Sidewall	**0.013**	No		Excavated to seawall
06-SC-89	06-SC-89-1.5	08/23/16	Sidewall	0.0027	No		
06-SC-90	06-SC-90-1.5	08/24/16	Sidewall	0.00003	No		
06-SC-91	06-SC-91-1.5	08/24/16	Sidewall	0.00012	No		
06-SC-92	06-SC-92-1.5	08/24/16	Sidewall	0.000054	No		
06-SC-93	06-SC-93-1.5	08/24/16	Sidewall	0.0095	No		
06-SC-94	06-SC-94-3.5	08/24/16	Floor	0.0016	No		
06-SC-95	06-SC-95-1.5	08/24/16	Sidewall	0.000017	No		
06-SC-96	06-SC-96-1.5	08/24/16	Sidewall	**0.26**	Yes	06-SC-104-1.5	
06-SC-97	06-SC-97-1.5	08/24/16	Sidewall	0.0083	No		
06-SC-98	06-SC-98-3.0	08/24/16	Floor	0.0019	No		
06-SC-99	06-SC-99-6.5	09/06/16	Floor	0.00037	No		
06-SC-100	06-SC-100-1.5	09/06/16	Sidewall	0.00091	No		
06-SC-101	06-SC-101-1.5	09/06/16	Sidewall	**0.071**	Yes	06-SC-105-1.5	
06-SC-102	06-SC-102-1.5	09/06/16	Sidewall	0.000026	No		
Quality Control Samples			**Unit**	pg/L			
FQC (EB)	EB-082316	08/23/16		0.12			
FQC (EB)	EB-082416	08/24/16		0.10			
FQC (EB)	EB-090616	09/06/16		6.8			

Notes:

[1] In accordance with the work plan, maximum excavation depth is at groundwater. Groundwater was encountered at approximately 6.5-feet below ground surface on 06/23/16. Groundwater was encountered at 5.5-feet below ground surface on 08/23/16.

µg/kg Micrograms per kilogram
EB Equipment blank
FQC Field quality control
pg/L Picograms per liter
TEQ Toxicity equivalent
USEPA United States Environmental Protection Agency

Orange shading represents exceedance of remediation goal

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Table D-3: Site 6 Confirmation Soil Sample Results – Third Round Excavation

Location	Sample ID	Sample Date	Floor or Sidewall	Dioxin TEQ
			Unit	µg/kg
			Method	USEPA 8290A
			Remediation Goal	0.012
06-SC-103	06-SC-103-2.5	10/19/16	Sidewall	0.0027
06-SC-104	06-SC-104-1.5	10/19/16	Sidewall	0.000021
06-SC-105	06-SC-105-1.5	10/19/16	Sidewall	0.000035

Notes:

Disposable scoops were used for 10/19/16 sampling.

µg/kg Micrograms per kilogram
TEQ Toxicity equivalent
USEPA United States Environmental Protection Agency

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Table D-4: Site 6 Groundwater Sampling Results

Well Identification	Date Sampled	TPH-g (µg/L)	TPH-d (µg/L)	TPH-mo (µg/L)	TTPH[1] (µg/L)	1,1,2-TCA (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Naphthalene (µg/L)	Arsenic (µg/L)	Manganese (µg/L)	MCPP (µg/L)	PFOA (µg/L)	PFOS (µg/L)	PFOA and PFOS (µg/L)	PFBS (µg/L)
Analytical Method		M8015	M8015	M8015	M8015	8260B	8260B	8260B	8260B	6020A	6020A	8151A	537 Modified	537 Modified	537 Modified	537 Modified
Project Screening Level[2]		NE	NE	NE	1,400/45,500[a]	17	94	43[b]	180	250	5,200	300	0.07[3]	0.07[3]	0.07[3]	380[3]
06-MW25	03/25/2014	330	120	480 U	450	0.50 U	26	**79**	4.2	--	--	--	--	--	--	--
06-MW25	08/26/2014	21 J	93 U	460 U	21 J	0.50 U	0.52	1.0 U	1.0 U	--	--	--	--	--	--	--
06-MW25	03/10/2015	250	150	100 J	500	0.50 U	13	32	4.1	--	--	--	--	--	--	--
06-MW25 (dup)	03/10/2015	250	150	71 J	471	0.50 U	12	31	3.6	--	--	--	--	--	--	--
06-MW25	09/16/2015	60 U	80	380 U	80	1.0 U	1.0 U	1.0 U	5.0 U	--	--	--	--	--	--	--
06-MW25	03/16/2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
06-MW25	09/19/2016	240	50 U	500 U	240	0.50 U	0.55 J	0.50 U	1.3	18 J	1,070 J	90 U	--	--	--	--
06-MW25	11/29/2016	370	120 J	150 J	640	0.50 U	0.66 J	0.50 U	0.88 J	19	785 J	90 UJ	--	--	--	--
06-MW25	05/08/2017	8.7 J	61 U	61 U	8.7 J	0.20 U	0.12 J	0.63 J	1.0 U	18	666	20 U	--	--	--	--
06-MW25	05/09/2017	--	--	--	--	--	--	--	--	--	--	--	**7.3[c]**	**7.1[c]**	**14[c]**	0.12
06-MW25	07/22/2017	49 J	52 U	52 U	49 J	0.20 U	1.1	0.20 U	1.0 U	33	1,130	20 U	--	--	--	--
06-MW25 (dup)	07/22/2017	32 J	54 U	54 U	32 J	0.20 U	1.1	0.20 U	1.0 U	32	1,120	20 U	--	--	--	--
06-MW25	09/11/2017	23 J	31 J	54 U	54 J	0.20 U	0.61 J	0.20 U	1.0 U	27	910	20 U	--	--	--	--
06-MW25 (dup)	09/11/2017	37 J	35 J	56 U	72 J	0.20 U	0.73 J	0.20 U	1.0 U	27	903	20 U	--	--	--	--
06-MW25	12/12/2017	10 U	50 U	50 U	50 U	0.20 U	0.69 J	0.20 U	1.0 U	27	557	20 U	**4.1**	**18**	**22**	0.084 J
06-MW25	03/19/2018	23 U	56 U	56 U	56 U	0.20 U	2.6	0.67 J	1.0 U	21	362	20 U	--	--	--	--
06-MW25	06/18/2018	12 J	51 U	51 U	12 J	0.20 U	0.16 J	0.20 U	1.0 U	29	599	20 U	--	--	--	--
06-MW25 (dup)	06/18/2018	8.3 J	50 U	50 U	8.3 J	0.20 U	0.16 J	0.20 U	1.0 U	28	600	20 U	--	--	--	--
06-MW26	03/25/2014	100 U	100 U	520 U	100 U	0.50 U	0.50 U	1.0 U	1.0 U	--	--	--	--	--	--	--
06-MW26	08/26/2014	24 J	110 U	540 U	24 J	0.50 U	0.21 J	0.13 J	1.0 U	--	--	--	--	--	--	--
06-MW26	03/10/2015	170	150	67 J	387	0.50 U	0.97	36	1.0 U	--	--	--	--	--	--	--
06-MW26	09/17/2015	92 U	56	380 U	56	0.80 U	0.40 U	0.40 U	0.40 U	--	--	--	--	--	--	--
06-MW26	03/16/2016	58	75	380 U	133	0.80 U	0.32 J	4.2	0.40 U	--	--	--	--	--	--	--
06-MW26 (dup)	03/16/2016	98	85	380 U	183	0.80 U	0.53 J	8.1	0.19 J	--	--	--	--	--	--	--
06-MW26	09/19/2016	300	50 U	500 U	300	0.50 U	0.76 J	--	0.50 U	15 J	519 J	90 U	--	--	--	--
06-MW26	11/29/2016	58	75 J	500 U	133	0.50 UJ	0.30 UJ	--	0.50 UJ	15	646 J	90 UJ	--	--	--	--
06-MW26	05/08/2017	8.7 J	62 U	62 U	8.7 J	0.20 U	0.20 U	--	1.0 U	13	534	20 U	--	--	--	--
06-MW26	05/09/2017	--	--	--	--	--	--	--	--	--	--	--	**0.75**	**10[c]**	**11[c]**	0.038
06-MW26	07/22/2017	20 J	55 J	82 J	157 J	0.20 U	0.20 U	--	1.0 U	18	680	20 U	--	--	--	--
06-MW26	09/11/2017	23 J	43 J	62 U	66	0.20 U	0.20 U	--	1.0 U	17	759	20 U	--	--	--	--
06-MW26	12/13/2017	10 U	54 U	54 U	54 U	0.20 U	0.20 U	0.20 U	1.0 U	17	679	20 U	**0.96**	**3.8**	**4.8**	0.028
06-MW26 (dup)	12/13/2017	10 U	62 U	62 U	62 U	0.20 U	0.20 U	0.20 U	1.0 U	17	666	20 U	--	--	--	--
06-MW26	03/20/2018	10 U	52 U	52 U	52 U	0.20 U	0.20 U	0.20 U	1.0 U	20	508	20 U	--	--	--	--
06-MW26 (dup)	03/20/2018	10 U	26 J	52 U	26 J	0.20 U	0.20 U	0.20 U	1.0 U	20	500	20 U	--	--	--	--
06-MW26	06/18/2018	10 U	51 U	51 U	51 U	0.20 U	0.20 U	0.20 U	1.0 U	25	518	20 U	--	--	--	--
06-MW30	09/19/2016	15 U	50 U	500 U	500 U	0.50 U	0.30 U	0.50 U	0.50 U	3.1 J	133 J	90 U	--	--	--	--
06-MW30	11/29/2016	15 U	110 J	500 U	110	0.50 U	0.30 U	0.50 U	0.50 U	2.3 J	67 J	90 UJ	--	--	--	--
06-MW30	05/08/201	10 U	60 U	60 U	60 U	0.20 U	0.20 U	0.20 U	1.0 U	2.1	7.2	20 U	--	--	--	--
06-MW30	05/09/2017	--	--	--	--	--	--	--	--	--	--	--	0.032	**0.13**	**0.16**	0.0060 J
06-MW30 (dup)	05/08/2017	10 U	56 U	56 U	56 U	0.20 U	0.20 U	0.20 U	1.0 U	2.1	8.0	20 U	--	--	--	--
06-MW30 (dup)	05/09/2017	--	--	--	--	--	--	--	--	--	--	--	0.033	**0.17**	**0.20**	0.0065 J
06-MW30	07/22/2017	10 U	53 U	53 U	53 U	0.20 U	0.20 U	0.20 U	1.0 U	2.5	29	20 U	--	--	--	--
06-MW30	09/11/2017	10 U	50 U	50 U	50 U	0.20 U	0.20 U	0.20 U	1.0 U	2.4	86	20 U	--	--	--	--
06-MW30	12/12/2017	10 U	59 U	59 U	59 U	0.20 U	0.20 U	0.20 U	1.0 U	3.0	155	20 U	0.027	**0.097**	**0.12**	0.015 U
06-MW30	03/19/2018	10 U	53 U	40 J	40 J	0.20 U	0.20 U	0.20 U	1.0 U	3.1	346	20 U	--	--	--	--
06-MW30	06/18/2018	10 U	51 U	51 U	51 U	0.20 U	0.20 U	0.20 U	1.0 U	2.8 U	67	20 U	--	--	--	--

Table D-4: Site 6 Groundwater Sampling Results (Continued)

Well Identification	Date Sampled	TPH-g (µg/L)	TPH-d (µg/L)	TPH-mo (µg/L)	TTPH[1] (µg/L)	1,1,2-TCA (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Naphthalene (µg/L)	Arsenic (µg/L)	Manganese (µg/L)	MCPP (µg/L)	PFOA (µg/L)	PFOS (µg/L)	PFOA and PFOS (µg/L)	PFBS (µg/L)
Analytical Method		M8015	M8015	M8015	M8015	8260B	8260B	8260B	8260B	6020A	6020A	8151A	537 Modified	537 Modified	537 Modified	537 Modified
Project Screening Level[2]		NE	NE	NE	1,400/45,500[a]	17	94	43[b]	180	250	5,200	300	0.07[3]	0.07[3]	0.07[3]	380[3]
06-MW31	05/08/2017	30 J	3,000	450 J	3,450	0.20 U	0.20 U	0.20 U	1.0 U	7.6	529	--	--	--	--	--
06-MW31	07/22/2017	16 J	2,900	420 J	3,336	0.20 U	0.20 U	0.20 U	1.0 U	34	744	--	--	--	--	--
06-MW31	09/11/2017	6.9 J	3,800	430 J	4,237	0.20 U	0.20 U	0.20 U	1.0 U	41	868	--	--	--	--	--
06-MW31	12/14/2017	21 J	4,300	330 J	4,651	0.20 U	0.20 U	0.20 U	1.0 U	50	538	--	**0.27**	**1.2**	**1.5**	0.061
06-MW31	03/20/2018	10 U	1,600	340 J	1,940	0.20 U	0.20 U	0.20 U	1.0 U	1.2	53	--	--	--	--	--
06-MW31	06/18/2018	20 J	1,800	750	2,570	0.20 U	0.20 U	0.20 U	1.0 U	28	473	--	--	--	--	--
06-MW32	09/19/2016	15 U	50 UJ	500 U	500 U	0.50 U	0.30 U	0.50 U	0.50 U	3.1 J	413 J	90 U	--	--	--	--
06-MW32 (dup)	09/19/2016	15 U	220 J	170 J	390	0.50 U	0.30 U	0.50 U	0.50 U	3.5 J	417 J	90 U	--	--	--	--
06-MW32	11/29/2016	15 U	110 J	160 J	270	0.50 U	0.30 U	0.50 U	0.50 U	6.5	890 J	90 UJ	--	--	--	--
06-MW32 (dup)	11/29/2016	15 U	110 J	160 J	270	0.50 U	0.30 U	0.50 U	0.50 U	6.5	929 J	--	--	--	--	--
06-MW32	05/09/2017	10 U	1,600	530 J	**2,130**	0.20 U	0.20 U	0.20 U	1.0 U	5.8	326	--	--	--	--	--
06-MW32	07/22/2017	10 U	540	120 J	660	0.20 U	0.20 U	0.20 U	1.0 U	5.5	135	--	--	--	--	--
06-MW32	09/11/2017	10 U	210 J	92 J	302 J	0.20 U	0.20 U	0.20 U	1.0 U	7.3	89	--	--	--	--	--
06-MW32	12/13/2017	10 U	110 J	98 J	208 J	0.20 U	0.20 U	0.20 U	1.0 U	10	17	--	**1.2**	**19**	**20**	0.13
06-MW32 (dup)	12/13/2017	--	--	--	--	--	--	--	--	--	--	--	**1.1**	**18**	**19**	0.15
06-MW32	03/20/2018	10 U	2,600	600	**3,200**	0.20 U	0.20 U	0.20 U	1.0 U	8.1	6.9	--	--	--	--	--
06-MW32	06/18/2018	10 U	1,500	690	**2,190**	0.20 U	0.20 U	0.20 U	1.0 U	11	21	--	--	--	--	--
06-MW33	09/19/2016	15 U	50 U	500 U	500 U	0.50 U	0.30 U	0.50 U	0.50 U	18 J	321 J	90 U	--	--	--	--
06-MW33	11/29/2016	15 U	66 J	140 J	206	0.50 U	0.30 U	0.50 U	0.50 U	20	65 J	90 UJ	--	--	--	--
06-MW33	05/19/2017	8.5 J	56 U	56 U	8.5 J	0.20 U	0.20 U	0.20 U	1.0 U	24	135	--	--	--	--	--
06-MW33	07/22/2017	10 U	38 J	44 J	82 J	0.20 U	0.20 U	0.20 U	1.0 U	21	183	--	--	--	--	--
06-MW33	09/11/2017	8.0 J	170 J	38 J	216 J	0.20 U	0.20 U	0.20 U	1.0 U	19	81	--	--	--	--	--
06-MW33	12/13/2017	10 U	52 U	52 U	52 U	0.20 U	0.20 U	0.20 U	1.0 U	22	194	--	**1.3**	**6.1**	**7.4**	0.064
06-MW33	03/20/2018	10 U	43 J	43 J	74 J	0.20 U	0.20 U	0.20 U	1.0 U	17	122	--	--	--	--	--
06-MW33	06/18/2018	10 U	52 U	52 U	52 U	0.20 U	0.20 U	0.20 U	1.0 U	19	101	--	--	--	--	--
06-MW34	09/19/2016	15 U	50 U	500 U	500 U	0.50 U	0.30 U	0.50 U	0.50 U	11 J	230 J	90 U	--	--	--	--
06-MW34	11/29/2016	15 U	170	200 J	370	0.50 U	0.30 U	0.50 U	0.50 U	14	118 J	90 UJ	--	--	--	--
06-MW34	05/10/2017	5.3 J	57 U	57 U	5.3 J	0.20 U	0.20 U	0.20 U	1.0 U	12	0.70 J	--	--	--	--	--
06-MW34	07/22/2017	10 U	55 J	33 J	88 J	0.20 U	0.20 U	0.20 U	1.0 U	11	9.5	--	--	--	--	--
06-MW34	09/11/2017	8.9 J	53 J	54 U	62 J	0.20 U	0.20 U	0.20 U	1.0 U	15	153	--	--	--	--	--
06-MW34	12/13/2017	6.7 J	66 J	68 J	141 J	0.20 U	0.20 U	0.20 U	1.0 U	19	6.6	--	**0.38**	**3.1**	**3.5**	0.065
06-MW34	03/20/2018	10 U	41 J	52 U	41 J	0.20 U	0.20 U	0.20 U	1.0 U	13	0.64 J	--	--	--	--	--
06-MW34	06/18/2018	5.7 J	54 U	54 U	5.7 J	0.20 U	0.20 U	0.20 U	1.0 U	12	2.3 U	--	--	--	--	--
06-MW35	09/19/2016	15 U	170	120 J	290	0.50 U	0.30 U	0.50 U	0.50 U	11 J	195 J	90 U	--	--	--	--
06-MW35	11/29/2016	15 U	310	210 J	520	0.50 U	0.30 U	0.50 U	0.50 U	21	234 J	90 UJ	--	--	--	--
06-MW35	05/09/2017	5.1 J	130 J	290 J	425 J	0.20 U	0.20 U	0.20 U	1.0 U	21	59	--	--	--	--	--
06-MW35	07/22/2017	8.5 J	190 J	34 J	233 J	0.20 U	0.20 U	0.20 U	1.0 U	20	46	--	--	--	--	--
06-MW35	09/11/2017	6.6 J	350 J	77 J	434 J	0.20 U	0.20 U	0.20 U	1.0 U	32	109	--	--	--	--	--
06-MW35	12/13/2017	10 U	250 J	49 J	299 J	0.20 U	0.20 U	0.20 U	1.0 U	43	126	--	**0.25**	**3.8**	**4.1**	0.048
06-MW35	03/20/2018	10 U	130 J	120 J	250 J	0.20 U	0.20 U	0.20 U	1.0 U	25	34	--	--	--	--	--
06-MW35	06/18/2018	10 U	210 J	430 J	640 J	0.20 U	0.20 U	0.20 U	1.0 U	30	19	--	--	--	--	--
06-MW36	09/19/2016	15 U	530	220 J	750	0.50 U	0.30 U	0.50 U	0.50 U	21 J	765 J	90 U	--	--	--	--
06-MW36	11/29/2016	15 U	600	290 J	890	0.50 U	0.30 U	0.50 U	0.50 U	22	740 J	90 UJ	--	--	--	--
06-MW36	05/09/2017	7.3 J	260 J	240 J	507 J	0.20 U	0.20 U	0.20 U	1.0 U	12	266	--	--	--	--	--
06-MW36	07/22/2017	5.2 J	560	120 J	685	0.20 U	0.20 U	0.20 U	1.0 U	24	830	--	--	--	--	--
06-MW36	09/11/2017	10 U	720	110 J	830	0.20 U	0.20 U	0.20 U	1.0 U	25	835	--	--	--	--	--

Table D-4: Site 6 Groundwater Sampling Results (Continued)

Well Identification	Date Sampled	TPH-g (µg/L)	TPH-d (µg/L)	TPH-mo (µg/L)	TTPH[1] (µg/L)	1,1,2-TCA (µg/L)	Benzene (µg/L)	Ethylbenzene (µg/L)	Naphthalene (µg/L)	Arsenic (µg/L)	Manganese (µg/L)	MCPP (µg/L)	PFOA (µg/L)	PFOS (µg/L)	PFOA and PFOS (µg/L)	PFBS (µg/L)
Analytical Method		M8015	M8015	M8015	M8015	8260B	8260B	8260B	8260B	6020A	6020A	8151A	537 Modified	537 Modified	537 Modified	537 Modified
Project Screening Level[2]		NE	NE	NE	1,400/45,500[a]	17	94	43[b]	180	250	5,200	300	0.07[3]	0.07[3]	0.07[3]	380[3]
06-MW36	12/13/2017	10 U	640	130 J	770	0.20 U	0.20 U	0.20 U	1.0 U	31	650	--	**0.35**	**1.4**	**1.8**	0.076
06-MW36	03/20/2018	10 U	650	290 J	940	0.20 U	0.20 U	0.20 U	1.0 U	11	114	--	--	--	--	--
06-MW36	06/18/2018	10 U	750	590	1,340	0.20 U	0.20 U	0.20 U	1.0 U	19	427	--	--	--	--	--

Notes:

1 TTPH was calculated based on the sum of reportable concentrations of TPH-g, TPH-d, and TPH-mo.
2 Groundwater remediation goals based on future recreational or construction worker exposure presented in the Site 6 Record of Decision/Final Remedial Action Plan (DON 2014).
3 Regulatory action limits have not been formally established for PFOA, PFOS, and PFBS. Comparison criteria for PFOA, PFOS, and PFBS are based on current health advisory levels, as established by the United States Environmental Protection Agency (USEPA 2016, 2017).
a TPH groundwater remediation goal is based on the San Francisco Bay and source area values provided in Table 4 of the Site 6 Record of Decision/Final Remedial Action Plan (DON 2014). As outlined in the Remedial Action Completion Report (CE2-Kleinfelder 2018), and in agreement with the Site 6 Record of Decision/Final Remedial Action Plan (DON 2014), the remediation goal for TTPH for monitoring wells at the San Francisco Bay (point of compliance) is 1,400 µg/L (06-MW32, 06-MW33, 06-MW34, and 06-MW35), and the remediation goal for TTPH for monitoring wells at the source area is 45,500 µg/L (06-MW25, 06-MW26, 06-MW30, 06-MW31, and 06-MW36). There are no remediation goals for TPH-g, TPH-d, and TPH-mo.
b San Francisco Bay Aquatic Receptors (point of compliance) provided in Table 4 of the Site 6 Record of Decision/Final Remedial Action Plan (DON 2014). The groundwater remedial goal for ethylbenzene at the source area (UST 240 area) is 1,393 µg/L, and the remediation goal for Subarea 1 is 540 µg/L.
c Due to high concentrations of the target analyte, sample required 20x dilution. Detection limit was adjusted accordingly.

Orange shading represents exceedance of remediation goal or project screening level

--	Not analyzed
1,1,2-TCA	1,1,2-trichloroethane
µg/L	Micrograms per liter
dup	Field duplicate sample
IR	Installation restoration
J	Analyte reported between reporting limit and method detection limit
MCPP	Methylchlorophenoxypropionic acid
NE	Not established
PFBS	Perfluorobutane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
TPH-d	Total petroleum hydrocarbons in the diesel range (C10 to C24)
TPH-g	Total petroleum hydrocarbons in the purgeable (gasoline) range (C6 to C10)
TPH-mo	Total petroleum hydrocarbons in the motor oil range (C24 to C34)
TTPH	Total petroleum hydrocarbons (C6 to C34)
U	Analyte not reported at or above the method detection limit
VOC	Volatile organic compound

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Table D-5: Site 12 Mann-Kendall Analysis Estimated Trend Table

175 Gateway Avenue Petroleum Area		
12-MW05	Aluminum	No Trend
	Arsenic	Decreasing
	Barium	No Trend
	Calcium	Increasing
	Cobalt	No Trend
	Copper	No Trend
	Iron	No Trend
	Magnesium	Increasing
	Manganese	Probably Increasing
	Molybdenum	Stable
	Nickel	No Trend
	Potassium	Increasing
	Selenium	Increasing
	Sodium	Increasing
	Vanadium	No Trend
	Zinc	No Trend
	Radium	No Trend
12-MW-20	Aluminum	Probably Decreasing
	Antimony	No Trend
	Arsenic	No Trend
	Barium	Decreasing
	Calcium	Stable
	Chromium	No Trend
	Cobalt	Stable
	Copper	No Trend
	Iron	No Trend
	Lead	No Trend
	Magnesium	No Trend
	Manganese	No Trend
	Molybdenum	Stable
	Nickel	Probably Decreasing
	Potassium	No Trend
	Selenium	Probably Increasing
	Sodium	Increasing
	Vanadium	No Trend
	Zinc	No Trend
	Radium	Probably Decreasing
12-MW21	Aluminum	Stable
	Antimony	No Trend
	Arsenic	Stable
	Barium	No Trend
	Calcium	No Trend
	Chromium	No Trend
	Cobalt	Stable
	Copper	No Trend
	Iron	Decreasing
	Lead	No Trend
	Magnesium	Stable
	Manganese	No Trend
	Molybdenum	Stable

Table D-5: Site 12 Mann-Kendall Analysis Estimated Trend Table (Continued)

175 Gateway Avenue Petroleum Area		
	Nickel	Increasing
	Potassium	Stable
	Sodium	No Trend
	Vanadium	No Trend
	Zinc	Increasing
	Radium	Stable
12-MW22	Aluminum	No Trend
	Antimony	Increasing
	Arsenic	Decreasing
	Barium	Increasing
	Calcium	Increasing
	Chromium	No Trend
	Cobalt	No Trend
	Copper	Increasing
	Iron	Decreasing
	Lead	Probably Increasing
	Magnesium	Probably Increasing
	Manganese	No Trend
	Molybdenum	Stable
	Nickel	Increasing
	Potassium	No Trend
	Selenium	Increasing
	Sodium	Increasing
	Vanadium	Increasing
	Zinc	Probably Decreasing
	Radium	No Trend
12-MW23	Aluminum	Probably Decreasing
	Arsenic	No Trend
	Barium	Increasing
	Calcium	Increasing
	Chromium	No Trend
	Cobalt	No Trend
	Copper	Increasing
	Iron	Increasing
	Lead	Increasing
	Magnesium	Increasing
	Manganese	Increasing
	Molybdenum	Stable
	Nickel	Increasing
	Potassium	Increasing
	Sodium	Increasing
	Vanadium	Probably Increasing
	Zinc	No Trend
	Radium	Increasing
12-MW24	Aluminum	Stable
	Arsenic	Probably Decreasing
	Barium	Probably Increasing
	Calcium	Increasing
	Chromium	No Trend
	Cobalt	No Trend

Table D-5: Site 12 Mann-Kendall Analysis Estimated Trend Table (Continued)

175 Gateway Avenue Petroleum Area		
12-MW-24 (continued)	Copper	No Trend
	Iron	Stable
	Lead	No Trend
	Magnesium	Stable
	Manganese	Probably Decreasing
	Molybdenum	Probably Decreasing
	Nickel	Increasing
	Potassium	Decreasing
	Sodium	Increasing
	Vanadium	Probably Increasing
	Zinc	No Trend
	Radium	Stable
12-MW34	Aluminum	Decreasing
	Antimony	Decreasing
	Arsenic	Stable
	Barium	Decreasing
	Cadmium	Decreasing
	Calcium	No Trend
	Chromium	Decreasing
	Cobalt	Decreasing
	Copper	Decreasing
	Iron	Decreasing
	Lead	Decreasing
	Magnesium	Probably Increasing
	Manganese	Probably Decreasing
	Molybdenum	Probably Decreasing
	Nickel	Decreasing
	Potassium	No Trend
	Selenium	Decreasing
	Sodium	Probably Decreasing
	Vanadium	No Trend
	Zinc	Stable
	Radium	Stable

Note:

Mann-Kendall results are taken from Appendix D of the Draft 2018 Annual Basewide Monitoring Report (NOREAS, 2019b).

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Table D-6: Site 12 Groundwater Analytical Results for TPH and Arsenic

Well Identification	Date Sampled	TPH-g (µg/L)	TPH-d (µg/L)	TPH-mo (µg/L)	TTPH [1] (µg/L)	Arsenic [2] (µg/L)
Analytical Method		M8015	M8015	M8015	M8015	6020A
Ambient Concentration		NE	NE	NE	NE	15 [3]
Project Screening Level		NE	NE	NE	1,400 [4]	NE
Remediation Goal		NE	NE	NE	NE	36 [4]
175 Gateview Ave. Petroleum Area						
12-MW05	03/26/2014	100 U	550	69 J	619	**120**
12-MW05	08/26/2014	100 U	460	520 U	460	**133**
12-MW05	03/10/2015	100 U	410	510 U	410	**79**
12-MW05	09/17/2015	50 U	280	370 U	280	**120**
12-MW05	03/15/2016	25 U	140	380 U	140	6.9
12-MW05	10/03/2018	30 U	1,900	280 J	**2,180**	**210**
12-MW05 (dup)	10/03/2018	30 U	2,000	290 J	**2,290**	**200**
12-MW05	12/11/2018	50 U	1,600	310 J	**1,910**	**190**
12-MW05 (dup)	12/11/2018	50 U	1,600	280 J	**1,880**	**160**
12-MW07	10/11/2018	50 U	180	200 J	380	12
12-MW07	12/13/2018	50 U	51 U	410 U	410 U	11
12-MW20	03/26/2014	100 U	89 J	520 U	89	30
12-MW20	08/26/2014	100 U	480	510 U	480	**90**
12-MW20	03/10/2015	100 U	130	160 J	290	**41**
12-MW20	09/17/2015	50 U	580	380 U	580	**110**
12-MW20	03/15/2016	25 U	140	380 U	140	2.2 J
12-MW20R	10/11/2018	50 U	3,700	690	**4,390**	6.1 J
12-MW20R	12/11/2018	50 U	1,500	420 J	**1,920**	8.0 U
12-MW21	03/26/2014	100 U	560	51 J	611	**53**
12-MW21	03/11/2015	100 U	420	100 J	520	**38**
12-MW21	03/16/2016	25 U	520	380 U	520	5.4
12-MW21R	10/04/2018	50 U	3,100	630	**3,730**	--
12-MW21R	10/11/2018	--	--	--	--	5.1 U
12-MW21R	12/12/2018	50 U	4,400	760	**5,160**	8.0 U
12-MW22	03/26/2014	100 U	270	560 U	270	17
12-MW22	08/26/2014	100 U	370	550 U	370	15
12-MW22	03/10/2015	100 U	1,100	110 J	1,210	28
12-MW22	09/17/2015	50 U	280	380 U	280	10
12-MW22	03/15/2016	25 U	97	380 U	97	9.5
12-MW22 (dup)	03/15/2016	--	--	--	--	10
12-MW22R	10/04/2018	50 U	440	500 U	440	--
12-MW22R	10/11/2018	--	--	--	--	20 U
12-MW22R	12/13/2018	30 U	640	320 J	960	40 U
12-MW23	03/25/2014	100 U	550	520 U	550	**84**
12-MW23	08/26/2014	100 U	960	470 U	960	**111**
12-MW23	03/11/2015	100 U	600	98 J	698	**84**
12-MW23	09/17/2015	50 U	590	380 U	590	**150**
12-MW23 (dup)	09/17/2015	50 U	509	380 U	590	**140**
12-MW23	03/15/2016	25 U	410	380 U	410	**53**
12-MW23	10/04/2018	50 U	1,400	480 U	**1,400**	**140**
12-MW23	12/11/2018	50 U	1,800	340 J	**2,140**	**140**

Table D-6: Site 12 Groundwater Analytical Results for TPH and Arsenic (Continued)

Well Identification	Date Sampled	TPH-g (µg/L)	TPH-d (µg/L)	TPH-mo (µg/L)	TTPH [1] (µg/L)	Arsenic [2] (µg/L)
Analytical Method		M8015	M8015	M8015	M8015	6020A
Ambient Concentration		NE	NE	NE	NE	15 [3]
Project Screening Level		NE	NE	NE	1,400 [4]	NE
Remediation Goal		NE	NE	NE	NE	36 [4]
175 Gateview Ave. Petroleum Area (Continued)						
12-MW24	03/25/2014	100 U	490	520 U	490	**63**
12-MW24	03/11/2015	100 U	86 J	530 U	86	**89**
12-MW24	03/15/2016	25 U	65	380 U	65	5.5
12-MW24R	10/03/2018	30 U	1,700	370 J	**2,070**	4.2 J
12-MW24R	12/12/2018	50 U	2,200	800	**3,000**	8.0 U
12-MW33	10/10/2018	57	230	380 U	287	400 U
12-MW33	12/12/2018	30 U	1,100 J	3,600 J	**4,700**	20 U
12-MW34	03/25/2014	100 U	110 U	580 U	110 U	22
12-MW34	03/11/2015	100 U	100 U	500 U	100 U	7.9
12-MW34	03/15/2016	25 U	45 J	370 U	45	4.6 J
12-MW34	10/09/2018	50 U	37 U	370 U	370 U	800 U
12-MW34	12/06/2018	50 U	39 UJ	390 UJ	390 UJ	20 U
12-MW35	10/09/2018	50 U	140	380 U	140	800 U
12-MW35 (dup)	10/09/2018	50 U	150	380 U	150	800 U
12-MW35	12/06/2018	50 U	160	400 U	160	20 U
12-MW35 (dup)	12/06/2018	50 U	130	390 U	130	800 U
12-MW36	10/09/2018	50 U	16 J	380 U	16 J	800 U
12-MW36	12/10/2018	50 UJ	29 J	390 U	29 J	20 U
12-MW37	10/10/2018	50 U	37 U	370 U	370 U	800 U
12-MW37	12/10/2018	50 UJ	17 J	400 U	17 J	20 U
12-MW38R	10/10/2018	51	3,900	610 J	**4,561**	16 J
12-MW38R	12/10/2018	50 U	2,000	540	**2,540**	--
12-MW38R	12/11/2018	--	--	--	--	8.0 U

Notes:

Orange text indicates value exceeds the Remediation Goal/Project Screening Level.

1 TTPH calculated based on the sum of reportable concentrations of TPH-g, TPH-d, and TPH-mo.

2 Arsenic data shown are dissolved concentrations.

3 Ambient concentration for arsenic (15 µg/L) is based on 95th percentile ambient value presented in the Final Technical Memorandum, Estimation of Ambient Concentrations of Metals in Groundwater (Tetra Tech, 2001).

4 The concentration for TTPH is a project screening level based on the lower San Francisco Bay (point of compliance) value (1,400 µg/L) provided in Table 4 of the Site 6 Final Record of Decision/Remedial Action Plan (DON, 2014). The groundwater remediation goal for arsenic is based on the California Toxics Rule value of 36 µg/L for off-site aquatic organisms along the shoreline.

-- Not analyzed
µg/L Micrograms per liter
dup Field duplicate sample
J Analyte reported between the reporting limit and method detection limit
NE Not established
TPH-d Total petroleum hydrocarbons in the diesel range (C10 to C24)
TPH-g Total petroleum hydrocarbons in the purgeable (gasoline) range (C6 to C10)
TPH-mo Total petroleum hydrocarbons in the motor oil range (C24 to C34)
TTPH Total petroleum hydrocarbons (C6 to C34)
U Analyte not reported at or above the method detection limit

Table D-7: Site 21 Soil Gas Analytical Results

SUB-SLAB LOCATIONS – INSIDE BUILDING 3						
Sample Date	**PCE**	**TCE**	**cis-1,2-DCE**	**trans-1,2-DCE**	**VC**	**Chloroform [d]**
Existing Comm/Ind Soil Gas SSSL[a]	83	120	6,132	10,512	6.3	21
Future Res Sub-slab Soil Gas SSSL[c]	16	20	1,460	2,503	1.2	4.2
LOCATION 21-SG-27						
04/08/14	**2,000**	**730**	8.2 J	11 U	11 U	**220**
08/27/14	**1,100**	**640**	6.5 J	6.0 U	5.6 U	**120**
03/13/15	**2,500**	**1,000**	9.1	6.0 U	5.7 U	**100**
09/18/15	**2,500**	**1,200**	10 J	14 U	14 U	**78**
06/19/18	**1,100**	**520**	3.8	3.2 U	3.1 U	**25**
11/02/18	**2,200**	**900**	6.1 J	5.0 U	5.0 U	**30**
LOCATION 21-SG-30						
04/08/14	**1,400**	**210**	7.8 U	7.6 U	7.1 U	**24**
08/27/14	**1,600**	**340**	4.9 U	4.8 U	4.4 U	**31**
03/13/15	**1,400**	**230**	0.46 J	0.61 U	0.58 U	**14**
09/18/15	**2,200**	**370**	13 U	13 U	13 U	**20**
06/19/18	**570**	**150**	0.42 J	2.0 U	1.9 U	**5.0**
11/02/18	**1,400**	**210**	3.0 U	3.0 U	3.0 U	**6.3 J**
LOCATION 21-SG-31						
04/08/14	**19**	5.0	0.64 U	0.63 U	0.58 U	2.7
08/27/14	**18**	7.1	0.64 U	0.63 U	0.58 U	0.86
03/13/15	**18**	5.7	0.59 U	0.56 U	0.54 U	0.37 J
09/18/15	**25**	8.3	0.72 U	0.72 U	0.72 U	0.43 J
06/19/18	**57**	17	2.0 U	2.1 U	2.0 U	0.79 J
11/02/18	**20**	17	0.64 U	0.64 U	0.64 U	0.33 J

Table D-7: Site 21 Soil Gas Analytical Results (Continued)

SUBSURFACE LOCATIONS – OUTSIDE BUILDING 3						
Sample Date	**PCE**	**TCE**	**cis-1,2-DCE**	**trans-1,2-DCE**	**VC**	**Chloroform [d]**
Existing Comm/Ind Soil Gas SSSL[b]	3,225	4,446	235,415	411,356	207	706
Future Res Subsurface Soil Gas SSSL[b]	569	655	49,527	87,366	33	114
LOCATION 21-SG-04						
04/08/14	**8,900**	**1,800**	95	52 U	49 U	52 U
08/27/14	**12,000**	**3,600**	47 J	89 U	82 U	89 U
03/13/15	**9,100**	**1,800**	49 J	56 U	54 U	60 U
09/18/15	**14,000**	**3,400**	93 U	93 U	93 U	93 U
06/19/18	**2,600**	**1,400**	15	2.6 J	11 U	6.9 J
11/02/18	**10,000**	**2,400**	21 J	12 U	12 U	10 J
LOCATION 21-SG-05						
04/08/14	**10,000**	**1,800**	63 U	61 U	57 U	61 U
08/27/14	**13,000**	**3,300**	83 U	81 U	75 U	81 U
03/13/15	**10,000**	**1,800**	45 J	63 U	60 U	68 U
09/18/15	**14,000**	**2,800**	91 U	91 U	91 U	91 U
06/19/18	**11,000**	**2,100**	55 U	57 U	54 U	55 U
11/02/18	**6,700**	**2,300**	35	8.6 U	8.6 U	8.7 J

Notes:
All concentrations in micrograms per cubic meter.

a Soil gas site-specific risk-based screening level (SSSL) for sub-slab soil gas monitoring probes for a commercial/industrial worker in an existing slab-on-grade building without engineered fill based on 1E-06 risk. Values from Table 3 of the Final HHRA Addendum (Shaw, 2012) as cited in the ROD/Final RAP (Navy, 2013a).

b SSSL for subsurface soil gas monitoring probes for a hypothetical future slab-on-grade building with engineered fill for the future resident and without engineered fill for the commercial/industrial worker based on 1E-06 risk. Values from Table 4 of the Final HHRA Addendum (Shaw, 2012) as cited in the ROD/Final RAP (DON, 2013a).

c SSSLs were presented in the Final HHRA Addendum (Shaw, 2012), Table 3 for sub-slab soil gas samples, resident (child/adult 30-year) scenario for future building slab on grade without engineered fill.

d Chloroform is not a COC at Site 21 but is listed because it exceeded the SSSL.

Bolded values exceed the residential SSSL

Bolded values exceed the residential and commercial/industrial SSSLs

Comm/Ind	Commercial/industrial worker	Res	Resident
DCE	Dichloroethene	ROD	Record of decision
HHRA	Human health risk assessment	SSSL	Soil gas site-specific risk-based screening level
J	Analyte reported between the reporting limit	TCE	Trichloroethene
PCE	Tetrachloroethene	U	Analyte not reported at or above the method detection limit
RAP	Remedial action plan	VC	Vinyl chloride

Table D-8: Site 21 Groundwater Analytical Results

Well Identification	Sample Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	VC (µg/L)
Project remediation goal [1]		86	56	712	1,420	165
Risk-based concentration [2]		5	11.5	630	170	2
21-IP07	3/25/2014	0.50 U	0.50 U	0.50 U	5.6	0.19 J
21-IP07	8/25/2014	0.50 U	0.50 U	0.15 J	5.4	0.58
21-IP07	3/10/2015	0.50 U	0.50 U	0.50 U	4.8	0.96
21-IP07	9/17/2015	*not sampled; destroyed 07/16/15*				
21-MW02A	3/25/2014	3.2	1.1	0.30 J	0.51	0.34 J
21-MW02A	8/25/2014	2.6	1.1	0.34 J	0.40 J	0.32 J
21-MW02A	3/10/2015	0.94	0.37 J	0.28 J	0.29 J	0.31 J
21-MW02A (dup)	3/10/2015	1.3	0.41 J	0.30 J	0.29 J	0.32 J
21-MW02A	9/17/2015	2.9	0.69 J	0.56 J	0.45 J	0.54 J
21-MW09A	3/25/2014	1.3	4.4	18	3.0	**5.0**
21-MW09A	8/25/2014	0.52	1.4	12	1.8	**6.6**
21-MW09A	3/10/2015	1.1	4.2	14	1.9	**4.1**
21-MW09A	9/17/2015	1.0 U	1.5	11	1.3	**6.3**

Notes:

1 Project remediation goals based on future construction/commercial exposure presented in the Site 21 Final Record of Decision/Remedial Action Plan (DON, 2013a).

2 Risk-based concentrations based on future residential exposure presented in the Site 21 Final Record of Decision/Remedial Action Plan (DON, 2013a).

Bolded values exceed the project remediation goal

Bolded values exceed the risk-based concentration

µg/L Micrograms per liter
DCE Dichloroethene
J Validation flag signifying analyte reported between the reporting limit and method detection limit
PCE Tetrachloroethene
TCE Trichloroethene
U Validation flag signifying analyte not reported at or above the method detection limit
VC Vinyl chloride

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Table D-9: Site 24 Groundwater Analytical Results

Well ID	Sample Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	VC (µg/L)	Arsenic (µg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Nitrate (µg/L)	Sulfate (µg/L)	TOC (mg/L)	Alkalinity [3] (mg/L)	Ferrous Iron [3] (mg/L)
Groundwater Cleanup Goal [1]		210	42	230	15	15 [2]	NE	NE	NE	NE	NE	NE	NE	NE
24-BB76	03/27/2014	0.50 U	0.50 U	2.8	1.6	--	--	--	--	--	--	--	--	--
24-BB76	08/27/2014	0.50 U	0.50 U	0.79	0.96	--	--	--	--	--	--	--	--	--
24-BB76	03/10/2015	0.50 U	0.10 J	3.3	0.94	--	--	--	--	--	--	--	--	--
24-BB76	09/16/2015	0.40 U	0.40 U	0.62 J	0.59 J	--	--	--	--	--	--	--	--	--
24-BB76	03/18/2016	0.40 U	0.40 U	3.1	0.80 U	--	--	--	--	--	--	--	--	--
24-BB76	09/06/2016	4.0 U	4.0 U	1.7 J	8.0 U	**20**	6.1	1.4 U	31	--	600,000	4.7	498	3.00
24-BB76	03/06/2017	0.19 J	0.40 U	2.6	1.2	4.5	9.3	1.4 U	6,500	--	260,000	25	636	2.20
24-BB76	06/13/2017	0.40 U	0.40 U	3.0	3.5	9.2	7.6	0.73 J	14,000	--	130,000	11	858	3.18
24-BB76	09/13/2017	0.40 U	0.40 U	1.8	1.6	9.5	5.0	1.4 U	7,800	--	300,000	9.3	990	3.30
24-BB76	12/13/2017	0.80 U	0.80 U	3.0	1.8 J	7.3	4.7 J	1.4 U	12,000	--	26,000	9.9	573	3.12
24-BB76	03/22/2018	0.40 U	0.40 U	0.65 J	1.8 J	8.0	4.9 J	1.4 U	8,800	--	1,600 J	9.2	1,540	5.80
24-BB76	06/20/2018	0.40 U	0.40 U	0.63 J	0.56 J	9.8	12	1.4 U	13,000	--	16,000	9.3	1,310	2.85
24-BB76	09/25/2018	0.40 U	0.40 U	0.27 J	0.25 J	11	7.0	1.4 U	7,200	--	3,500	8.4	1,200	1.83
24-BB76	12/12/2018	0.40 U	0.40 U	0.20 J	0.80 U	9.9	2.8 J	1.4 U	3,100	--	1,000 J	8.7	985	2.11
24-BB80	03/27/2014	0.50 U	0.50 U	1.4	1.4	--	--	--	--	--	--	--	--	--
24-BB80	08/25/2014	0.50 U	0.50 U	1.0	0.66	--	--	--	--	--	--	--	--	--
24-BB80	03/10/2015	0.50 U	0.50 U	2.1	1.6	--	--	--	--	--	--	--	--	--
24-BB80	09/16/2015	0.40 U	0.40 U	1.5	0.99 J	--	--	--	--	--	--	--	--	--
24-BB80	03/17/2016	0.40 U	0.40 U	3.3	0.87 J	--	--	--	--	--	--	--	--	--
24-BB80	09/06/2016	4.0 U	4.0 U	4.0 U	8.0 U	5.1	6.8	1.4 U	420	--	26,000	4.1	535	3.50
24-BB80	03/06/2017	0.40 U	0.40 U	2.0	0.64 J	5.2	0.81 J	1.4 U	120	--	140,000	4.0	416	1.40
24-BB80	06/13/2017	0.40 U	0.40 U	1.2	0.56 J	8.4	1.5 U	1.4 U	76	--	570,000	5.8	230	3.09
24-BB80	09/13/2017	0.40 U	0.40 U	0.58 J	0.54 J	5.3	0.64 J	1.4 U	69	--	100,000	3.7	340	1.90
24-BB80	12/13/2017	0.80 U	0.80 U	0.46 J	1.6 U	3.3	1.5 J	1.4 U	120	--	23,000	3.7	273	1.29
24-BB80	03/22/2018	0.40 U	0.40 U	1.1	0.59 J	3.8	1.0 J	1.4 U	140	--	23,000	3.5	770	2.00
24-BB80	06/20/2018	0.40 U	0.40 U	1.5	0.66 J	7.1	1.3 J	0.99 J	45	--	100,000	3.2	480	2.17
24-EW11	03/27/2014	0.50 U	1.5	**2,200**	**940**	--	--	--	--	--	--	--	--	--
24-EW11	08/28/2014	0.50 U	0.13 J	200	**210**	--	--	--	--	--	--	--	--	--
24-EW11 (dup)	08/28/2014	0.50 U	0.13 J	210	**220**	--	--	--	--	--	--	--	--	--
24-EW11	03/12/2015	0.50 U	0.75	**1,200**	**850**	--	--	--	--	--	--	--	--	--
24-EW11 (dup)	03/12/2015	0.50 U	0.71	**1,200**	**840**	--	--	--	--	--	--	--	--	--
24-EW11	09/17/2015	0.40 U	0.40 U	35	**43**	--	--	--	--	--	--	--	--	--
24-EW11	03/17/2016	8.0 U	8.0 U	**810**	**620**	--	--	--	--	--	--	--	--	--
24-EW11	09/06/2016	8.0 U	8.0 U	**730**	**470**	**16**	60	64	630	150 U	84,000	3.0	715	2.00
24-EW11	03/06/2017	2.0 U	2.0 U	1.9 J	3.7 J	2.0 J	140 J	24	24,000 J	--	6,800	34	884	0.80
24-EW11	06/13/2017	0.40 U	0.15 J	1.7	1.4	3.8	100 J	1.2 J	27,000	--	43,000	4.8	1,030	0.56
24-EW11	09/13/2017	0.40 U	0.16 J	2.0	0.77 J	3.7	120	1.4 U	10,000 J	--	130,000	4.6	955	1.78
24-EW11	12/11/2017	0.40 U	0.18 J	1.5	0.87 J	9.3 J	160	2.8 U	18,000	600 U	110,000	4.8	750	3.04
24-EW11	03/21/2018	0.40 U	0.15 J	1.2	0.46 J	11	86	1.4 U	22,000	--	110,000	5.8	1,540	4.60
24-EW11	06/20/2018	0.40 U	0.40 U	1.2	0.45 J	10	250	1.4 U	14,000	--	150,000	4.3	990	1.95
24-EW11	09/25/2018	0.40 U	0.40 U	1.3	0.80 U	5.6	13	1.4 U	2,100	--	580,000	3.0	890	1.35
24-EW11	12/12/2018	0.40 U	0.40 U	1.7	0.80 U	5.5	7.2	1.4 U	670	600 U	660,000	2.8	695	1.43
24-EW15	09/07/2016	4.0 U	4.0 U	4.0 U	8.0 U	**29**	42	1.4 U	7,500	--	9,200	54	1,185	1.00
24-EW15	03/06/2017	20 U	20 U	20 U	40 U	8.6	1.5 U	1.4 U	21,000	--	9,000 J	2,300	--	--
24-EW15	06/13/2017	0.40 U	0.16 J	0.57 J	0.80 U	12	15	1.5 J	16,000	--	4,300 J	100	1,378	0.32
24-EW15	09/13/2017	2.0 U	2.0 U	2.0 U	4.0 U	13	12	0.87 J	15,000	--	7,100 J	43	2,410	0.24
24-EW15	12/11/2017	0.80 U	0.80 U	0.59 J	1.6 U	1.1 J	36	1.2 J	21,000	--	14,000	34	1,820	0.31
24-EW15	03/21/2018	0.40 U	0.40 U	0.55 J	0.80 U	11	43	1.4 U	22,000	--	13,000 J	40	1,925	0.40

Table D-9: Site 24 Groundwater Analytical Results (Continued)

Well ID	Sample Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	VC (µg/L)	Arsenic (µg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Nitrate (µg/L)	Sulfate (µg/L)	TOC (mg/L)	Alkalinity [3] (mg/L)	Ferrous Iron [3] (mg/L)
Groundwater Cleanup Goal [1]		210	42	230	15	15 [2]	NE	NE	NE	NE	NE	NE	NE	NE
24-EW15	06/20/2018	0.40 U	0.40 U	0.71 J	0.26 J	8.8	19	4.2 U	11,000	--	13,000	32	2,030	0.39
24-EW15	09/25/2018	0.40 U	0.40 U	0.33 J	0.28 J	**93**	4.1	1.4 U	13,000	--	42,000	38	2,635	0.17
24-EW28	03/28/2014	0.50 U	0.50 U	0.36 J	0.38 J	--	--	--	--	--	--	--	--	--
24-EW28	08/27/2014	0.50 U	0.50 U	0.31 J	0.34 J	--	--	--	--	--	--	--	--	--
24-EW28	03/12/2015	0.50 U	0.50 U	**1,500**	**360**	--	--	--	--	--	--	--	--	--
24-EW28	09/15/2015	0.40 U	0.40 U	2.6	1.9	--	--	--	--	--	--	--	--	--
24-EW28 (dup)	09/15/2015	0.40 U	0.40 U	2.4	2.0	--	--	--	--	--	--	--	--	--
24-EW28	09/06/2016	4.0 U	4.0 U	**310**	**280**	--	170	320	14,000	--	2,400	6.1	1,325	3.40
24-EW28R	12/12/2017	0.80 U	0.80 U	0.22 J	1.6 U	--	420	4.2 U	23,000	--	1,400 J	6.4	1,485	3.30
24-EW28R	12/13/2018	2.0 U	2.0 U	2.0 U	4.0 U	--	50	1.4 U	4,100	--	1,600 J	5.9	1,125	3.78
24-EW29	03/26/2014	0.50 U	0.16 J	0.57	0.24 J	--	--	--	--	--	--	--	--	--
24-EW29	08/26/2014	0.50 U	0.25 J	0.88	0.27 J	--	--	--	--	--	--	--	--	--
24-EW29	03/10/2015	0.50 U	0.12 J	0.48 J	0.23 J	--	--	--	--	--	--	--	--	--
24-EW29	09/15/2015	0.40 U	0.16 J	0.47 J	0.80 U	--	--	--	--	--	--	--	--	--
24-EW29	09/07/2016	4.0 U	4.0 U	4.0 U	8.0 U	--	100	1.4 U	18,000	--	4,300 J	7.0	1,235	2.60
24-EW29 (dup)	09/07/2016	4.0 U	4.0 U	4.0 U	8.0 U	--	96	2.8 U	17,000	--	4,300 J	7.1	--	--
24-EW29	12/12/2017	0.80 U	0.80 U	0.76 J	1.1 J	--	160	1.4 U	13,000	--	90,000	6.5	1,135	2.83
24-EW29 (dup)	12/12/2017	0.80 U	0.80 U	0.84 J	1.2 J	--	120	1.4 U	9,000	--	92,000	6.4	--	--
24-EW29	12/13/2018	0.40 U	0.40 U	0.22 J	0.31 J	--	13	1.4 U	320	--	430,000	5.6	610	1.93
24-EW29 (dup)	12/13/2018	0.40 U	0.40 U	0.20 J	0.27 J	--	12	1.4 U	300	--	430,000	5.6	--	--
24-IW4	09/06/2016	4.3	2.3	1.1	0.80 U	--	5.4	1.4 U	690	--	640,000	1.4	560	0.00
24-IW4	12/12/2017	0.80 U	0.54 J	4.0	0.91 J	--	42	0.62 J	5,200	--	210,000	4.2	755	2.59
24-IW4	12/13/2018	0.40 U	0.29 J	4.3	0.63 J	--	65	1.4 U	3,200	--	110,000	4.7	748	2.48
24-IW9	09/06/2016	4.0 U	4.0 U	4.0 U	8.0 U	--	31	1.4 U	10,000	--	49,000	22	1,355	2.00
24-IW9	12/12/2017	0.80 U	0.80 U	0.26 J	1.6 U	--	240	2.8 U	18,000	--	13,000	23	1,255	0.23
24-IW12	09/06/2016	0.40 U	0.40 U	0.40 U	0.80 U	--	50	1.4 U	170	--	230,000	3.1	540	1.80
24-IW12	12/11/2017	0.80 U	0.80 U	0.80 U	1.6 U	--	48	1.4 U	750	--	180,000	3.3	444	3.26
24-IW21	03/27/2014	0.50 U	0.27 J	0.93	0.40 J	--	--	--	--	--	--	--	--	--
24-IW21	08/27/2014	0.50 U	0.23 J	0.57	0.24 J	--	--	--	--	--	--	--	--	--
24-IW21	03/11/2015	0.50 U	0.16 J	0.78	0.40 J	--	--	--	--	--	--	--	--	--
24-IW21	09/15/2015	2.0 U	2.0 U	0.7 J	4.0 U	--	--	--	--	--	--	--	--	--
24-IW21	03/17/2016	2.0 U	2.0 U	1 J	4.0 U	--	--	--	--	--	--	--	--	--
24-IW21	09/07/2016	4.0 U	4.0 U	4.0 U	8.0 U	--	230	2.8 U	20,000	--	2,500 J	42	1,035	2.00
24-IW21	03/06/2017	40 U	40 U	40 U	80 U	8.3	12 J	4.7 J	24,000	--	21,000	4,800	2,860	2.00
24-IW21	06/13/2017	0.40 U	0.32 J	0.95 J	0.80 U	12	18	1.4 U	19,000	--	2,300 J	180	2,088	3.30
24-IW21	09/13/2017	2.0 U	2.0 U	2.0 U	4.0 U	3.0	29	1.4 U	13,000	--	3,400 J	71	2,335	2.99
24-IW21	12/12/2017	0.80 U	0.80 U	1.3 J	1.6 U	--	--	--	--	--	--	--	--	--
24-IW21	03/21/2018	0.40 U	0.14 J	1.1	0.80 U	2.2 J	30	1.4 U	8,400	--	3,600 J	68	2,310	3.00
24-IW21	06/20/2018	0.40 U	0.40 U	1.1	0.80 U	2.0 J	92	4.2 U	19,000	--	2,500 J	55	1,420	2.07
24-IW21	09/25/2018	0.40 U	0.40 U	1.3	0.80 U	2.3 J	65	1.4 U	12,000	--	1,900 J	50	1,680	1.82
24-IW21	12/13/2018	0.40 U	0.40 U	0.82 J	0.80 U	2.0 U	35	1.4 U	5,400	--	2,000 J	19	570	3.02
24-IW24	09/06/2016	4.0 U	4.0 U	4.0 U	3.1 J	--	680	140	13,000	--	330,000	6.1	800	2.50
24-IW24	12/13/2017	0.80 U	0.80 U	0.80 U	1.6 U	--	130	2.8 U	14,000	--	1,500 J	3.9	555	2.55
24-IW24	12/12/2018	0.40 U	0.40 U	0.13 J	0.80 U	--	160	1.4 U	7,100	--	54,600	3.7	290	3.30
24-TW-11	03/28/2014	**850**	**640**	**570**	**280**	--	--	--	--	--	--	--	--	--
24-TW-11 (dup)	03/28/2014	**1,000**	**750**	**650**	**320**	--	--	--	--	--	--	--	--	--
24-TW-11	08/27/2014	32	**75**	50	**15**	--	--	--	--	--	--	--	--	--

Table D-9: Site 24 Groundwater Analytical Results (Continued)

Well ID	Sample Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	VC (µg/L)	Arsenic (µg/L)	Ethane (µg/L)	Ethene (µg/L)	Methane (µg/L)	Nitrate (µg/L)	Sulfate (µg/L)	TOC (mg/L)	Alkalinity [3] (mg/L)	Ferrous Iron [3] (mg/L)
Groundwater Cleanup Goal [1]		210	42	230	15	15 [2]	NE	NE	NE	NE	NE	NE	NE	NE
24-TW-11	03/12/2015	**240**	**430**	**1,200**	**370**	--	--	--	--	--	--	--	--	--
24-TW-11	09/17/2015	58	**61**	180	**30**	--	--	--	--	--	--	--	--	--
24-TW-11 (dup)	03/17/2016	**2,400**	**2,200**	**2,800**	**400**	--	--	--	--	--	--	--	--	--
24-TW-11	03/17/2016	**1,900**	**1,800**	**2,400**	**320**	--	--	--	--	--	--	--	--	--
24-TW-11	09/06/2016	45	**43**	130	**35**	**93**	150	90	9,900	150 U	1,300 J	5.6	1,245	2.00
24-TW-11 (dup)	09/06/2016	43	**44**	140	**37**	**96**	160	89	11,000	150 U	1,400 J	5.7	--	--
24-TW-11	03/06/2017	**210**	**190**	**3,500**	**750**	**53**	160	750	20,000	--	12,000	40	830	1.20
24-TW-11 (dup)	03/06/2017	**250**	**240**	**3,600**	**710**	**52**	130	790	23,000	--	12,000	40	--	--
24-TW-11	06/13/2017	4.0 U	4.0 U	**1,100**	**620**	**68**	390	1,600	20,000	--	11,000	12	820	3.30
24-TW-11 (dup)	06/13/2017	8.0 U	8.0 U	**1,100**	**600**	**69**	360	1,600	18,000	--	11,000	11	--	--
24-TW-11	09/13/2017	8.0 U	8.0 U	**620**	**540**	**68**	330	530	8,400	--	6,200	5.6	940	3.30
24-TW-11 (dup)	09/13/2017	8.0 U	8.0 U	**620**	**530**	**72**	370	590	9,500	--	6,500	5.5	--	--
24-TW-11	12/11/2017	0.80 U	0.80 U	79	**110**	**67**	510	610	18,000	150 U	2,400 J	6.1	805	3.30
24-TW-11	03/21/2018	0.80 U	0.80 U	3.2	4.9	**55**	280	82	13,000	--	8,000	6.1	1,540	6.60
24-TW-11 (dup)	03/21/2018	0.40 U	0.40 U	3.0	4.7	**50**	380	120	15,000	--	8,400	6.1	--	--
24-TW-11	06/20/2018	0.40 U	0.40 U	58	**60**	**69**	320	360	12,000	--	9,500	4.2	940	3.23
24-TW-11 (dup)	06/20/2018	0.80 U	0.80 U	63	**61**	**67**	250	310	9,000	--	10,000	4.2	--	--
24-TW-11	09/25/2018	0.40 U	0.40 U	32	**22**	**74**	160	64	8,700	--	23,000	5.1	87	2.45
24-TW-11	12/12/2018	0.40 U	0.29 J	18	13	**69**	120	29	4,200	150 U	58,000	5.4	895	2.75
24-TW-47	03/28/2014	22	23	**730**	**230**	--	--	--	--	--	--	--	--	--
24-TW-47	08/27/2014	0.50 U	0.50 U	5.0	7.8	--	--	--	--	--	--	--	--	--
24-TW-47	03/12/2015	3.6	3.5	**390**	**260**	--	--	--	--	--	--	--	--	--
24-TW-47	09/16/2015	0.29 J	0.9 J	97	**100**	--	--	--	--	--	--	--	--	--
24-TW-47 (dup)	09/16/2015	0.22 J	0.82 J	100	**110**	--	--	--	--	--	--	--	--	--
24-TW-47	09/06/2016	8.0 U	8.0 U	**780**	**330**	--	120	17	8,300	--	180,000	5.9	605	3.00
24-TW-47R	12/13/2017	0.80 U	0.80 U	0.80 U	1.6 U	--	41	2.8 U	20,000	--	11,000	7.1	384	2.99
24-TW-47R	09/25/2018	0.80 U	0.80 U	9.2	**110**	**15**	57	110	11,000	--	31,000	5.5	564	2.28
24-TW-47R	12/13/2018	0.40 U	0.40 U	0.41 J	0.65 J	--	23	1.7 J	3,500	--	30,000	4.5	226	2.17
24-TW-48	03/28/2014	16	5.2	**640**	**350**	--	--	--	--	--	--	--	--	--
24-TW-48 (dup)	03/28/2014	17	5.4	**620**	**330**	--	--	--	--	--	--	--	--	--
24-TW-48	08/27/2014	1.3	5.3	**560 J**	**510**	--	--	--	--	--	--	--	--	--
24-TW-48	03/12/2015	2.3	5.3	**1,100**	**210**	--	--	--	--	--	--	--	--	--
24-TW-48	09/16/2015	180	**180**	**2,300**	**480**	--	--	--	--	--	--	--	--	--
24-TW-48	03/17/2016	34	31	**730**	**94**	--	--	--	--	--	--	--	--	--
24-TW-48	09/06/2016	1.5 J	32	**350**	**79**	**69**	130	31	8,300	150 U	250,000	5.6	850	3.00
24-TW-48R	03/06/2017	40 U	14 J	**4,400**	**520**	4.8	310	370	26,000	--	25,000	700	718	3.40
24-TW-48R	06/13/2017	0.40 U	0.45 J	1.5	**24**	**17**	210	240	22,000	--	2,200 J	7.4	564	3.30
24-TW-48R	09/13/2017	0.40 U	0.15 J	0.80 J	**15**	**17**	400	360	11,000	--	1,000 J	12	960	2.77
24-TW-48R	12/11/2017	8.0 U	8.0 U	**620**	**450**	**23**	780	610	23,000	150 U	1,400 J	76	925	3.30
24-TW-48R (dup)	12/11/2017	8.0 U	8.0 U	**620**	**460**	**24**	780	640	22,000	150 U	1,400 J	79	--	--
24-TW-48R	03/22/2018	12	**380**	**1,200**	**240**	**43**	790	380	21,000	--	42,000	5.3	1,155	3.40
24-TW-48R	06/20/2018	0.40 U	0.15 J	1.1	0.94 J	**46**	910	43	13,000	--	35,000	4.4	500	3.30
24-TW-48R	09/25/2018	0.40 U	0.15 J	0.58 J	0.43 J	**57**	890	64 J	9,800	--	7,900	5.8	515	2.23
24-TW-48R (dup)	09/25/2018	0.40 U	0.17 J	0.51 J	0.47 J	**55**	890	120 J	9,900	--	7,900	7.0	--	--
24-TW-48R	12/12/2018	8.0 U	3.3 J	**11,000**	**4,300**	**52**	340	94	5,700	30 U	100,000	3.5	350	3.30
24-TW-48R (dup)	12/12/2018	8.0 U	8.0 U	**12,000**	**4,600**	**52**	290	79	5,000	30 U	100,000	3.4	--	--

Table D-9: Site 24 Groundwater Analytical Results (Continued)

Notes:

1 Groundwater cleanup goals presented in the Site 24 Final Record of Decision/Final Remedial Action Plan (DON, 2015).
2 Naval Station Treasure Island ambient concentration.
3 Analyzed by field test kits.

Orange text indicates value exceeds cleanup goal.

--	Not analyzed
DCE	Dichloroethene
Dup	Duplicate field sample
J	Estimated value
µg/L	Micrograms per liter
mg/L	Milligrams per liter
NE	Not established
PCE	Tetrachloroethene
TCE	Trichloroethene
TOC	Total organic carbon
U	Not detected at the reported limit
VC	Vinyl chloride

Table D-10: Site 24 Soil Gas Analytical Results

Well Identification	Sample Date	PCE (µg/m^3)	TCE (µg/m^3)	cis-1,2-DCE (µg/m^3)	VC (µg/m^3)
Residential Soil Gas Cleanup Goal [1]		**533**	**615**	**46,408**	**31**
Commercial/Industrial Soil Gas Cleanup Goal [1]		**2,862**	**3,970**	**209,217**	**188**
24-SG-01	07/20/2015	260	3.0	0.25 J	1.0 U
24-SG-01	11/23/2015	160	2.1	1.1 U	1.0 U
24-SG-01	02/24/2016	120	1.9	1.3 U	1.3 U
24-SG-01	05/19/2016	200	2.9	1.1 U	1.0 U
24-SG-01	09/27/2016	250	2.8 J	1.3 U	1.7 U
24-SG-01	03/15/2017	150	4.0 J	3.0	1.0 U
24-SG-01	06/14/2017	340	30	490	**47**
24-SG-01	09/14/2017	130	5.4	0.53 J	0.52 J
24-SG-01	12/13/2017	5.7	2.4 U	0.68 J	1.1 U
24-SG-01	03/30/2018	110	1.9 J	0.74 J	1.1 U
24-SG-01	06/20/2018	190	2.3 J	0.79 U	1.1 U
24-SG-01	09/25/2018	170	7.7	0.79 U	1.1 U
24-SG-01	12/13/2018	110	2.2 J	0.79 U	1.1 U
24-SG-02	07/20/2015	170	11	1.8	1.0 U
24-SG-02	11/19/2015	130	9.8	1.3	1.0 U
24-SG-02	02/16/2016	85	2.5	1.3 U	1.3 U
24-SG-02	05/19/2016	100	3.5	0.87 U	0.8 U
24-SG-02	09/27/2016	140	8.7	0.97 J	1.0 U
24-SG-02 (dup)	09/27/2016	150	11	2.3	0.53 J
24-SG-02	03/15/2017	62	1.1 J	0.79 U	1.0 U
24-SG-02	06/14/2017	110	3.5 J	0.37 J	1.0 U
24-SG-02	09/14/2017	130	5.6	0.49 J	1.0 U
24-SG-02	12/13/2017	85	4.8	0.79 U	1.0 U
24-SG-02	03/30/2018	56	1.5 J	0.79 U	1.0 U
24-SG-02	06/20/2018	130	9.6	0.79 U	1.0 U
24-SG-02	09/25/2018	93	5.4	0.79 U	1.0 U
24-SG-02	12/12/2018	59	2.5 J	0.79 U	1.0 U
24-SG-21	07/27/2015	**910**	110	3.7	1.0 U
24-SG-21	11/16/2015	**720**	90	2.9	1.0 U
24-SG-21 (dup)	11/16/2015	**690**	90	2.9	1.0 U
24-SG-21	02/17/2016	**610**	60	1.5	1.3 U
24-SG-21	05/19/2016	**850**	78	2.2 J	2.0 U
24-SG-21	09/26/2016	**1,100**	90	5.4 U	7.0 U
24-SG-21	12/14/2017	160	31	0.80 J	1.0 U
24-SG-21	12/12/2018	**540**	30	0.69 J	1.0 U
24-SG-22	07/27/2015	**1,000**	410	1.8	1.0 U
24-SG-22 (dup)	07/27/2015	**1,300**	430	1.7	1.0 U
24-SG-22	11/16/2015	**630**	230	1.1 J	1.0 U
24-SG-22	02/15/2016	470	150	0.48 J	1.3 U
24-SG-22	05/19/2016	**880**	300	0.75 J	4.0 U
24-SG-22 (dup)	05/19/2016	**860**	270	1.1 J	1.0 U
24-SG-22	09/26/2016	**1,000**	320	4.1 U	5.2 U
24-SG-22	03/15/2017	**590**	180	33	2.9 J
24-SG-22 (dup)	03/15/2017	**610**	190	33	2.8 J
24-SG-22	06/14/2017	**1,100**	420	260	29

Table D-10: Site 24 Soil Gas Analytical Results (Continued)

Well Identification	Sample Date	PCE (µg/m^3)	TCE (µg/m^3)	cis-1,2-DCE (µg/m^3)	VC (µg/m^3)
Residential Soil Gas Cleanup Goal [1]		**533**	**615**	**46,408**	**31**
Commercial/Industrial Soil Gas Cleanup Goal [1]		**2,862**	**3,970**	**209,217**	**188**
24-SG-22 (dup)	06/14/2017	**1,200**	440	260	26
24-SG-22	09/14/2017	**970 J**	310 J	16 J	3.4 U
24-SG-22 (dup)	09/14/2017	0.52 J	2.4 J	2.1 J	1.0 U
24-SG-22	11/02/2017	**570**	180	4.3	1.7 U
24-SG-22	12/14/2017	430	110	1.4 J	2.4 U
24-SG-22	03/30/2018	380 J	100 J	0.90 J	1.0 U
24-SG-22 (dup)	03/30/2018	64 J	41 J	0.60 J	1.0 U
24-SG-22	06/20/2018	270	97	1.1 J	1.0 U
24-SG-22	09/25/2018	**840**	200	0.89 J	2.5 U
24-SG-22	12/13/2018	370	73	0.79 U	1.0 U
24-SG-24	07/24/2015	**670**	7.7	1.1 U	1.0 U
24-SG-24	11/17/2015	310	6.1	1.1 U	1.0 U
24-SG-24	02/17/2016	240	2.2	1.3 U	1.3 U
24-SG-24 (dup)	02/17/2016	250	2.3	1.3 U	1.3 U
24-SG-24	05/16/2016	440	3.1	2.2 U	2.0 U
24-SG-24	09/26/2016	**570**	6.1 J	3.1 U	4.0 U
24-SG-24	12/14/2017	30	0.98 J	0.79 U	1.0 U
24-SG-24	12/12/2018	170	1.2 J	0.79 U	1.0 U
24-SG-25	07/28/2015	**600**	23	0.21 J	1.0 U
24-SG-25	11/17/2015	**600**	22	0.18 J	1.0 U
24-SG-25	02/17/2016	0.45 J	1.3 U	1.3 U	1.3 U
24-SG-25	05/19/2016	**650**	17	1.1 U	1.0 U
24-SG-25	09/27/2016	**770**	23	1.2 J	1.0 U
24-SG-25	12/15/2017	3.2	1.5 J	0.79 U	1.0 U
24-SG-25	12/12/2018	320	7.9	0.79 U	1.0 U
24-SG-26	07/29/2015	230	60	0.62 J	1.0 U
24-SG-26	11/18/2015	200	51	0.53 J	0.98 U
24-SG-26	02/18/2016	170	36	0.22 J	1.3 U
24-SG-26	05/18/2016	180	38	0.33 J	1.0 U
24-SG-26	09/26/2016	220	44	0.79 U	1.0 U
24-SG-26	03/15/2017	73	20	0.79 U	1.0 U
24-SG-26	06/14/2017	220	37	0.79 U	1.0 U
24-SG-26	09/14/2017	0.59 J	1.1 J	0.79 U	1.0 U
24-SG-26	12/13/2017	170	29	0.79 U	1.0 U
24-SG-26	03/30/2018	81	18	0.79 U	1.0 U
24-SG-26	06/20/2018	190	25	0.79 U	1.0 U
24-SG-26 (dup)	06/20/2018	210	32	0.79 U	1.0 U
24-SG-26	09/25/2018	200	30	0.48 J	1.0 U
24-SG-26 (dup)	09/25/2018	200	29	0.79 U	1.0 U
24-SG-27	07/31/2015	220	120	6.2	1.0 U
24-SG-27	11/18/2015	220	120	5.6	1.0 U
24-SG-27	02/18/2016	180	83	3.2	1.3 U
24-SG-27	05/18/2016	190	89	4.1	1.0 U
24-SG-27	09/26/2016	260	120	3.9	1.0 U
24-SG-27	12/15/2017	150	74	2.6	1.0 U

Table D-10: Site 24 Soil Gas Analytical Results (Continued)

Well Identification	Sample Date	PCE (µg/m^3)	TCE (µg/m^3)	cis-1,2-DCE (µg/m^3)	VC (µg/m^3)
Residential Soil Gas Cleanup Goal [1]		**533**	**615**	**46,408**	**31**
Commercial/Industrial Soil Gas Cleanup Goal [1]		**2,862**	**3,970**	**209,217**	**188**
24-SG-27 (dup)	12/15/2017	170	75	2.5	1.0 U
24-SG-32	07/30/2015	**3,500**	**620**	7.1	1.0 U
24-SG-32	11/23/2015	**2,900**	460	5.0	1.0 U
24-SG-32	02/18/2016	**3,300**	480	4.9 J	11 U
24-SG-32	05/18/2016	**3,400**	**630**	6.9 J	12 U
24-SG-32	09/28/2016	**3,600**	460	16 U	20 U
24-SG-32	12/14/2017	**2,500**	300	6 U	7.7 U
24-SG-32	09/25/2018	**2,900**	380	6.7 U	8.6 U
24-SG-32	12/13/2018	**1,400**	160	3.2 U	4.1 U
24-SG-33	07/30/2015	**2,000**	**770**	88	1.0 U
24-SG-33	11/23/2015	**3,600**	**980**	62	1.0 U
24-SG-33	02/18/2016	**3,200**	**780**	70	2.7 U
24-SG-33	05/18/2016	**3,800**	**960**	100	12 U
24-SG-33	09/28/2016	**5,300**	**1,200**	76	24 U
24-SG-33	12/14/2017	**1,600**	460	34	5.1 U
24-SG-33	09/25/2018	**3,600**	**640**	27	11 U
24-SG-33	12/13/2018	**2,600**	380	19	8.0 U
24-SG-36	07/23/2015	**12,000**	440	31 J	39 U
24-SG-36	11/17/2015	**9,100**	330	21 J	24 U
24-SG-36 (dup)	11/17/2015	**8,800**	340	22 J	22 U
24-SG-36	02/23/2016	**8,500**	340	41	31 U
24-SG-36	05/20/2016	**12,000**	480	31 J	49 U
24-SG-36	09/28/2016	**16,000**	520	56 U	73 U
24-SG-36	03/15/2017	**21,000**	580	49 J	82 U
24-SG-36	06/14/2017	**12,000**	270 J	60 U	77 U
24-SG-36	09/14/2017	11	1.9 J	0.84 J	1.0 U
24-SG-36	11/02/2017	**8,000**	200	18 U	23 U
24-SG-36	12/15/2017	**7,200**	140	20 U	26 U
24-SG-36	03/30/2018	**5,600**	92	4.4 J	13 U
24-SG-36	06/20/2018	**6,600**	110	5.0 J	10 U
24-SG-36	09/25/2018	2.7 U	2.1 U	0.79 U	1.0 U
24-SG-36	12/13/2018	**2,500**	36	6.3 U	8.1 U
24-SG-37	07/24/2015	**8,600**	470	31 U	28 U
24-SG-37	11/23/2015	**5,700**	260	2.1	1.0 U
24-SG-37	02/18/2016	**4,400**	200	21 U	21 U
24-SG-37	05/20/2016	**6,300**	240	28 U	25 U
24-SG-37 (dup)	05/20/2016	**6,000**	250	1.1 U	1.0 U
24-SG-37	09/28/2016	**4,700**	210	21 U	27 U
24-SG-37	12/14/2017	**2,800**	110	7.3 U	9.4 U
24-SG-37R	12/13/2018	**1,100**	31	2.3 U	2.9 U
24-SG-38	07/22/2015	**320,000**	**41,000**	19,000	1,200 U
24-SG-38	11/19/2015	**210,000**	**29,000**	19,000	830 U
24-SG-38 (dup)	11/19/2015	**200,000**	**29,000**	19,000	810 U
24-SG-38	02/24/2016	**120,000**	**15,000**	8,400	550 U

Table D-10: Site 24 Soil Gas Analytical Results (Continued)

Well Identification	Sample Date	PCE (µg/m^3)	TCE (µg/m^3)	cis-1,2-DCE (µg/m^3)	VC (µg/m^3)
Residential Soil Gas Cleanup Goal [1]		**533**	**615**	**46,408**	**31**
Commercial/Industrial Soil Gas Cleanup Goal [1]		**2,862**	**3,970**	**209,217**	**188**
24-SG-38	05/20/2016	**240,000**	**24,000**	11,000	970 U
24-SG-38	09/27/2016	**300,000**	**30,000**	13,000	900 U
24-SG-38R	03/15/2017	**650**	85	22	**510**
24-SG-38R	06/14/2017	**830**	430	3,400	**6,100**
24-SG-38R	09/14/2017	230	25	13	1.5 J
24-SG-38R	11/02/2017	92	9.2	4.3	0.81 J
24-SG-38R	12/13/2017	83	6.0	1.6	1.0 U
24-SG-38R	03/30/2018	75	5.2	0.59 J	1.0 U
24-SG-38R	06/20/2018	100	4.8	0.84 J	1.0 U
24-SG-38R	09/25/2018	59	2.3 J	1.5 U	1.9 U
24-SG-38R	12/12/2018	30	1.9 J	2.8	1.0 U
24-SG-39	07/28/2015	**570**	40	1.1 J	1.0 U
24-SG-39	11/17/2015	240	13	0.32 J	1.0 U
24-SG-39	02/24/2016	190	20	3.5	1.3 U
24-SG-39 (dup)	02/24/2016	180	18	3.1	1.3 U
24-SG-39	05/18/2016	210	4.7	0.28 J	1.0 U
24-SG-39	09/27/2016	**2,200**	110	9.3 U	12 U
24-SG-39	12/14/2017	290	25	2.0	1.0 U
24-SG-39	12/12/2018	220	17	0.79 U	1.0 U
24-SG-40	07/22/2015	**650**	67	1.1 J	1.0 U
24-SG-40	11/17/2015	**640**	45	0.6 J	1.0 U
24-SG-40	02/16/2016	520	14	1.3 U	1.3 U
24-SG-40	05/20/2016	430	18	1.1 U	1.0 U
24-SG-40 (dup)	05/20/2016	440	18	0.22 J	1.0 U
24-SG-40	09/27/2016	460	35	2.1 U	2.8 U
24-SG-40	12/13/2017	160	4.4	0.79 U	1.0 U
24-SG-40	12/13/2018	270	5.8	0.79 U	1.0 U
24-SG-40 (dup)	12/13/2018	270	5.9	0.79 U	1.0 U
24-SG-45	07/29/2015	450	59	3.4	1.0 U
24-SG-45	11/19/2015	**730**	85	5.9	3.0 U
24-SG-45	02/18/2016	490	48	0.55 J	1.3 U
24-SG-45 (dup)	02/18/2016	510	49	0.58 J	1.3 U
24-SG-45	05/19/2016	430	36	0.54 J	1.0 U
24-SG-45	09/28/2016	430	38	1.4 J	2.6 U
24-SG-45	12/14/2017	460	40	1.6 J	1.5 U
24-SG-45	12/14/2018	400	29	0.73 J	1.0 U
24-SG-46	07/24/2015	140	14	0.99 J	1.0 U
24-SG-46	11/23/2015	140	6.3	1.1 U	1.0 U
24-SG-46	05/17/2016	260	6.3	2.2 U	2.0 U
24-SG-46	09/28/2016	260	9.4	1.2 U	1.6 U
24-SG-46	06/14/2017	360	8.0	0.79 U	1.0 U
24-SG-46	09/14/2017	270	12	0.79 U	1.0 U
24-SG-46	12/13/2017	6.2	120	0.79 U	1.0 U
24-SG-46	06/20/2018	290	6.2	0.79 U	1.0 U

Table D-10: Site 24 Soil Gas Analytical Results (Continued)

Well Identification	Sample Date	PCE (µg/m^3)	TCE (µg/m^3)	cis-1,2-DCE (µg/m^3)	VC (µg/m^3)
Residential Soil Gas Cleanup Goal [1]		**533**	**615**	**46,408**	**31**
Commercial/Industrial Soil Gas Cleanup Goal [1]		**2,862**	**3,970**	**209,217**	**188**
24-SG-46	09/25/2018	210	5.7	0.79 U	1.0 U
24-SG-47	07/28/2015	110	1.2 J	1.1 U	1.0 U
24-SG-47	11/18/2015	74	0.82 J	1.1 U	1.0 U
24-SG-47	02/16/2016	46	0.49 J	1.3 U	1.3 U
24-SG-47	05/17/2016	65	0.63 J	2.2 U	2.0 U
24-SG-47	09/27/2016	93	4.8	0.51 J	1.0 U
24-SG-47	06/14/2017	83	2.0 J	0.79 U	1.0 U
24-SG-47	09/14/2017	83	0.95 J	0.79 U	1.0 U
24-SG-47	12/13/2017	41	0.73 J	0.79 U	1.0 U
24-SG-47	03/30/2018	29	0.65 J	0.79 U	1.0 U
24-SG-47	06/20/2018	70	1.6 J	0.79 U	1.0 U
24-SG-47	09/25/2018	64	0.73 J	0.79 U	1.0 U
24-SG-47	12/14/2018	31	2.1 U	0.79 U	1.0 U

Notes:

[1] Soil gas cleanup goals presented in the Site 24 Record of Decision/Final Remedial Action Plan (DON, 2015).

Orange shaded text indicates value exceeds the soil gas cleanup goal for residential.

Green shaded text indicates values exceeds the soil gas cleanup goal for commercial/industrial workers.

µg/m³	Micrograms per cubic meter	TCE	Trichloroethene
DCE	Dichloroethene	U	Not detected at the reported limit
Dup	Field duplicate sample	VC	Vinyl chloride
J	Estimated value		

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APPENDIX E: RESPONSE TO COMMENTS

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Responses to Regulatory Agency Comments on the "Draft Second Five-Year Review, Former Naval Station Treasure Island, San Francisco, California," dated September 13, 2019

Revised text is shown in bold italics and underlined; removed text is shown with strikeout.

Number	Commenter	Site	Comment	Response
1	Langan/TIDA Comment 1	Site 6	**Section 2.1.7 Site 6 Protectiveness Statement, page 28**. This section should note that the revised recommended arsenic groundwater cleanup goal (15 µg/L) is presented in Table 2-8.	The protectiveness statement for Site 6 in the Executive Summary and in Section 2.1.7 was revised as shown below to add the recommended remediation goal (RG) for arsenic: ***"****In order to be protective in the long term, ~~it is recommended to revise~~ the construction worker groundwater RG ~~selected in the ROD/Final RAP~~ for arsenic* ***will be revised to 15 µg/L.****"* A reference to Table 2-8 was not added to the protectiveness determination for Site 6 to be consistent with protectiveness determinations for other sites.
2	Langan/TIDA Comment 2	Site 12	**Section 2.2.4.2, Site Inspection, page 48**. It is noted that "missing bolts or damaged well boxes were noted in some of the monitoring wells." Note which actions were taken to ensure that these issues were addressed and fixed or refer to the report in which a description of these actions may be found.	The second paragraph of Section 2.2.4.2 was revised as shown below to indicate the actions Navy took to fix the collapsed fencing at Site 12. Please note the damaged well box identified in the site inspection was located within a solid waste disposal area, which is not subject to this Five-Year Review; thus, text related to damaged well boxes at Site 12 was removed from the text. "*Observations made during the site inspection indicated that the monitoring network and security measures were in place. Missing bolts ~~or damaged well boxes~~ were noted in some of the monitoring wells.* ***In addition, partially collapsed fencing was observed during the site inspection at the central portion of the radiologically controlled area along the western boundary of Site 12 SWDA Westside; the fencing was repaired by the DON in fall 2019. Well bolts were replaced by the Navy.*** *No issues concerning the protectiveness of the remedies were noted."*
3	Langan/TIDA Comment 3	Site 12	**Figures 2-14 and 2-15, Site 12 TPH and Metals Results in the Gateview Arsenic/TPH Area**. Per the Draft 2018 Annual Basewide Monitoring Report Installation Restoration Program Sites 6, 12, 21, and 24, groundwater samples were collected from groundwater monitoring wells located in the Gateview Arsenic/TPH area in October and December 2018. Analytical results for these sampling events do not appear to be included on these figures. Please address this discrepancy and/or include this analytical data on these figures.	Figures 2-14 and 2-15 were revised to show total petroleum hydrocarbons (TPH) and arsenic data for all 13 wells within the Gateview Arsenic/TPH Area from March 2014 through December 2018. The notes on Figure 2-14 were revised because no RG for total TPH (TTPH) in groundwater was established in the Record of Decision/Final Remedial Action Plan (ROD/Final RAP) for Site 12.
4	Langan/TIDA Comment 4	Site 12	**Section 2.2.2.4, Selected Remedy, page 46**. The third sentence of the third paragraph of this section states that TPH is not a CERCLA COC. As a result, the numeric values provided for soil are not remediation goals for Site 12. Please provide a source or reference to document or report which provides/presents the numerical values used to address TPH at the Gateview Arsenic/TPH area at Site 12.	A reference to the Site 12 ROD/Final RAP was added to the end of the subject third sentence of the third paragraph in Section 2.2.2.4: "*Because TPH is not a CERCLA COC, the numeric values provided for soil are not remediation goals for Site 12* ***(DON, 2017)***."*
5	Langan/TIDA Comment 5	Site 12	**Figure 2-15, Site 12 Metals Results in Gateview Arsenic/TPH Area**. This figure presents detected concentrations of barium, iron and manganese in groundwater monitoring wells at the Gateview Arsenic/TPH area. A discussion of the monitoring of these constituents, and their associated screening level exceedances, should be included in the Site 12 specific review section.	Figure 2-15 was revised to remove concentrations of barium, iron, and manganese as these metals were not identified as contaminants of concern (COCs) for groundwater at Site 12. In addition, Note 3 of Figure 2-15 was replaced in its entirety with the following: *"****Arsenic is the only COC for groundwater. The project screening level is the remediation goal identified for arsenic in the Record of Decision signed by the Navy and the State in March 2017. The remediation goal is based on the California Toxics Rule.****"*
6	Langan/TIDA Comment 6	Site 21	**Table 2-16, Site 21 Risk-Based Concentrations and RGs for Groundwater, page 63**. This table presents the groundwater RGs for Site 21. A table presenting the site-specific risk-based screening levels established for soil gas, as presented in *the Final HHRA Addendum, Site 21* (Shaw, 2012), should be included in this section.	A new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default attenuation factor (AF) of 0.03.

Responses to Regulatory Agency Comments on the "Draft Second Five-Year Review, Former Naval Station Treasure Island, San Francisco, California," dated September 13, 2019

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Number	Commenter	Site	Comment	Response
7	Langan/TIDA Comment 7	Site 21	**Section 2.3.4.1, Data Review, page 66**. The last paragraph of this section states that Table 2-20 shows the soil gas concentrations measured at all five of the monitoring locations. Table 2-20 only shows the Mann-Kendall trends in soil gas at the five monitoring locations. This table should be updated to present recent soil gas concentrations at the Site 21 monitoring locations.	The fourth paragraph of Section 2.3.4.1 was revised to refer to the Site 21 soil gas analytical results presented in Table D-7 in Appendix D: *"~~Table 2-20~~ **Table D-7** and **Figure 2-20** ~~Figure 2-19~~ show the soil gas concentrations measured at all five of the monitoring locations. Note that chloroform is not a COC **for commercial/industrial workers** at Site 21 but is listed in **Table 2-21** ~~Table 2-20~~ because it was detected at levels exceeding the **soil gas site-specific risk-based screening level (**SSSL**)**~~; detected chloroform concentrations~~ **but** ~~are~~ within the risk management range of 10^{-4} to 10^{-6}. Concentrations of **PCE and** TCE ~~and PCE~~ measured in soil gas ~~indicate~~ **suggest no trend or** ~~slightly~~ increasing trends for locations inside Building 3 and stable**, probably increasing, or no** trends for exterior locations above the plume of VOCs in groundwater. **Table 2-21** ~~Table 2-20~~ illustrates the Mann-Kendall trends **estimated for** ~~in~~ soil gas concentrations at Site 21 **(NOREAS, 2019b)**."*
8	Langan/TIDA Comment 8	Site 21	**Table 2-22, Technical Evaluation – Question B (Site 21), page 69**. This table notes, in the "Changes in Toxicity and Other Contaminant Characteristics" and "Changes in Risk Assessment Methods" rows, that toxicity criteria for chlorinated VOCs in soil gas (e.g. PCE) have recently been updated. As a result, screening levels for "cis- and trans-1,2-DCE would be reduced" and there would be a "small reduction in screening levels based on revisions for the toxicity criteria for PCE". Given these changes, a table (similar to Table 2-23, Site 21 Groundwater Cleanup Goals) should be prepared to compare established Site 21 site-specific screening levels for primary COCs in sub-slab and subsurface soil gas with updated regulatory criteria.	A new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default AF of 0.03.
9	Langan/TIDA Comment 9	Site 21	**Section 2.3.7, Site 21 Protectiveness Statement, page 70**. A discussion of the comparison between the established cleanup goals for groundwater and soil gas and the updated regulatory criteria (as presented Table 2-23 and the requested additional table for soil gas, see comment above) should be included in this section.	A discussion of the changes in toxicity and updated screening levels was added to Table 2-23 (formerly Table 2-22) for groundwater remediation goals (RGs) and soil gas screening levels. In addition, a new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default AF of 0.03.
10	Langan/TIDA Comment 10	Executive Summary	**Executive Summary, ES-1**. The second sentence in the fourth paragraph should be revised as follows: "New and revised data that became available after **31 December** 2018 are not included in this Second Five-Year Review ~~are not included in this Five-Year Review~~."	The first two sentences of the fourth paragraph of the Executive Summary were deleted. Statements about data reviewed in the second Five-Year Review are included in the site-specific Five-Year Review sections.
11	Langan/TIDA Comment 11	Section 1.0	**Section 1.0, Introduction, page 1**. In the sixth paragraph, remove the period at the beginning of the paragraph.	The extra period at the beginning of the sixth paragraph of Section 1.0 was removed.
12	Langan/TIDA Comment 12	Site 6	**Figure 2-4, Site 6, Area Requiring Institutional Control**. Please change the color or adjust the shading of the "Partial Site ICs" and the "Existing Buildings" in the legend. These current colors are too similar such that it is difficult to distinguish between these two areas.	Figure 2-4 was revised to adjust the coloring used to shade the "Partial Site Institutional Controls (ICs)."

Responses to Regulatory Agency Comments on the "Draft Second Five-Year Review, Former Naval Station Treasure Island, San Francisco, California," dated September 13, 2019

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Number	Commenter	Site	Comment	Response
13	Langan/TIDA Comment 13	Site 6	**Figure 2-7, Site 6 Groundwater Results**. Please revise this figure to show historical concentrations of COCs MCPP and 1,1,2-TCA.	There were no detections of methylchlorophenoxypropionic acid (MCPP) or 1,1,2-trichloroethane (1,1,2-TCA) in the Five-Year Review period from 2014 through 2018. The asterisk in the legend of Figure 2-7 addressing MCPP and 1,1,2-TCA was revised for clarification as follows: *"1,1,2-**TCA** ~~trichloroethane, benzene, ethylbenzene, naphthalene,~~ and MCPP were below their method detection limits for all ~~events.~~ **wells from 2014 through 2018. Naphthalene was below its method detection limit in well 06-MW26 from 2014 through 2018. Naphthalene, ethylbenzene, and benzene were below their method detection limits from 2016 through 2018 in wells 06-MW30 through 06-MW36.**"* Additionally, Figure 2-7 was revised to: • Remove the highlighting for ethylbenzene for the March 2014 sampling event for monitoring well 06-MW25 (the RG for this source area well is 1,393 microgram per liter [µg/L]) • Show the ethylbenzene results for the September and November 2016 sampling events for monitoring well 06-MW26 • Add the project screening levels for ethylbenzene of 540 µg/L for Subarea 1 and 1,393 µg/L for the Source Area.
14	Langan/TIDA Comment 14	Appendix D, Site 6	**Appendix D, Tables D-1 through D-2**. The site from which these samples were collected is not identified on these tables. Please indicate to the site-specific information on these tables.	"**Site 6**" was added to the titles of Tables D-1, D-2, and D-3 in Appendix D.
15	Langan/TIDA Comment 15	Appendix D, Site 21	**Appendix D, Tables**. Please include a summary table with historical groundwater monitoring data for Site 21.	A new table, Table D-8: Site 21 Groundwater Analytical Results, was added to Appendix D to present groundwater data collected at Site 21 between 2014 through 2016, prior to well decommissioning activities at Site 21.
16	Langan/TIDA Comment 16	Appendix D, Editorial	**Appendix D, Tables**. On all the Appendix D tables, include an explanation in the notes to clarify the meaning of the dashes ("--").	The definition for dashes "--" was added to tables where "--" was present in table but not defined in the notes. The definition for "--" was added as "not analyzed."
17	CDPH Comment 1	All Sites	The Environmental Management Branch has no further comment on, "Treasure Island Draft Second Five-Year Review, former Naval Station Treasure Island, San Francisco, CA." issued September 13, 2019.	Thank you for your review and "no further comment" statement.
18	Regional Water Board Comment 1	Editorial	Numerous typographical and grammatical errors were present in the report. Please revise the document to address these errors.	Document will be fully reviewed thoroughly for typographical and grammatical errors prior to finalization.
19	Regional Water Board Comment 2	Sites 21 and 24	The screening levels for Trichloroethylene (TCE) in indoor air have changed. Based on the Regional Water Board's 2019 Environmental Screeing [sic] Levels (ESLs)[1], TCE concentrations for indoor air are 3 µg/m^3 for protection against cancer and 8.8 µg/m^3 to protect against non-cancer effects for commercial users. However, there are immediate reponse [sic] action levels for indoor air to address the short-term effects TCE has to unborn children. An accelerated action level of 8 µg/m^3 for commerical [sic] users within an 8 hr work day requires regulator response to protecting sensitive and vulnerable populations. The remedies for Naval Station Treasure Island sites where TCE is a contaminant of concern (COC) should be evaluated to determine whether they are protective of future residents/occupants and current commerical [sic] users, given concerns about the short-term exposure risk associated with TCE. ([1] Regional Water Board, 2019. User's Guide: Derivation and Application of Environmental Screening Levels – Interim Final. California Environmental Protection Agency, Regional Water Quality Control Board, San Francisco Bay Region.)	The following paragraph was added as the last paragraph of Section 2.3.4.1: *"**An indoor air evaluation was completed by TIDA, the current landowner at Building 3, in 2019 (Langan 2019c). That evaluation included a building survey, indoor and ambient air sampling, and sub-slab soil vapor sampling. The building survey was a visual inspection of the eastern corner of Building 3 (including the non-enclosure area) to identify potential preferential pathways for vapor migration, such as cracks or penetrations through the slab, and to identify potential sources of indoor air contaminants. The building survey identified small holes in the main room of Building 3 and noted that the area was vacant. Four indoor air samples, one duplicate indoor air sample, and two ambient air samples were collected outside the Site 21 boundary representing upwind and downwind conditions. Three sub-slab soil vapor samples and one duplicate sub-slab soil vapor sample were collected. Sample results were compared with the most conservative (lowest concentration) commercial land use screening criteria from the Regional Water Board (January 2019); the DTSC screening levels in HERO HHRA Note 3 (April 2019); or the USEPA RSLs (May 2019). Results for indoor air indicate that PCE was not detected above its screening criterion of 0.47 µg/m^3 and TCE was not detected above its laboratory reporting limit of 0.0537 µg/m^3.***"

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Number	Commenter	Site	Comment	Response
				Results for indoor air also indicated that benzene, ethylbenzene, naphthalene, and carbon tetrachloride were detected above their screening criteria. However, benzene, ethylbenzene, and naphthalene were not detected in sub-slab soil vapor suggesting that the indoor air concentrations are a result of an aboveground source rather than vapor intrusion from the subsurface. Carbon tetrachloride concentrations in indoor air closely matched the concentrations in ambient air suggesting that indoor air concentrations are related to ambient conditions rather than vapor intrusion from the subsurface. Results for sub-slab soil vapor indicate PCE was detected above its screening criterion of 67 µg/m^3 in the four sub-slab samples (including the duplicate sample); TCE was detected above its screening criterion of 100 µg/m^3 in two of the four sub-slab samples; and chloroform was detected above its screening criterion of 18 µg/m3 in one of the four sub-slab samples (Langan 2019c)." Section 2.4.4.7, Site Inspection, was renumbered to Section 2.4.4.8 and a new Section 2.4.4.7, Indoor Air Evaluation, was added for Site 24 as follows: ***"An indoor air evaluation was completed by TIDA, the current landowner, at Site 24 in 2019 (Langan 2019d). The indoor air sampling was conducted at Buildings 96, 99, 260, and 455. These buildings are currently occupied or are anticipated to be occupied, with the exception of Buildings 99 and 455 that are not in use. The evaluation included building surveys and indoor air and ambient air sampling. The building surveys were visual inspections to identify potential preferential pathways for vapor migration, such as cracks or penetrations through the slabs, and to identify potential sources of indoor air contaminants. Eight indoor air samples, one duplicate indoor air sample, and two ambient air samples from within the Site 24 boundary representing upwind and downwind conditions were collected. Sample results were compared with the current Regional Water Board commercial/industrial land use environmental screening levels (January 2019). The only VOCs detected in indoor air at concentrations greater than their screening levels were carbon tetrachloride and naphthalene. Carbon tetrachloride detections ranged from 0.274 to 0.552 µg/m^3 with seven of the eight exceeding the screening criterion of 0.29 µg/m^3. Carbon tetrachloride was also detected at concentrations ranging from 0.496 to 0.524 µg/m^3 in ambient air, indicating that the indoor air concentrations are not the result of vapor intrusion. Naphthalene detections ranging from 0.287 to 0.561 µg/m^3 exceeded the screening criterion of 0.36 µg/m^3 at four of eight locations. Naphthalene was not detected in ambient air samples. The four exceedances of naphthalene only slightly exceed the screening criterion indicating potential risk at the lower end of the risk management range. The naphthalene exceedances were detected in samples collected from Buildings 99 and 260, both of which are currently used for storage or are unoccupied. None of the VOCs commonly associated with dry cleaning solvents were detected at concentrations exceeding their respective commercial/industrial screening criteria. The indoor air sampling report concluded that there was no immediate unacceptable risk to occupants at Buildings 96, 99, 260, or 455 under the current or anticipated near-future commercial occupancy scenario (Langan, 2019d).***"

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Number	Commenter	Site	Comment	Response
20	Regional Water Board Comment 3	Sites 21 and 24	The default attenuation factor has been revised to 0.03. This Attenuation Factor (AF) is the measure of reduction between the gaseous transport of contamination from subsurface to indoor air. Beginning with the 2019 ESLs, an alternative approach is used based on the generic AFs developed from the US Environmental Protection Agency (USEPA) Empirical VI Database and recommended by USEPA. The AFs are: a. Subslab Soil Gas and Deep/Exterior AF (AFSG) – 0.03 b. Groundwater AF (AFGW) – 0.001 These AFs apply to all buildings, residential and commerical [sic]/ industrial, current and future (see footnote 1 for reference). The remedies at Naval Station Treasure Island sites where soil gas is an impacted media for Volatile Organic Compounds such as Tetrachloroethene (PCE), TCE, cis and trans 1,2-dichloroethene (1,2-DCE), and Vinyl Chloride should be evaulated [sic] to determine whether occupants/tenants are protected from exposure via a vapor intrusion pathway.	The boundaries of the three Areas Requiring Institutional Controls (ARICs) at Site 24 were guided based on the revised default AFs set by the United States Environmental Protection Agency (USEPA) and San Francisco Bay Regional Water Quality Control Board (Regional Water Board). Additional soil gas sampling will be conducted at Site 24 by the Navy to continue delineating soil gas concentrations and confirm the ARIC boundaries. As noted in the Navy's response to Regional Water Board Comment #2, the indoor air evaluation completed for Site 21 was added to Section 2.3.4.1 and the indoor air evaluation completed for Site 24 was added to new Section 2.4.4.7. A new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default AF of 0.03. Similarly, Table 2-33 (formerly Table 2-31) presents the Site 24 soil gas cleanup goals established in the 2015 ROD/Final RAP and current screening criteria using the revised default AF of 0.03.
21	Regional Water Board Comment 4	Executive Summary	**Executive Summary, Paragraph 4** – The five-year review process consists of document reviews, which includes review of human health risk assessments (HHRA) and ecological risk assessments (ERA). Provide a reference list of the risk assessments used for the evaluation of protectiveness in the 5-year review into Section 3.0.	The risk assessments for these sites were originally presented in the remedial investigation (RI) reports and a basewide screening-level ecological risk assessment (SLERA) for the sites listed below. In addition, a human health risk assessment (HHRA) addendum was prepared for Site 21 after the RI was completed to incorporate soil gas data that was not previously available. All relevant documents were reviewed in the Five-Year Review to understand the origins of the RGs and an evaluation was presented in Question B for each site. Citations for each of these documents are presented by site in the reference list (Section 3.0). Site 6: ERRG, 2012. Final Remedial Investigation/Feasibility Study Report for Installation Restoration Site 6, Former Fire Training School, Naval Station Treasure Island, San Francisco, California. October. Site 12: TriEco-Tt, 2012. Final Remedial Investigation Report for Installation Restoration Site 12, Naval Station Treasure Island, San Francisco, California. June. Site 21: SulTech, 2007b. Final Site 21 Remedial Investigation Report, Naval Station Treasure Island, San Francisco, California. February. Shaw, 2012. Final Human Health Risk Assessment Addendum, Installation Restoration Site 21, Naval Station Treasure Island, San Francisco, California. November. Site 24: SulTech, 2008. Final Remedial Investigation and Focused Feasibility Study Report for Installation Restoration Site 24, Former Dry Cleaning Facility, Naval Station Treasure Island, San Francisco, California. July 3. Site 27: Tetra Tech EM Inc., 2001. Final Remedial Investigation Offshore Sediments Operable Unit, Naval Station Treasure Island, San Francisco, California. December 28. Tetra Tech EM Inc., 2010. Final Feasibility Study, Site 27, Clipper Cove Skeet Range, Naval Station Treasure Island, San Francisco, California. August 13. Site 30: SulTech, 2006. Final Remedial Investigation Report, Installation Restoration Program Site 30, Daycare Center, Naval Station Treasure Island, San Francisco, California. February. In addition, a basewide SLERA was conducted for onshore sites: SulTech, 2007a. Final Screening-Level Ecological Risk Assessment for Sites 6, 12, 21, 24, 30, 31, 32, and 33, Naval Station Treasure Island, San Francisco, California. March 23.

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Number	Commenter	Site	Comment	Response
22	Regional Water Board Comment 5	Section 1.0	**Section 1.2.4.1, Rising Sea Levels** –The Navy has referenced three future scenarios for sea level rise and determined a contingency to account for up to a 3-foot increase in sea level to provide a reasonable level of protection. Clarify whether storm surge has been accounted for in the sea level rise scenarios proposed by the Navy.	According to the document Rising Seas in California (California Ocean Projection Council Science Advisory Team Working Group, 2017), storm surges will produce significantly higher water levels than sea-level rise alone and greater risks to coastal development. It is noted that while storm surges along the coast of California are considerably less than severe hurricanes and nor'easters, a surge during a major winter storm can reach as much as 3 feet above predicted sea levels. However, according to the State of California Sea-Level Rise Guidance 2018 Update (California Natural Resources Agency and California Ocean Protection Council, 2018), acute increases in water levels associated with El Nino events, king tides, storm surges or large waves are not included in the projections for the height of sea-level rise over various timescales of representative concentration pathways 2.6 and 8.5.
23	Regional Water Board Comment 6	Site 6	**Section 2.1.1, Site Description and Background** – Clarify which subarea contains Underground Storage Tank (UST) 248A through 248D area and Aboveground Storage Tank (AST) 248. Please review and revise the text to correctly state the location of the USTs and AST.	The second bullet in Section 2.1.1 was revised to the following: *"Subarea 2 consists of the eastern portion of the site**, including the UST/Aboveground Storage Tank (AST) 248 Area**."*
24	Regional Water Board Comment 7	Site 6	**Table 2-2: RGs for Site 6** – The total petroleum hydrocarbons (TPH) aquatic receptor numbers for San Francisco Bay is 1,400 µg/L as referenced in the December 2014 Final Record of Decision/Remedial Action Plan (ROD/RAP) for Site 6. Our 2019 Environmental Screening Levels (ESLs) employ a groundwater to surface water criterion of 640 µg/L TPH-d for diesel-range hydrocarbons. The same criterion is employed for identify metabolite impact, which are measured as the sum of TPH-d and TPH-mo. We recommend using the 640 µg/L criterion to determine impact to the Bay.	The Navy added a new table, Table 2-9: Site 6 Surface Water Cleanup Goals, in the Five-Year Review report showing surface water goals selected in the ROD/Final RAP for Site 6 and current criteria, including the current criterion of 640 µg/L for TPH-diesel in surface water. Please note, pursuant to the RACR for Site 6, residual petroleum contamination will be addressed in the petroleum program. No issues or recommendations are identified for residual petroleum since it was not considered in the protectiveness determination for Site 6.
25	Regional Water Board Comment 8	Site 6	**Section 2.1.6, Site 6 Issues, Recommendations, and Follow-up Actions** – Water Board staff agree that continued investigations into the nature and extent of Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA), and evaluations into potential future exposures, is needed. The California State Water Resources Control Board has implemented a plan to investigate Per- and polyfluoroalkyl substances (PFAS) in three phases for groundwater at sites where releases could have occurred. Phase I included recent issuance of California Water Code, Section 13267 Order to over 30 airports where aqueous film forming foam (AFFF) was believed to have been used, and to more than 250 landfills that were believed to have accepted materials that contain PFAS. Phases II and III will include issuing orders to additional facilities where PFAS and PFAS-containing products were used and manufactured. PFOS and PFOA were detected in concentrations greater than the State of California notification levels (0.014 and 0.013 µg/L). Sites at Treasure Island could meet the decriptions [sic] of those the State Water Board has identified for investigation. And, should federal and/or state regulatory levels, such as drinking water standards be promulgated for PFAS, additional investigation at Treasure Island could be warranted.	The Navy will conduct a basewide preliminary assessment (PA) in 2020 for the emerging contaminants per- and polyfluoroalkyl substances (PFAS) at Treasure Island (TI). In order to expedite the remedial investigation (RI) at Site 6, the Navy resumed groundwater monitoring of the existing well network at Site 6 for PFAS and will begin delineating the PFAS plume at Site 6 in Summer 2020. The RI will investigate the nature and extent of PFAS at Site 6 and will evaluate the risk to human health and ecological receptors. CERCLA documentation, with cleanup as needed, will consider the appropriate environmental screening levels (ESLs) as issued by the Regional Water Board in May 2020.

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Number	Commenter	Site	Comment	Response
26	Regional Water Board Comment 9	Site 6	**Section 2.1.7, Site 6 Protectiveness Statement** – The Navy has indicated that there is no current exposure to PFOS and PFOA. I disagree with the Navy's protectiveness statement. The available data presented by the Navy indicates that a complete pathway of exposure exists for groundwater discharge into the Bay as well as exposure risk to aquatic/ecological receptors. Since there is a complete exposure pathway from contaminated groundwater to ecological receptors. We recommend that the Navy conduct a screessing [sic] level ecological risk assessment for PFAS compounds detected at Site 6. While it is understood that groundwater at Treasure Island carries an exemption to drinking water, PFOS and PFOA are discharging into the Bay.	The protectiveness statement for Site 6 was revised in the Executive Summary and Section 2.1.7 as follows: **Site(s):** Site 6 | **Protectiveness Determination:** Protectiveness Deferred ~~in the short-term~~ **Protectiveness Statement:** ~~The remedy at Site 6 is protective in the short-term of human health and the environment because no current exposure is occurring.~~ A protectiveness determination of the remedy for Site 6 cannot be made until the nature and extent of emerging contaminants, PFAS (specifically PFOA and PFOS), detected in groundwater at Site 6 after the ROD/Final RAP was signed, has been investigated in an RI, including an evaluation of risks to human health and ecological receptors, and any necessary response is implemented. The review of the remedy selected in the ROD/Final RAP indicates that RAOs have been met, the excavation and soil gas sampling for naphthalene are complete, the LUC RD has been finalized, and ICs are in place to prevent exposures to COCs in soil and groundwater. Annual inspections of the ICs will begin ~~initiated~~ in 2020 to ensure ~~that~~ the remedy will continue to be protective in the long-term. However, the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) and current toxicity criteria contained in DTSC screening ~~criteria~~ values ~~result in a lower concentration of arsenic in groundwater protective of the construction worker exposure and~~ indicate that the RG for arsenic in groundwater identified in the ROD/Final RAP is not protective of construction worker exposure. In order to be protective in the long-term, ~~it is recommended to revise~~ the construction worker groundwater RG ~~selected in the ROD/Final RAP~~ for arsenic will be revised to 15 µg/L. ~~The ROD/Final RAP selected ICs as the remedy to address construction worker exposure to groundwater. Therefore, revising the RG for construction worker exposure to arsenic in groundwater is necessary to ensure that when the ICs are removed, concentrations are at protective levels. In addition, PFOA and PFOS, emerging contaminants not yet listed as CERCLA hazardous substances, were detected in all Site 6 wells sampled in May and December 2017. There is no current exposure to PFOA or PFOS. Investigations into the nature and extent of PFOA and PFOS and evaluations of potential future exposure to PFOA and PFOS will continue.~~
27	Regional Water Board Comment 10	Site 6	**Figure 2-4, Area Requiring Institutional Control** – Revise the color shades in the legend for the Partial Site ICs and Building (Existing). The shades used for this figure are too close together to differentiate the two features of the legend.	Figure 2-4 was revised to adjust the coloring used to shade the "Partial Site ICs."
28	Regional Water Board Comment 11	Site 6	**Figure 2-8, PFOA and PFOA Sample Results** – Revise Figure 2-8 to include the 2017 sampling results for Perfluorobutane Sulfonic Acid (PFBS).	Figure 2-8 was revised to present the 2017 results for perfluorobutane sulfonic acid (PFBS) samples. In addition, the California Notification Levels referenced in the figure were updated per information provided in DTSC HERO Comment #1.
29	Regional Water Board Comment 12	Site 12	**Section 2.2.6, Site 12 Issues, Recommendations, and Follow-up Actions** – Based on the *Draft 2018 Annual Basewide Monitoring Report*, dissolved arsenic levels are not decreasing. In some cases it appears to be increasing exceeding the project screening level of 36 µg/L. Therefore, the remedy is not protective of Marine Ecological receptors.	The Draft 2018 Annual Basewide Monitoring Report estimated a stable trend for arsenic at two monitoring wells (12-MW05 and 12-MW34) and an increasing trend for arsenic at one monitoring well (12-MW23). Arsenic was identified as exceeding the remediation goal of 36 microgram per liter (µg/L) in wells 12-MW05 and 12-MW23. However, arsenic was not detected above the reporting limit at four shoreline wells (12-MW34 through 12-MW37) in December 2018 indicating that arsenic is not discharging to the Bay at concentrations above 36 µg/L. The monitoring wells were also sampled in October 2018 but had elevated reporting limits above the screening level. At this time, the remedy is functioning as intended, the remediation goal has not changed, and no other information has come to light that calls into question the protectiveness of the remedy. The Navy will continue to monitor the groundwater in this area of Site 12 to evaluate the effectiveness of the remedy and to determine when the remediation goals are met. Therefore, the protectiveness determination made for Site 12 groundwater is appropriate.

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td></td><td>The bulleted list in Section 2.2.2.4 was revised to identify the monitored natural attenuation (MNA) component of the remedy:

"The remedy for groundwater at the Gateview Arsenic/TPH Area included:

• Excavate petroleum in soil, add ORM if necessary;
• Conduct in situ soil mixing with chemical oxidants, if necessary; <s>and</s>
• Monitor the <u>natural attenuation of arsenic concentrations in</u> groundwater to confirm the reduction of arsenic concentrations."

The following was added as the last sentence in the Demonstration of Completion column of Table 2-12 (formerly Table 2-11):

"<u>The DON will develop a Monitored Natural Attenuation Plan that describes the details of this component of the groundwater remedy.</u>"

The following row was added to Section 2.2.6:

<table>
<tr><th rowspan="2">Issue</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Due to recent changes in state toxicity criteria for arsenic, it cannot be determined at this time whether there may be an unacceptable risk to construction workers via dermal contact with groundwater.</td><td>No</td><td>Yes</td><td>Reevaluate potential risk to construction workers from dermal contact with groundwater to determine if the remedy remains protective. An ambient concentration of arsenic of 15 µg/L will be used as the screening level because the current DTSC screening criterion of 8.5 µg/L falls below the ambient concentration of arsenic at NAVSTA TI.</td><td>Navy</td><td>DTSC</td><td>May 2021</td></tr>
</table>

In addition, Figure 2-15 was revised to show the location and sampling results for groundwater monitoring wells 12-MW07, 12-MW33, 12-MW35, 12-MW36, 12-MW37, and 12-MW38.</td></tr>
<tr><td>30</td><td>Regional Water Board Comment 13</td><td>Site 12</td><td>Figure 2-15, Metals Results in Gateview Arsenic/TPH Area –

a. Revise the figure to bold and highlight all arsenic values exceeding the project screening level. This figure does not highlight all arsenic exceedance values.

b. Clarify why arsenic is reported as total arsenic. As stated in the ROD, dissolved arsenic is a contaminant of concern. Dissolved arsenic is more mobile and, therefore, a higher risk to aquatic organisms. Provide a revised or additional figure that presents the dissolved arsenic concentrations.</td><td>Figure 2-15 was revised to replace total arsenic results with dissolved arsenic results and to highlight dissolved concentrations of arsenic that exceed the RG.</td></tr>
</table>

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Number	Commenter	Site	Comment	Response
31	Regional Water Board Comment 14	Site 12	**Section 2.3.1.1, Land and Resource Use** – Former land use for this site included building 111, an old firehouse. Clarify whether PFOS and PFOA products were used at this site.	As noted in the Navy's response to Regional Water Board Comment #8, the Navy will conduct a basewide PA in 2020 for PFAS at TI. Any areas identified as potentially using or storing PFAS at TI will be evaluated.
32	Regional Water Board Comment 15	Site 21	**Section 2.3.2.1, Basis for Taking Action** – a. Provide clarification of the source and driver of contamination at Site 21. For example, is groundwater driving contamination to soil gas, or is a soil source contributing to soil gas contamination? b. Explain how the Navy determined that benthic organisms were not affected by groundwater discharge to the Bay. Provide a data reference to groundwater data to demonstrate that contamination in groundwater is not discharging to the Bay.	a. In the 2007 Site 21 RI, spills and leaks were identified as the primary release mechanism into soil that then infiltrated into groundwater. However, the RI concluded that there were no significant concentrations of volatile organic compounds (VOC), semivolatile organic compounds (SVOC), or TPH in the soil. VOC contamination in groundwater was the basis for action at Site 21 and is the source of the VOCs in soil gas. The first two paragraphs of Section 2.3.2.1 were deleted and replaced with the following text: *"**Investigations of the contamination at Site 21, including the 2007 RI, identified a risk to future commercial/industrial workers through inhalation of VOCs that migrate from groundwater into indoor air, and a risk to future construction workers from dermal contact with, and inhalation of, VOCs in groundwater in a construction trench.**"* In addition, the third paragraph of Section 2.3.2.1 was deleted because it is already contained in the description for "Soil Gas Investigation and Risk Assessment Addendum" in Table 2-16 (formerly Table 2-15). b. The Navy determined that benthic organisms were not affected by groundwater discharge to the Bay in a SLERA completed as part of the RI for Site 21. The fourth paragraph of Section 2.3.2.1 describing the SLERA for Site 21 was deleted because protection of off-site aquatic receptors was not a basis for action at Site 21 and because information on the 2007 SLERA was presented in the description of the 2007 RI report in Table 2-16 (formerly Table 2-15). The 2007 RI row of Table 2-16 (formerly Table 2-15) was revised as follows: *"The ~~Final~~ RI presented the analytical results of all investigations completed at Site 21, including the inactive fuel line investigation, the Phase I and Phase II RIs, the EBS investigation, the basewide quarterly groundwater monitoring, and the Site 21 RI itself. Data collected during these investigations **were** ~~was~~ used to evaluate site conditions for the HHRA and the **SL**ERA. The HHRA concluded that VOCs in groundwater were the COCs at Site 21; no soil COCs were identified. The SLERA concluded that the industrial setting and managed habitat on **NAVSTA** TI were inadequate to support healthy terrestrial ecological populations. The SLERA concluded that **COCs** ~~chemical migration~~ in groundwater from Site 21 ~~does~~ not pose an unacceptable risk to benthic invertebrates or other aquatic biota offshore ~~of TI~~ **because the groundwater VOC plume is stable and not migrating off-site**."* The Navy successfully conducted treatability studies on the VOCs in the groundwater and installed a permeable reactive barrier at Site 21 as described in the Navy's response to DTSC Specific Comment #12. These actions demonstrate that VOCs are not migrating off-site.

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<tr>
<td>33</td>
<td>Regional Water Board Comment 16</td>
<td>Site 21</td>
<td>Table 2-20: Site 21 Soil Gas Mann-Kendall Results – Provide a reference to the data used to tabulate the Mann-Kendall Soil Gas Results. It is not clear if current data was used to determine trends of soil gas.</td>
<td>Table 2-21 (formerly Table 2-20) was revised to correct the observed, estimated trends in soil gas concentrations as reported in the 2018 annual basewide monitoring report and a reference to the Draft 2018 soil gas sampling results for Site 21 was added to the paragraph before Table 2-21 (formerly Table 2-20). The table below shows the revisions to Table 2-21.
<table>
<tr><th>Well</th><th>Analyte</th><th><u>Estimated</u> Trend</th></tr>
<tr><td>21-SG-04</td><td><u>Chloroform</u></td><td><u>Stable</u></td></tr>
<tr><td></td><td>PCE</td><td>Stable</td></tr>
<tr><td></td><td>TCE</td><td>No Trend</td></tr>
<tr><td>21-SG-05</td><td><u>Chloroform</u></td><td><u>No Trend</u></td></tr>
<tr><td></td><td>PCE</td><td><u>No Trend</u>~~Stable~~</td></tr>
<tr><td></td><td>TCE</td><td><u>Probably Increasing</u>~~No Trend~~</td></tr>
<tr><td>21-SG-27</td><td><u>Chloroform</u></td><td><u>Probably Decreasing</u></td></tr>
<tr><td></td><td>PCE</td><td>No Trend</td></tr>
<tr><td></td><td>TCE</td><td><u>No Trend</u>~~Increasing~~</td></tr>
<tr><td>21-SG-30</td><td><u>Chloroform</u></td><td><u>Stable</u></td></tr>
<tr><td></td><td>PCE</td><td><u>No Trend</u>~~Increasing~~</td></tr>
<tr><td></td><td>TCE</td><td><u>No Trend</u>~~Increasing~~</td></tr>
<tr><td>21-SG-31</td><td><u>Chloroform</u></td><td><u>Decreasing</u></td></tr>
<tr><td></td><td>PCE</td><td>Increasing</td></tr>
<tr><td></td><td>TCE</td><td>Increasing</td></tr>
</table>
</td>
</tr>
</table>

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34	Regional Water Board Comment 17	Site 21	**Section 2.3.7, Site 21 Protectiveness Statement** – Regional Water Board staff do not agree with the protectiveness of Site 21. The Land Use Control (LUC) are institutional controls that prohibit residental [sic] use unless appropriate engineering control are implemented that are protective of future residents on site, or unless site conditions are changed such that unacceptable vapor intrusion risks are eliminated. In addition to restricting the use of Site 21, the Site 21 ROD also requires that care be taken if interior alterations are made to the portion of Building 3 where VOC concentrations remain in the sub-slab soil gas so that the space is not enclosed in such a way that indoor air VOCs may accumulate to unacceptable concentrations for commerical [sic]/industrial users. There is a potential of exposure for commerical [sic] tenants of Building 3 to COC, the restrictions on this site are not protective of current commercial/industrial users. See comment #2 and #3. Provide the indoor air sampling data that the Navy used to assume protectiveness of current commerical [sic]/industrial users.	The factors considered in making the protectiveness determination for Site 21 are the successful completion of the Land Use Control Remedial Design (LUC RD), annual inspections that monitor changes in land use, the inclusion of restrictions in transfer deed and Covenant to Restrict the Use of Property (CRUP), the California Department of Toxic Substances (DTSC) determination regarding the encroachment on the non-enclosure area, and the Treasure Island Development Authority (TIDA) indoor air evaluation. These factors are described below. The LUC RD contains provisions protective of current commercial/industrial occupants at Site 21. Section 3.0 of the LUC RD required the transfer deed and CRUP to contain a requirement that the property owner notify users of the southeast corner of Building 3 of the risks associated with the soil gas and notify DTSC of improvements to the building that result in the area being fully enclosed (this area is referred to as the "non-enclosure" area since the area cannot be enclosed). These restrictions were contained in the Site 21 transfer deed and CRUP and annual LUC inspections have been ongoing since 2015. The LUC inspection conducted in 2018 identified a potential issue with the non-enclosure area of Building 3. A large portion of Building 3 was partially enclosed, and that partial enclosure encroached on a portion of the non-enclosure area (this is shown on Figure 3 of the 2018 annual LUC inspection report). DTSC was notified of this issue and in March 2018, DTSC concluded that the partial enclosure contained a larger area than the non-enclosure area in Building 3, and thus was in compliance with the CRUP. No changes to the encroachment were identified in the subsequent 2019 annual LUC inspection report. This information is contained in the Five-Year Review report. As noted in the Navy's response to Regional Water Board Comment #2, detail was added as the last paragraph of Section 2.3.4.1 to describe the 2019 indoor air evaluation conducted by Langan at Building 3 in Site 21. The protectiveness statement for Site 21 presented in Section 2.3.7 and the Executive Summary was revised as follows: **Site(s):** Site 21 | **Protectiveness Determination**: Protective **Protectiveness Statement:** The remedy for Site 21 is protective of human health and the environment. RAOs have been met, the LUC RD has been finalized, ICs are in place to prevent exposure to COCs in ~~groundwater and~~ soil gas, ~~and~~ annual ~~IC~~ LUC inspections are occurring, and the recent indoor air evaluation indicates that concentrations of PCE and TCE in indoor air do not exceed indoor air screening levels for current users. However, soil gas concentrations at Site 21 exceed soil gas screening levels and are increasing in select wells. To ensure ongoing protectiveness, soil gas monitoring locations and frequency will be evaluated under the Basewide Monitoring Program. In addition, the legend of Figure 2-18 was revised to define the non-enclosure area as follows: *"Area Requiring Deed Notice for Commercial/Industrial Occupants **(Non-Enclosure Area)**"*
35	Regional Water Board Comment 18	Site 21	**Figure 2-19, Site 21 Soil Gas Results** – Provide a figure with the 2016 groundwater monitoring data to support the assertion that the groundwater plume is stable.	Figure 2-19: Site 21 Groundwater Results was added to show the groundwater data collected between 2014 and 2016. Table D-8: Site 21 Groundwater Analytical Results was also added to Appendix D to show the groundwater data for Site 21.

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Number	Commenter	Site	Comment	Response
36	Regional Water Board Comment 19	Site 27	**Section 2.5.7, Site 27 Protectiveness Statement** – a. The remedy in place includes rock armor to protect aquatic organisms from exposure to lead shot. Maintence [sic] of the remedy includes a survey to determine whether subsidence has impacted the staus [sic] of the armor. Clarify the physical status of the rock armor at Site 27 (i.e. damage to rock, movement or transport of rock, etc.). Explain how the remedy will be maintained to protect aquatic organisms from exposure to lead shot. b. The LUC for Site 27 included Institutional controls to protect the integrity of the protective cap (rock armor) over lead shot remaining at Site 27. Restrictions on disturbing the sediment in place at the site included adminsitrative [sic] mechanisms and specific restrictions to ensure integrity of armor. One such restriction is a no "no wake" zone within the area of armored material. Clarify how these restrictions such as the above are being enforced.	a. The discussion of the physical status of the rock armor was added to the following sections. Section 2.5.4.1, Data Review, was expanded as follows: "*Construction of the remedy at Site 27 was completed in November 2013. The first post-remediation bathymetric survey was conducted in November 2014 to provide a baseline survey for subsequent 5-year monitoring events and was conducted in accordance with the ~~Final~~ RAWP (Tetra Tech EC, Inc., 2013).* ***The RAWP identified the performance objective for the engineered backfill area: if a decrease of more than 0.33 foot over 20 percent of the backfilled area or approximately 20,000 square feet is identified, then measures will be taken to ensure the remedy remains protective. The performance objective is contained in the decision rules in the RAWP (Tetra Tech EC, Inc. 2013).*** *~~The purpose of the bathymetric surveys is to ensure the remedy remains protective in accordance with the document rules in the RAWP and to verify the following:~~* • *~~Whether 2-feet of coverage remains above the sediment containing lead shot if the disturbance is located outside the backfilled area of Site 27~~* • *~~Whether 1.5-feet of coverage remains above sediment if the disturbance is located within the backfilled area of Site 27.~~* *The first post-RA bathymetric survey conducted over the protective armor layer was completed in November 2013 (considered to be the Year 0 survey) (Tetra Tech EC, Inc., 2013). The second in the series, completed in November 2014, was considered to be Year 1 survey (MMEC, 2015). The Year 0 survey provided the baseline against which the Year 1 survey data were compared. The observed settlement is as expected following backfilling activities and the backfilled area is within design elevation tolerance. Additionally, no abnormalities or concerns with adherence to the RA ICs were observed. Because the Year 1 survey is the baseline for all other surveys to be conducted in the future and because there were no issues discovered in the backfill areas, there were no apparent issues to address. The remedy was determined to be stable and remained in compliance with RAOs.* *The Year 5 bathymetric survey was conducted on May 13, 2018 (Langan, 2019). Survey results were compared to the pre-dredge and Year 1 bathymetric surveys to ~~confirm that~~* ***evaluate whether*** *the remedy is within the design elevation tolerance and ~~is~~ still protective of ecological receptors (Figure 2-~~30~~**31** through Figure 2-~~32~~**33**). Comparing the Year 5 results to the pre-dredge bathymetric survey results indicates that the remedy is still within the design elevation tolerance range. Comparing the Year 5 to the Year 1 bathymetric survey results indicates a combination of minor to no sediment surface elevation differences and decreases in sediment surface elevation of greater than 0.26-foot* ***that are uniformly distributed*** *throughout the backfilled area. The areas indicating an elevation decrease of greater than 0.26-foot are limited to the approximate bounds of the backfilled area.* ***[Note that the 0.26-foot comparison value is less than the 0.33-foot performance objective. A comparison with the 0.33-foot performance objective did not show a decrease over 20 percent of the engineered backfilled area, indicating the area is in compliance with the decision rules (Langan, 2020).]*** *Elevation decreases are attributed to the dense backfill material and rock armor layer causing continued settlement* ***of the less dense Bay mud materials beneath the backfilled area****.* ***The uniform distribution of the low-elevation areas and their location within the backfilled area indicate settlement is the likely cause of the surface elevation change. If the apparent thickness of the backfill were decreasing for reasons other than settlement, then similar elevation differences would be expected outside of the***

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>36
(Cont'd)</td><td>Regional Water Board Comment 19 (Cont'd)</td><td>Site 27 (Cont'd)</td><td></td><td>***<u>backfilled area, but none were observed. The gradual settlement of the entire 1.5-foot thick backfill layer is the likely cause of the elevation decreases noted in the Year 5 bathymetric survey. The evaluation of the bathymetric survey did not identify any external causes that could displace the armor layer (such as mooring, anchor dragging, motor scouring, or ship grounding). The filter layer and protective armor layer were both constructed using sand, gravel, and cobbles that settle slightly during and after placement but would not be expected to continue to consolidate over time. The clay and organic material composing the underlying Bay mud would, however, be expected to slowly consolidate beneath the filter and armor layers as water is expelled and organic material decomposes over time. The initial bathymetric survey (Year 1) indicated adequate thicknesses of the filter and armor layers were placed as specified in the remedial design. Although the surface elevation of the backfill layer may be decreasing, the backfill remains protective.</u>***
No decreases in sediment elevation were observed in the area outside the backfilled area, which indicates that the required two feet of coverage remains above the lead-impacted sediment in these areas. The next 5-year bathymetric survey is scheduled for November 2023 (Langan, 2019a)."

In addition, the protectiveness statement for Site 27 has been revised in the Executive Summary and Section 2.5.7 as follows:

<table>
<tr><td>Site(s): Site 27</td><td>Protectiveness Determination: Protective</td></tr>
<tr><td colspan="2">Protectiveness Statement: The remedy for Site 27 is protective of human health and the environment. RAOs have been met, focused dredging is complete, <u>the 1.5-foot thick engineered backfill was installed within 75-feet of the shoreline, is in place, and is functioning as intended to prevent exposure.</u> ~~and t~~There have been no decreases in sediment elevation in the area outside the backfilled area ~~within Site 27~~, indicating that the required two feet of coverage remains in place above the lead-impacted sediment ~~in these areas~~. In addition, the LUC RD has been finalized, <u>the</u> ICs <u>and the SMP</u> are in place to restrict disturbance of the <u>engineered backfill area and the</u> sediment<u>,</u> ~~that was not dredged, which will prevent or minimize re-suspension of lead shot, and~~ annual <u>LUC</u>~~IC~~ inspections are occurring<u>, and bathymetric surveys are being completed every five years</u>.</td></tr>
</table>

The remedy at Site 27 will be maintained by conducting and evaluating bathymetric surveys and implementation of the Site Management Plan developed by TIDA.</td></tr>
</table>

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>36
(Cont'd)</td><td>Regional Water Board Comment 19 (Cont'd)</td><td>Site 27
(Cont'd)</td><td></td><td>b. The "No Wake Zone" and "No Mooring Zone" restrictions are contained in the Site Management Plan developed by TIDA for the protection of the remedy at Site 27. However, signs indicating "No Wake Zone" and "No Mooring Zone," that are required in the Site Management Plan have not been posted. In addition, information indicates that enforcement of these restrictions should be improved. These have been identified as issues for Site 27 and the following text of Section 2.5.6 was replaced in its entirety with the following table:

"<s>No issues have been identified for Site 27 that would affect current or future protectiveness of the remedy. No recommendations or follow-up actions have been identified.</s>"

<table>
<tr><th rowspan="2">Issue</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."</td><td>No</td><td>Yes</td><td>Erect necessary signage and revise the IC compliance checklist to verify the presence of signage and to evaluate the condition of the signage.</td><td>TIDA</td><td>DTSC</td><td>May 2021</td></tr>
<tr><td>Information indicates boats violating "No Wake Zone" speed limit requirements.</td><td>No</td><td>Yes</td><td>Identify specific enforcement provisions for speed limits in a revised Clipper Cove SMP and improve enforcement of speed limits.</td><td>TIDA</td><td>DTSC</td><td>May 2022</td></tr>
</table>
</td></tr>
<tr><td>37</td><td>Regional Water Board Comment 20</td><td>Site 30</td><td>Section 2.6.6, Site 30 Protectiveness Statement – The slab of the building at Site 30 is used as a barrier/remedy/cap from the contamination within soil. Clarify what measures are used to determine effectiveness of the barrier against human exposure.</td><td>Section 2.6.2.5 describes the annual LUC inspections being conducted at Site 30. These annual inspections are visual assessments of the Building 502 foundation and inspections of the associated exterior Site 30 concrete pad.

The paragraph in Section 2.6.2.5 located under the table was revised as follows:

"The DON finalized the LUC RD <s>report</s> in November 2010 (Trevet, 2010). The DON conducted annual LUC inspections at Site 30 <s>starting in</s> <u>from</u> 2011 <s>and have continued</s> through 2018 (Adanta, 2018). <u>TIDA conducted the annual LUC inspection in 2019 (Langan, 2019)</u>. The site inspection<u>s</u> involved a visual assessment of the interior and exterior of Building 502 <s>and the associated exterior concrete pad</s> to <u>identify cracks, holes, penetrations, or removal of the building foundation</u> <s>evaluate whether the building's slab continued to serve as an effective barrier to potential subsuface contamination</s> (Figure 2-36). <u>The site inspections also reviewed Building 502 and the Site 30 concrete pad for unauthorized changes in land use, including utility repairs and removals, and to determine if contaminated soil has been brought to the surface.</u> No violations of the <u>ICs</u> <s>LUCs</s> were identified during any of the site inspections. Findings from those LUC inspections are summarized in Table 2-44."</td></tr>
</table>

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr>
<td>38</td>
<td>DTSC General Comment 1</td>
<td>Site 6</td>
<td>Site 6 – The Five-Year Review notes in Section 2.1.1.1 that future land use at Site 6 may include hiking and walking trails which suggests the potential for terrestrial habitat development. Terrestrial habitat development is also envisioned in the approved development documents which include figures showing open space plans and descriptions referring to "large areas for passive recreation and native habitat." These areas appear to be on or immediately adjacent to Site 6. (See approved development documents at https://sftreasureisland.org/approved-plans-and-documents).

This potential habitat development is acknowledged in Table 2-6. However, based on the information presented in the Five-Year Review, the selected remedy does not address potential terrestrial ecological risk under a future use scenario that includes terrestrial habitat development. The exposure assumptions in the 2007 screening level ecological risk assessment (SLERA), on which the remedy was based, are invalid under the likely future use scenario. The SLERA concluded that no further evaluation was necessary based on the poor quality of habitat at Site 6 under current conditions. The poor habitat quality also drove the receptor selection for the SLERA. That is, the receptors only included urban species adapted to industrial and landscaped habitat, not a range of representative receptors that would likely be present in native habitat in the future. Please revise the Five-Year Review for Site 6 to evaluate the protectiveness of the soil remedy with respect to potential risk to terrestrial receptors likely to be present after the approved redevelopment is implemented.</td>
<td>The ROD/Final RAP documented that construction of habitat for terrestrial receptors does not need a restriction. The IC selected in the ROD/Final RAP requires evaluation of potential risk to aquatic receptors if wetland habitat is constructed. This IC is in place and annual LUC inspections are scheduled to begin in 2020. The site inspection conducted pursuant to the Five-Year Review did not identify any new constructed habitat or wetland and indicated that physical site conditions had not changed in a way that affects the protectiveness of the remedy. This is stated in Table 2-6 in the discussion of changes in exposure pathways. Therefore, the conclusion is appropriate that the remedy for soil at Site 6 is protective of future habitat development. The content of the ecological risk assessment for the future constructed habitat will be determined at the time specific details on the constructed habitat are known and definite. The Navy has identified changes to the underlying assumptions documented in the ROD/Final RAP as an issue to be tracked in the next Five-Year Review to determine if changes to the remedy for ecological receptors are necessary (see table inset below). This issue does not affect the current or future protectiveness of the remedy for Site 6. Please note the protectiveness determination for Site 6 (see Section 2.1.6) was deferred as noted in the Navy's response to Regional Water Board Comment #9.
<table>
<tr><th rowspan="2">Issue</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Habitat development after Site 6 is transferred may be different than contemplated in the SLERA and the ROD/Final RAP.</td><td>No</td><td>No</td><td>Evaluate redevelopment plans in the next Five-Year Review to determine if the underlying assumptions for ecological receptors are still valid.</td><td>DON</td><td>DTSC</td><td>May 2025</td></tr>
</table>
</td>
</tr>
</table>

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>39</td><td>DTSC General Comment 2</td><td>Site 6</td><td>Site 6 – Table 2-6 discusses changes in exposure pathways but does not include the groundwater to surface water pathway for arsenic. Arsenic results in MW-35 in 2017 exceeded the California Toxics Rule value of 36 ug/L (Figure 2-7). Please revise the Five-Year Review to evaluate the groundwater to surface water pathway for Site 6 contaminants detected in perimeter wells.</td><td>Arsenic exceeded 36 µg/L in one Site 6 well (06-MW35) in one sampling event in December 2017. Subsequent concentrations in well 06-MW35 were reported as 25.3 µg/L in March 2018 and 29.5 µg/L in June 2018. Groundwater monitoring for arsenic will resume at Site 6 as noted in Table 2.1.6 (edit shown below).
<table>
<tr><th rowspan="2">Issue</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>~~Use~~ Consideration of newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) and use of current DTSC toxicity criteria results in a lower arsenic concentration ~~of arsenic~~ in groundwater that is acceptable for construction worker exposure, indicating that the RG selected in the ROD/Final RAP is not protective.</td><td>No</td><td>Yes</td><td>Revise the groundwater RG for arsenic that was selected in ROD/Final RAP. The ROD/Final RAP selected ICs as the remedy for construction worker exposure to groundwater. Therefore, revising the groundwater RG and resuming monitoring for arsenic is necessary to ensure that the ICs are enforceable and implemented when, concentrations of arsenic in groundwater are not at protective levels.</td><td>DON</td><td>DTSC</td><td>May 2023 ~~December 2020~~</td></tr>
</table></td></tr>
<tr><td>40</td><td>DTSC General Comment 3</td><td>Site 6</td><td>Site 6 – The Five-Year Review concludes that the monitoring network and security measures are in place, no operation or maintenance issues have been identified, and no maintenance follow-up actions are necessary. However, photograph 15 in Appendix B shows an uncapped former well or similar structure providing a potential conduit for contaminant transport to the subsurface. Please revise the Five-Year Review to completely evaluate and address operation and maintenance issues at each site.</td><td>The two well covers in need of repair at wells MW-31 and MW-26 have been repaired. The uncapped structure was not a well but a sanitary sewer access point. The wastewater treatment plant personnel fabricated a cover and placed it over the opening. The second paragraph of Section 2.1.4.2 was revised to the following:

"Observations made during the site inspection indicated that the remedy~~ies~~: monitoring network and security measures were <u>mostly</u> in place. <u>The site inspection identified an uncapped structure resembling a well (see photograph 15 for Site 6 in Appendix B) and two well covers in need of repair. However, the two well covers in need of repair at wells MW-31 and MW-26 have been repaired and the uncapped structure was not a well but a sanitary sewer access point. The wastewater treatment plant personnel fabricated a cover and placed it over the opening.</u> ~~No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP.~~"</td></tr>
<tr><td>41</td><td>DTSC General Comment 4</td><td>Site 12</td><td>Site 12 – The Five-Year Review focuses on the groundwater remedy in the Gateview Arsenic/Total Petroleum Hydrocarbon (TPH) Area, but the discussion and inspection data provided for Site 12 are much broader potentially confusing the reader. For example:
– Section 2.2.1.1 discusses the Former Storage Yard (Halyburton Court/SWDA Bigelow Court) which is unrelated to the remedy under review.
– Section 2.2.2.1 Basis for Taking Action discusses contamination from debris and does not relate to the arsenic and TPH remedy under review.
– Table 2-9 is titled Previous Groundwater Investigations Summary but describes soil and groundwater investigations well beyond the scope of the remedy under review.</td><td>Section 2.2.1.1 (Former Storage Yard Area (Halyburton Court/SWDA Bigelow Court) was removed in its entirety.

Section 2.2.1.2 (Gateview Arsenic/TPH Area) was renumbered as a result and is now Section 2.2.1.1. Section 2.2.2.1 was revised in its entirety to the following:

"<u>Investigations at Site 12, including the RI in 2012, identified arsenic in groundwater as a COEC for off-site aquatic receptors in the Bay. Naturally occurring concentrations of arsenic were mobilized by the petroleum contamination in the area. The basis for taking action for groundwater is to address the potential risk to off-site aquatic receptors in San Francisco Bay from arsenic-contaminated groundwater.</u> ~~Site 12 was designated as a CERCLA site in 1988 in the Final Preliminary Assessment/Site Inspection report (Dames and~~</td></tr>
</table>

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td></td><td></td><td></td><td>– The inspection checklist for Site 12 in Appendix A includes inspection of the vegetative cover at SWDAs Bayside, Westside, and Northpoint.
– Appendix B site inspection photographs include photographs that appear to be unrelated to the remedy under review.
Please revise the Five-Year Review for Site 12 to clearly focus on the groundwater remedy in the Gateview Arsenic/TPH Area.</td><td><s>Moore, 1988). The site was recommended for an RI based on the potential of soil and groundwater contamination from debris that was previously identified on site and from existing debris that may not have been entirely removed during housing construction.</s>"

Table 2-10 (formerly Table 2-9) was revised to remove the following referenced reports:
• Preliminary Risk Assessment, dated 1992
• EBS, dated 1997-1998

Appendix A, Site Inspection Checklists: The Navy acknowledges that the site inspection included items not pertinent to implementation of the groundwater remedy; however, only those items pertinent to the groundwater remedy were reported in the text of the Five-Year Review. Because the site inspection was completed and items were noted, the site inspection checklists were not revised.

Appendix B, Site Inspection Photographs: Photographs not pertinent to the groundwater remedy at the Gateview Arsenic/TPH Area were removed.</td></tr>
<tr><td>42</td><td>DTSC General Comment 5</td><td>Site 21</td><td>Site 21 – The Five-Year Review for Site 21 is incomplete and incorrect. The Five-Year Review concludes that the remedy is protective, and ICs are in place to prevent exposure to COCs in groundwater and soil gas. However, PCE and TCE concentrations are increasing in soil gas, and soil gas data through December 2018 was not considered in the analysis (Figure 2-19).[1] The data review notes that the concentrations observed in soil gas under Building 3 "continue to slightly exceed the regulatory criteria with a hazard index (HI) greater than 1." Using soil gas data collected in November 2018 and current commercial/industrial risk assessment methods, the non-cancer hazard index for trichloroethylene is 3. Please revise the Five-Year Review to consider all soil gas data collected through 2018, current vapor intrusion risk assessment methods, and current Building 3 configuration and slab condition.

([1] The soil gas data provided in Appendix D were not referenced or interpreted in the Five-Year Review Section 2.3.)</td><td>Figure 2-20 (formerly Figure 2-19) was revised to show soil gas data collected in November 2018 and remove April 2018 data that were incorrectly included on the figure. The April 2018 soil gas data was unable to be used in the Five-Year Review report because the data showed exceedances of the leak check compound indicating that it had been contaminated by ambient air concentrations. The Navy re-collected soil gas samples in June 2018 to replace the data from April 2018.

The fourth paragraph of Section 2.3.4.1 was revised to refer to the Site 21 soil gas analytical results as shown in the Navy's response to Langan/TIDA Comment #7.

Table 2-21 (formerly Table 2-20) was revised to correct the observed, estimated trends in soil gas concentrations (see below). Mann-Kendall analysis for PCE suggests an increasing trend only at well 21-SG-31 (inside Building 3); Mann-Kendall analysis for TCE suggests an increasing trend at 21-SG-31 and a probably increasing trend at 21-SG-05 (outside Building 3). In addition, a note was added to Table 2-21 to indicate the source of the analysis: "Mann-Kendall results are taken from Appendix D of the Draft 2018 Annual Basewide Monitoring Report (NOREAS, 2019b)."
<table>
<tr><th>Well</th><th>Analyte</th><th>Estimated Trend</th></tr>
<tr><td>21-SG-04</td><td>Chloroform</td><td>Stable</td></tr>
<tr><td></td><td>PCE</td><td>Stable</td></tr>
<tr><td></td><td>TCE</td><td>No Trend</td></tr>
<tr><td>21-SG-05</td><td>Chloroform</td><td>No Trend</td></tr>
<tr><td></td><td>PCE</td><td>No Trend<s>Stable</s></td></tr>
<tr><td></td><td>TCE</td><td>Probably Increasing<s>No Trend</s></td></tr>
<tr><td>21-SG-27</td><td>Chloroform</td><td>Probably Decreasing</td></tr>
<tr><td></td><td>PCE</td><td>No Trend</td></tr>
<tr><td></td><td>TCE</td><td>No Trend<s>Increasing</s></td></tr>
<tr><td>21-SG-30</td><td>Chloroform</td><td>Stable</td></tr>
<tr><td></td><td>PCE</td><td>No Trend<s>Increasing</s></td></tr>
<tr><td></td><td>TCE</td><td>No Trend<s>Increasing</s></td></tr>
<tr><td>21-SG-31</td><td>Chloroform</td><td>Decreasing</td></tr>
<tr><td></td><td>PCE</td><td>Increasing</td></tr>
<tr><td></td><td>TCE</td><td>Increasing</td></tr>
</table>
As noted in the Navy's response to Regional Water Board Comment #2, detail was added as the last paragraph of Section 2.3.4.1 to describe the 2019 indoor air evaluation conducted by Langan at Building 3 in Site 21.</td></tr>
</table>

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Number	Commenter	Site	Comment	Response
42 (Cont'd)	DTSC General Comment 5 (Cont'd)	Site 21 (Cont'd)		The Implementation of ICs row in Table 2-22 (formerly Table 2-21) in Section 2.3.5.1 was revised to discuss exposure to commercial/industrial workers inside Building 3 being deemed acceptable based on the size and configuration of Building 3. The remedy prohibits the portion of Building 3 overlying the plume from being fully enclosed (referred to as the non-enclosure area). The 2018 LUC inspection identified a partial encroachment of the non-enclosure area that was determined to be acceptable and in compliance with the CRUP. The 2019 LUC inspection found the configuration had not changed since the 2018 LUC inspection. The revised text in Table 2-22 is shown below: *"Yes. On September 20, 2016, Site 21 was transferred to TIDA. In accordance with the Site 21 CRUP, ICs associated with Site 21 require on-going (annual) inspections ~~and monitoring~~. The DON previously conducted annual **LUC inspections** ~~IC compliance monitoring~~ in 2015, 2016 and 2017. TIDA conducted the annual **LUC inspections** ~~IC compliance inspections~~ in 2018 **and 2019** (Langan, 2018**, 2019b**). **The LUC inspection conducted in 2018 identified a potential issue with the non-enclosure area of Building 3. A large portion of Building 3 was partially enclosed, and that partial enclosure encroached on a portion of the non-enclosure area (this is shown on Figure 3 of the 2018 Annual Institutional and LUC Inspection Report). DTSC was notified of this issue and in March 2018, DTSC concluded that the partial enclosure contained a larger area than the non-enclosure area in Building 3, thus was in compliance with the CRUP. Other** minor non-compliance items were discovered during the annual inspections but were addressed in a timely manner, as detailed in Section 2.3.2.5."* A new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default AF of 0.03.
43	DTSC General Comment 6	Site 24	**Site 24** – The Five-Year Review identifies the need to revise the soil gas remediation goals. During DTSC's review of the Land Use Control Remedial Design (LUC RD), DTSC noted that contaminant concentrations in soil gas are incompletely delineated if soil gas remediation goals are revised using the default attenuation factor and toxicity criteria (see Table 2-31 in the Five Year Review and Figure 4 in the Final LUC RD [July 2019]). Please include this information in Section 2.4.5.3, Table 2.4.6, and Section 2.4.7. Specifically address the protectiveness of the remedy for current commercial industrial use of Site 24 and adjacent parcels.	The information about delineating the soil gas plume based on the current USEPA, DTSC, and Regional Water Board default AFs was not added to Section 2.4.5.3 Question C because Question C is for information not presented in response to Questions A and B. Instead, the information about delineating the soil gas plume based on the current USEPA, DTSC, and Regional Water Board default AFs was identified as an issue and was included in the protectiveness statement. However, Section 2.4.5.3 was revised as follows: *"**No new human health or ecological risks have been identified. No other information has been identified to suggest that the remedies may not be protective of human health and the environment. No weather-related incidents, earthquakes, or other natural disasters have affected the protectiveness of the remedy.** ~~No other information has been identified to suggest that the remedies may not be protective of human health or the environment.~~"*

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>43
(Cont'd)</td><td>DTSC
General
Comment 6
(Cont'd)</td><td>Site 24
(Cont'd)</td><td></td><td>
The table in Section 2.4.6 was revised as shown below to add the issue that the soil gas plume is not fully delineated based on the current USEPA, DTSC, and Regional Water Board default AFs, to recommend the follow-up action for additional soil gas delineation, and to identify a milestone date. The table was expanded to include this new row at the bottom of the table.
<table>
<tr><th rowspan="2">Issues</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Soil gas concentrations are not fully delineated based on the current USEPA, DTSC, and Regional Water Board default attenuation factors.</td><td>No</td><td>Yes</td><td>Perform additional sampling to delineate the soil gas plume.</td><td>DON</td><td>DTSC</td><td>May 2021</td></tr>
</table>
The protectiveness determination for Site 24 (Section 2.4.7) was revised as shown in the following table:
<table>
<tr><td>Site(s): Site 24</td><td>Protectiveness Determination: Protective in the Short-term</td></tr>
<tr><td colspan="2">Protectiveness Statement: The remedy for Site 24 is protective in the short-term of human health and the environment because no ~~current~~ unacceptable exposure is occurring. RAOs have been met, soil excavation and groundwater treatment are complete, and the LUC RD has been finalized with an expanded ARIC. ~~that includes areas where concentrations of COCs in soil gas exceed levels based on current USEPA and Regional Water Board default attenuation factors and the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) Appendix I, Tables A and B. Therefore, exposure to COC concentrations in soil gas is being controlled.~~ In addition, the recent indoor air evaluation concluded that there was no immediate unacceptable risk to current users at Buildings 96 and 260 from VI. However, the current USEPA, DTSC, and Regional Water Board default attenuation factors and the newly promulgated state toxicity criteria contained in Cal. Code Regs. tit. 22 §§ 69021 and 69022(c) (Appendix I, Tables A and B) ~~result in lower concentrations of COCs in soil gas protective of the resident and commercial/industrial worker VI exposures and~~ indicate that the RGs selected in the ROD/Final RAP for cis-1,2-DCE, TCE, and VC in soil gas ~~may~~ are not ~~be~~ protective of VI exposure for the resident and commercial/industrial worker. In order to be protective in the long-term, ~~it is recommended to revise~~ the RGs selected in the ROD/Final RAP will be reevaluated and revised, if necessary, and any potential soil gas plume outside the current ARIC for Site 24 will be delineated. ~~The ROD/Final RAP selected ICs as the remedy to address exposure to residual VI risk remaining after the groundwater treatment was complete and while concentrations of COCs in soil gas attenuate. Therefore, revising the RGs selected in the ROD/Final RAP is necessary to ensure that the ICs are implemented while concentrations of COCs in soil gas are not at protective levels.~~</td></tr>
</table>
</td></tr>
</table>

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>44</td><td>DTSC General Comment 7</td><td>Site 27</td><td>Site 27 – The Five-Year Review inconsistently describes the remedy and does not demonstrate that the remedy remains protective. The implementation status (Table 2-34) erroneously describes the remedy as dredging to 2.5 ft below sediment surface (bss) the entire exposure interval for diving ducks. The remedy implemented was dredging to 1.5 ft bss then placement of backfill including a filter layer and surface armor layer (rock). Because the dredging left lead shot in place between 1.5 ft bss and 2 ft bss within the exposure interval, the remedy must ensure that diving ducks will not forage in this exposure interval. The filter and armor layers were installed to eliminate the lead ingestion pathway for diving ducks.

The Year 5 Bathymetric Survey Monitoring Report (Langan, 2019) identified elevation decreases of greater than 0.26 foot, outside the design tolerance range, in the backfill area. The Five-Year Review and Year 5 Bathymetric Monitoring Report assume that the decrease in elevation beyond the design tolerance is attributable to the dense backfill material and rock armor layer rather than erosion, but no evidence is provided to support that assumption. No information is provided to demonstrate that the filter and armor layers remain intact. Please revise the Five-Year Review to clearly and consistently describe the remedy as constructed, explain if/how the remedy remains protective in the backfill area, and describe any needed changes to the monitoring program to specifically inspect the filter and armor layers.</td><td>Table 2-36 (formerly Table 2-34) was corrected to indicate 1.5-feet of sediment was dredged.

<table><tr><th>RAO</th><th>Demonstration of Completion</th><th>RAO Met? (Yes/No)</th></tr><tr><td>Prevent or minimize ingestion of lead shot by diving ducks within 75-feet of the shoreline, where there is a complete exposure pathway under current conditions</td><td>Focused dredging within 75-feet of the shoreline removed lead shot within the top 1.5 ~~2.5~~ feet of sediment where diving ducks could be exposed. Backfill will prevent exposure to lead shot that may be buried deeper than 1.5 ~~2.5~~ feet beneath the sediment surface.</td><td>Yes</td></tr></table>
The following was added as the last sentence of the first paragraph after Table 2-36 (formerly Table 2-34) to describe the protective armor layers:

"<u>After dredging was complete, engineered backfill was installed by placing 7,190 tons of sand followed by placing 8,519 tons of protective rock.</u>"

Please see the Navy's response to Regional Water Board Comment #19 for changes to Section 2.5.4.1 and Section 2.5.6.</td></tr>
<tr><td>45</td><td>DTSC General Comment 8</td><td>NA</td><td>DTSC did not perform an editorial review of the document. Nevertheless, we observed multiple editorial errors and incomplete inspection records during our review. For example, in the Executive Summary (fourth paragraph, second sentence) text is repeated. The tables in Appendix D are generally not referenced or discussed in the main text. Some of the figures are not referenced or discussed (see Section 2.4, for example). In Appendix A, the inspection checklists for Site 6, Site 12, and Site 21 are incomplete. Please perform a complete editorial review (including appendices) and correct and complete the document as appropriate.</td><td>A thorough editorial review will be conducted, and corrections will be completed prior to finalization.</td></tr>
<tr><td>46</td><td>DTSC Specific Comment 1</td><td>Executive Summary</td><td>Executive Summary: The executive summary is based on information provided in subsequent sections. Our general comments above, and our specific comments below, will trigger changes to the executive summary. Please revise the executive summary accordingly.</td><td>Edits to the Executive Summary will be completed as appropriate when items are edited in the main body of the text.</td></tr>
<tr><td>47</td><td>DTSC Specific Comment 2</td><td>All Sites</td><td>Table 1-1 CERCLA Sites: Some of the sites listed in Table 1-1 are not depicted on a Figure 1-1. Please revise Figure 1-1 to show the location of all CERCLA sites listed in Table 1-1.</td><td>Figure 1-1 was revised to show the CERCLA sites listed in Table 1-1 for Treasure Island; no sites on Yerba Buena Island are evaluated in this Five-Year Review.</td></tr>
<tr><td>48</td><td>DTSC Specific Comment 3</td><td>Site 6</td><td>Site 6, Section 2.1.1.1 Land and Resource Use: This section discusses planned future land use, but no figure is provided to clearly illustrate the planned future land use at and adjacent to Site 6. Please add a figure to clarify the future land use in the vicinity of Site 6.</td><td>A new figure, Figure 1-2, Future Land Use, was added to show the locations of the six sites included in this second Five-Year Review. Sites 6, 12, 21, 24, 27, and 30 are overlaid on TIDA's conceptual land use plan presented in the May 2015 Major Phase I Approved Application on Figure 1-2.</td></tr>
<tr><td>49</td><td>DTSC Specific Comment 4</td><td>Site 6</td><td>Table 2-3 Demonstration of Completion – Site 6: The second row of the table states that "Excavation has been completed and confirmation samples met RGs" (remedial goals).

However, Section 2.1.4.1.1 describes residual contamination in soil. Please qualify the statement in the table to more accurately explain the post-excavation status of the site.</td><td>The second row of the Demonstration of Completion column in Table 2-3 was revised as follows:

"Excavation has been completed~~,~~ and confirmation soil samples me<u>e</u>t RGs, <u>with two exceptions. These exceptions are described in Section 2.1.4.1.1 and do not prevent the achievement of overall project goals</u>. <u>The</u> LUC RD ~~has been submitted~~ was <u>completed</u> in 2016. <u>The</u> RACR <u>was completed</u> ~~submitted~~ in 2018 to demonstrate that RAOs have been met."

Similar edits were also made the first row in Table 2-3.</td></tr>
<tr><td>50</td><td>DTSC Specific Comment 5</td><td>Site 6</td><td>Section 2.1.7 Site 6 Protectiveness Statement: The text states that "There is no current exposure to PFOA or PFOS." This statement is inconsistent with the data provided on Figure 2-8 which show that the groundwater to surface water transport pathway is potentially complete for PFOA and PFOS, indicating potential exposure for surface water receptors. Please revise the protectiveness statement for consistency with the groundwater data and proximity to surface water.</td><td>As detailed in the Navy's response to Regional Water Board Comment #9, the protectiveness statement for Site 6 was revised in the Executive Summary and Section 2.1.7.</td></tr>
</table>

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Number	Commenter	Site	Comment	Response
51	DTSC Specific Comment 6	Site 12	**Site 12 Table 2-9, page 45**, states that the elevated petroleum concentrations in soil and groundwater were most likely from a suspected former waste oil tank in the area. However, Section 2.2.1.2, page 43, states that diesel is the predominant fuel detected in groundwater. Please revise the text and table to resolve this apparent conflict.	The investigation summary for Groundwater Monitoring in Table 2-10 (formerly Table 2-9) was revised as follows: *"The DON has conducted groundwater monitoring at Site 12 since 1992. The groundwater monitoring identified elevated concentrations of arsenic in groundwater in the vicinity of Buildings 1311 and 1313 (now known as the Gateview Arsenic/TPH Area). Elevated petroleum concentrations in soil and groundwater were also reported in that area. The elevated concentrations were most likely the result of releases from a suspected former ~~waste oil~~ **petroleum** tank in the area."* The last paragraph of Section 2.2.1.1 (formerly Section 2.2.1.2) was revised as follows: *"An automobile service station was located directly east of the current Gateview Arsenic/**TPH Area** ~~Petroleum location~~ during the 1939 and 1940 Golden Gate International Exposition. Fuel tanks associated with the service station were removed around 1944. ~~The abandoned oil tank and the~~ **A** former **petroleum tank** ~~service station~~ may be the source~~s~~ of TPH contamination for the Gateview ~~Avenue~~ Arsenic/**TPH** ~~Petroleum~~ Area. However, diesel is the predominant fuel detected in groundwater, and the service station apparently stored and dispensed gasoline. **No further historical information is available regarding the types of fuels that may have been used at the former service station.**"*
52	DTSC Specific Comment 7	Site 12	**Site 12 Table 2-9, page 45**, states that the DON "excavated the petroleum-contaminated soil in the Gateview Arsenic/TPH Area." Please delete "the" to qualify the statement consistent with the context.	The third sentence in the summary row for "TCRA for Soil and Groundwater at Site 12" in Table 2-10 (formerly Table 2-9) was revised as follows: *"The DON excavated ~~the~~ petroleum-contaminated soil in the Gateview Arsenic/TPH area and added a biostimulation compound to further treat the petroleum."*
53	DTSC Specific Comment 8	Site 12	**Section 2.2.2.4 Selected Remedy**: The first paragraph states that no chemicals of ecological concern were identified for terrestrial ecological receptors at Site 12. Please see General Comment 1 which also applies to Site 12. Please delete this statement because it does not apply to the Gateview Arsenic/TPH Area groundwater remedy under review. Similarly, please delete text in the last paragraph of this section that relates to soil remediation goals.	The last sentence of the first paragraph in Section 2.2.2.4 was removed: *~~"No chemicals of ecological concern were identified for terrestrial ecological receptors at Site 12."~~* The second paragraph of Section 2.2.2.4 was revised as follows: *"~~Only one~~ **The only** CO**E**C ~~was~~ identified for groundwater **was**~~:~~ arsenic. ~~Arsenic was identified for the protection of off-site aquatic receptors in San Francisco Bay.~~ **The DON developed a numerical RG for arsenic in groundwater that is protective of off-site aquatic receptors.** Because TPH is not a CERCLA COC, the numeric values provided for soil are not remediation goals for Site 12 **(DON, 2017).** These numeric values ~~will be~~ **were** used to target mass reduction of free and smeared product in the Gateview Arsenic/TPH Area."* The fourth paragraph of Section 2.2.2.4 was removed in its entirety: *~~"The DON developed numerical remediation goals for soil protective of current and future residential receptors and has targeted all locations within Site 12 with concentrations of COCs above these numerical remediation goals for excavation and off-site disposal. The DON did not develop RAOs or numerical remediation goals for non-residential receptors because excavating all locations with concentrations of COCs above residential remediation goals will also be protective of future commercial/industrial workers, future recreational users, and future construction workers since the excavation will remove concentrations of the COCs that posed unacceptable risk to these receptors from the site. The DON also developed a numerical remediation goal for arsenic in groundwater that is protective of off-site aquatic receptors."~~*

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Number	Commenter	Site	Comment	Response
54	DTSC Specific Comment 9	Site 12	**Section 2.2.4.1.1 Gateview Arsenic/TPH Area**: The text states that post-removal action groundwater monitoring will be performed to monitor the effects of source removal in this area. The remedy includes natural attenuation of arsenic. Groundwater monitoring needs to be performed as part of the cleanup action to demonstrate that the concentrations of arsenic in the groundwater are decreasing and meet the remediation goal. Please revise the last sentence in this section to clarify the purpose and duration of the monitoring, as well as the performance criteria for the remedy.	The following sentence was added to the end of the first paragraph in Section 2.2.4.1.1: *"**Annual groundwater monitoring will be performed as part of the cleanup action until the concentrations of arsenic in groundwater have met the RG.**"*
55	DTSC Specific Comment 10	Site 12	**Figures 2-14 and 2-15** are not referenced in the Site 12 Gateview Arsenic/TPH Area discussion. Figure 2-14 does not include data for TPH in certain wells, but no note is provided to explain why. Figure 2-15 provides data for barium, iron, and manganese which are not discussed in the groundwater monitoring text. Please revise the text to fully describe the figures that are included in the document and briefly describe the groundwater monitoring program for Gateview Arsenic/TPH Area.	A new paragraph was added to the end of Section 2.2.4.1.1 to include discussion of arsenic and TPH concentrations in the Gateview Arsenic/TPH Area and to reference Figures 2-14 and 2-15 as follows. *"**Figure 2-13 shows the groundwater monitoring wells located in the Gateview Arsenic/TPH Area. Sampling results through December 2018 (NOREAS, 2019b) suggest decreasing or stable trends in total TPH concentrations in two monitoring wells (12-MW05 and 12-MW34). Total TPH concentrations were either not detected or below the screening level in all four shoreline wells (12-MW34 through 12-MW37) nearest the Bay. Figure 2-14 shows the total TPH concentrations in groundwater. Sampling results through December 2018 suggest an increasing trend in arsenic concentrations at one monitoring well (12-MW23) and stable trends at two other wells (12-MW05 and 12-MW34). Arsenic was identified as exceeding the remediation goal of 36 µg/L in wells 12-MW05 and 12-MW23. However, arsenic was not detected above the reporting limit at the four shoreline wells nearest the Bay in October and December 2018 indicating that arsenic is not discharging to the Bay at concentrations above 36 µg/L. Figure 2-15 shows the concentrations of arsenic in groundwater.**"* In addition, Figure 2-14 was revised to include TPH data for all 13 wells in the Site 12 Gateview Arsenic/TPH Area as the data for several wells was not shown in the draft report. As noted in the Navy's response to Langan/TIDA Comment #5, Figure 2-15 was revised to remove the results for barium, iron, and manganese as these are not chemicals of concern.
56	DTSC Specific Comment 11	Site 21	**Site 21 Section 2.3.1.1 Land and Resource Use**: This section does not address future land use at Site 21. Please expand the text to identify any anticipated changes in land use under the redevelopment plan.	The following text was included as the second paragraph of Section 2.3.1.1: *"**The future reuse of Site 21 is identified in the 2011 Final EIR (CCSF, 2011) and the 2011 TIDA Design for Development (TIDA, 2011) as mixed use (Building 3) and open space/recreational (shoreline).**"*
57	DTSC Specific Comment 12	Site 21	**Section 2.3.2.1 Basis for Taking Action**: The last sentence in this section refers to the conclusion that there is no risk to aquatic wildlife offshore because the groundwater volatile organic chemical (VOC) plume at Site 21 is stable and not moving offsite. Table 2-15 states that the groundwater monitoring program was designed to confirm that the human health risk from the VI pathway remains in the acceptable range for commercial workers – there is no mention of monitoring plume stability to ensure that the groundwater to surface water pathway is incomplete. The Navy ceased groundwater monitoring at Site 21 in 2017. Please expand the Five-Year Review to provide a summary of the groundwater data that demonstrate that the VOC plume was stable from 2007 through 2016 and potential risk to aquatic wildlife has been addressed.	The second paragraph below Table 2-20 (formerly Table 2-19) in Section 2.3.4.1 was replaced in its entirety with the following to explain why groundwater sampling was discontinued in 2016: *"**The treatability studies at Site 21 conducted in 2005 to 2006 and 2008 to 2010 successfully treated VOCs in groundwater at Site 21, including the source area (Figure 2-19). A permeable reactive barrier (PRB) installed in 2005 near the downgradient end of the VOC plume prevented VOC migration toward the Bay. Analysis of groundwater monitoring data in 2014 and 2015 suggested concentrations of VOCs in groundwater exhibited stable, decreasing, or no trends, except for an increasing PCE trend in well 21-MW02A in 2015; however, all VOC concentrations were lower than RGs. Table D-8 presents groundwater data collected from within the center of the Site 21 groundwater plume in 2014 and 2015. Groundwater monitoring was discontinued in 2016 in accordance with the recommendation in the Final 2014 Annual Basewide Groundwater and Soil Gas Monitoring Report (Trevet, 2015) that was reviewed and approved by the regulatory agencies. Groundwater monitoring wells were subsequently decommissioned.** ~~Concentrations of COCs in groundwater have generally decreased over time, and the post-ROD/Final RAP groundwater monitoring data are below the remedial goals for all wells. Trend analysis of current and historical groundwater data has shown that COC concentration trends across Site 21 are stable or decreasing.~~"*

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Number	Commenter	Site	Comment	Response
57 (Cont'd)	DTSC Specific Comment 12 (Cont'd)	Site 21 (Cont'd)		Regarding information about ecological risk, the fourth paragraph of Section 2.3.2.1 was deleted and information on the 2007 SLERA was added to the description of the 2007 RI report in Table 2-16 (formerly Table 2-15): *"The ~~Final~~ RI presented the analytical results of all investigations completed at Site 21, including the inactive fuel line investigation, the Phase I and Phase II RIs, the EBS investigation, the basewide quarterly groundwater monitoring, and the Site 21 RI itself. Data collected during these investigations ~~was~~ **were** used to evaluate site conditions for the HHRA and the **SL**ERA. The HHRA concluded that VOCs in groundwater were the COCs at Site 21**:** no soil COCs were identified. The SLERA concluded that the industrial setting and managed habitat on **NAVSTA** TI were inadequate to support healthy terrestrial ecological populations. The SLERA concluded that **COCs** ~~chemical migration~~ in groundwater from Site 21 do~~es~~ not pose an unacceptable risk to benthic invertebrates or other aquatic biota offshore ~~of TI~~ **because the groundwater VOC plume is stable and is not migrating off-site**."* Please also see the Navy's response to Regional Water Board Comment #15 regarding other significant changes to Section 2.3.2.1.

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<tr>
<td>58</td>
<td>DTSC Specific Comment 13</td>
<td>Site 21</td>
<td>Section 2.3.2.5 Implementation Status and Table 2-18: Table 2-18 reports partial compliance that was later resolved in coordination with DTSC. Please expand the discussion of the non-enclosure area versus the observed partial compliance and include a figure showing the non-enclosure area and the observed enclosure. Consider current soil gas data and risk assessment methods in evaluating the status of compliance.</td>
<td>The legend of Figure 2-18 was revised to define the non-enclosure area as follows:

"Area Requiring Deed Notice for Commercial/Industrial Occupants <u>(Non-Enclosure Area)</u>"

The 2018 column in Table 2-19 (formerly Table 2-18) was revised for the rows titled "In Compliance?" and "Resolved" as shown in the following table:
<table>
<tr><th>IC Status</th><th>2015</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th></tr>
<tr><td>In-compliance?</td><td>Partially – Damaged wells and well covers</td><td>Partially – Damaged well covers</td><td>Partially – Compromised well covers at the time of inspection</td><td>Partially – the transfer deed and CRUP prohibit a 50-foot by 50-foot area within the southeast corner of Building 3 from being enclosed (referred to as the non-enclosure area). A larger portion of Building 3 was observed as partially enclosed and this partial enclosure encroached on the non-enclosure area.~~Portion of Building 3 was identified as "non-enclosure" area~~</td><td>Yes, based on determination in 2018 that the partial enclosure area complies with the requirements detailed in the Site 21 CRUP</td></tr>
<tr><td>Resolved?</td><td>Yes, in Summer 2015</td><td>Yes, wells were part of the decommissioning conducted in March 2017</td><td>Yes, by March 2017~~,~~ ~~T~~the wells were properly destroyed</td><td>Yes – TIDA contacted DTSC who reviewed the partial enclosure area and non-enclosure area and concluded~~based on email from DTSC dated March 01, 2018~~ that the partial~~ly~~ enclosure area appears to be sufficiently larger than the ~~"~~non-enclosure~~"~~ area, and therefore complies with requirements detailed in the Site 21 CRUP.</td><td>No Issues</td></tr>
</table>
</td>
</tr>
</table>

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Number	Commenter	Site	Comment	Response
58 (cont'd)	DTSC Specific Comment 13 (cont'd)	Site 21 (cont'd)		Table 2-19 (formerly Table 2-18) was revised (see table above) to discuss exposure to commercial/ industrial workers inside Building 3; this exposure was deemed acceptable by DTSC based on the size and configuration of Building 3. The remedy prohibits the portion of Building 3 overlying the plume from being fully enclosed (referred to as the non-enclosure area). The 2018 LUC inspection identified a partial encroachment of the non-enclosure area that was determined by DTSC to be acceptable and in compliance with the CRUP. The 2019 LUC inspection found the configuration had not changed since the 2018 inspection. Details and data related to DTSC's determination were not available for review as part of this second Five-Year Review. A new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current USEPA, DTSC, and Regional Water Board screening criteria using the revised default AF of 0.03.
59	DTSC Specific Comment 14	Site 21	**Figure 2-19 Site 21 Soil Gas Results**: This figure is incomplete. Please include all soil gas data collected prior to December 31, 2018.	Figure 2-20 (formerly Figure 2-19) was updated to include the November 2018 soil gas data and remove April 2018 data that were incorrectly included on the figure. The April 2018 soil gas data was unable to be used in the Five-Year Review report because the data showed exceedances of the leak check compound indicating that it had been contaminated by ambient air concentrations. The Navy re-collected soil gas samples in June 2018 to replace the data from April 2018.
60	DTSC Specific Comment 15	Site 21	**Section 2.3.4.1 Data Review and Figure 2-19**: The text and figure do not include all data collected through 2018. Please expand the text to specifically address non-cancer hazard associated with trichloroethylene (TCE).	As noted in the Navy's response to DTSC Specific Comment #14, Figure 2-20 (formerly Figure 2-19) was revised to show all soil gas data collected through 2018. The following text was added as the final sentence in the second to last paragraph of Section 2.3.4.1 to provide a statement on the noncancer hazard associated with TCE in sub-slab soil gas: *"**The 2018 sub-slab soil gas concentrations indicate that the noncancer hazard for TCE is a concern because it may exceed 1, indicating the need to continue implementation of the ICs.**"*
61	DTSC Specific Comment 16	Site 21	**Table 2-22 Technical Evaluation – Question B (Site 21)**: The technical evaluation considers changes in groundwater remediation goals but does not provide a summary of soil gas screening levels used at the time of remedy selection compared with current soil gas screening levels. The remedy is now being monitored using soil gas data not groundwater data (see Table 2-19). Table 2-19 refers to Table 2-20 for site-specific soil gas screening levels (Remedial Goals) for VOCs. Table 2-20 does not provide soil gas remedial goals, but it does note that tetrachloroethylene (PCE) and TCE are increasing in soil gas. Please revise the technical evaluation and supporting tables to provide a coherent, complete, and current evaluation of vapor intrusion risk at Site 21 for both cancer and non-cancer endpoints.	A new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default AF of 0.03. Table 2-23 (formerly Table 2-22), Changes in Toxicity and Other Contaminant Characteristics, was revised as follows (new text in bold and underlined): "***Sub-slab and Subsurface Soil Gas****: Sub-slab and subsurface soil gas screening levels were developed in the 2012 Risk Assessment Addendum. The more health protective of the Cal/EPA and USEPA IURs and RfCs were used.* ***Updated soil gas screening levels are provided in Table 2-25, which are derived based on a target cancer risk of 1E 06 and target noncancer hazard of 1****. The toxicity criteria for TCE and VC are consistent with what is currently recommended by ~~DTSC~~ **OEHHA** (DTSC, 2019). Toxicity criteria for PCE used in the development of the screening levels has~~ve~~ been updated (DTSC, 2019). The RfCs for cis-, and trans-1,2-dich**h**loroethene have **also** been updated by ~~OEHHA~~ **DTSC** (DTSC, 2019).* ***The inhalation toxicity values for cis- and trans-1,2-dichloroethene are extrapolated by DTSC based on an oral exposure. The USEPA does not recommend inhalation toxicity values for cis- or trans-1,2-dichloroethene and therefore inhalation risk is not estimated using USEPA criteria.*** *~~The use of the revised toxicity factors for PCE would have little impact to the final screening level, but the values for cis- and trans-1,2-DCE would be reduced.~~* ***The soil gas screening levels are protective under both the residential and commercial/industrial scenarios. Additionally, concentrations of cis-1,2-DCE and trans-1,2-DCE in soil gas are consistently below the soil gas screening levels for residential and commercial/industrial receptors or are not detected. Concentrations of VC in soil gas are consistently not detected at Site 21 (see Table D-7 of Appendix D). The current toxicity criteria do not affect the protectiveness of the soil gas screening levels because when using the current criteria, the screening level***

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Number	Commenter	Site	Comment	Response
				concentrations result in cancer risks ranging from 1E-07 to 2E-06 for future commercial/industrial workers and from 4E-08 to 4E-06 for future residents, which are within the risk management range. In addition, the noncancer hazards range from 0.0009 to 0.8 for future commercial/industrial workers and from 0.0003 to 0.3 for future residents, which do not exceed the noncancer threshold of 1 for either receptor."
62	DTSC Specific Comment 17	Site 24	**Section 2.4.1 Site Description and Background, last paragraph**: The last paragraph omits information from the Economic Development Conveyance Memorandum of Agreement (EDC MOA; https://sftreasureisland.org/EDC-MOA) between TIDA and the Navy which describes a contingency plan for expanded residential development on Site 24. Please expand the paragraph to provide that information and include applicable details in Section 2.4.1.1. Please also clarify if Site 24 ownership has been transferred to TIDA since the Covenant to Restrict the Use of Property has been completed.	The third paragraph of Section 2.4.1 was revised as follows: "*~~The~~ Site 24 ~~boundary extends from the central portion of the island northeast to the bay and encompasses approximately 20.4 acres. The~~ area is primarily paved, with some landscaping, and numerous utilities traverse the site. ~~The Site is currently owned by the DON. The parcel is planned for mostly open space reuse bordered on the south side by residential property as documented in the 2011 TIDA Design for Development (TIDA, 2011).~~* ***Site 24 contains several buildings in addition to Building 99 described above. Building 69 was used as an engineers and shipfitters shop, hobby shop, garage, and storage. Building 96 was used as storage, reserve training, and a printing plant. Building 230 was used as storage. Building 260 was used as supply offices and a warehouse. Buildings 342 and 343 were part of the Hydraulic Training School and former Building 344 was used as storage for the school. Building 455 was used as a boiler plant.***" Section 2.4.1.1 was revised in its entirety to the following: "*Currently, ~~Site 24 contains one building (96) that~~ Building 96 is occupied and ~~is~~ used as a winery or spirits storage and tasting rooms* ***for the public.***~~,~~ ~~*and two b*~~***B****uildings~~ (69 and 260) that are~~* ***is*** *infrequently occupied* ***by workers*** *to retrieve and return items stored at ~~each~~* ***the*** *building.* ***The remaining six*** *~~Seven other~~ buildings (****69,*** *99, ~~105,~~ 230, 342, 343, ~~344,~~ and 455) are not in use. In addition, landscape workers may frequent some unpaved areas within Site 24.* ***The site was transferred from the DON to TIDA on October 30, 2019.*** *The* ***2011 Final EIR (CCSF, 2011) and*** *2011 TIDA Design for Development* ***(TIDA, 2011)*** *lists the proposed future uses of the western and northeastern parts of Site 24 as open space and the southeastern part of Site 24 as residential ~~(TIDA, 2011)~~* ***(see Figure 1-2)****. ~~Specifically, t~~****T****he Site 24 open space area is planned to be developed as a regional sports complex. The regional sports complex may include baseball diamonds, soccer fields, and other sports facilities, including concessionaire, parking, and restroom facilities. The residential portion of Site 24 is designated as the Eastside Residential District and is planned to consist of dense, low-rise and mid-rise structures, with neighborhood high-rise structures serving as neighborhood markers. Most residential parking will be in subsurface garages within residential buildings. Community and commercial spaces will be included at the ground-floor level of some buildings.* ***In addition, the 2011 Disposition and Development Agreement between TIDA and their developer, Treasure Island Community Development, LLC, provides for a "Redesign Trigger Event" that allows for the developer to re-entitle, redesign and rebuild portions of the project on portions of Site 24 and the surrounding area if environmental restrictions prohibit the timely development of the Site 12 development parcel or there is a termination of the conveyance agreement for failure to meet certain other closing conditions. Property that is the subject to the Redesign Trigger Event includes residential development.*** *~~There are no perennial surface water bodies located at Site 24.~~ Future plans for lands adjacent to Site 24 may* ***also*** *include residential development and open space.* ***There are no perennial surface water bodies located at Site 24.*** *Groundwater at Site 24 is not a potential source of drinking water, and no other uses of groundwater are planned at Site 24 (DON, 2015b)."*

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Number	Commenter	Site	Comment	Response
63	DTSC Specific Comment 18	Site 24	**Site 24 Section 2.4.1 Site Description and Background and Figure 2-20**: This section describes features of Sites 5, 17, and 24 but does not clearly illustrate Site 5 and Site 17 on Figure 2-20. Without clearly labeling these sites on the referenced figure, the figure is less useful to the public. Please revise Figure 2-20 to clearly illustrate the information discussed in Section 2.4.1.	Figures 1-1 and 2-21 (formerly Figure 2-20) were revised to show the locations of Sites 5 and 17 before they were merged into Site 24.
64	DTSC Specific Comment 19	Site 24	**Section 2.4.2.1 Basis for Taking Action**: This first sentence states that "COCs in groundwater and soil gas pose unacceptable risk to human health at TI." Is this sentence meant to refer only to Site 24? Please clarify or correct the text.	The first sentence of Section 2.4.2.1 was revised to the following: *"COCs in groundwater and soil gas pose unacceptable risk to human health at **Site 24** ~~TI~~."*
65	DTSC Specific Comment 20	Site 24	**Table 2-24 Previous Investigations Summary – Site 24**: The last page of the table refers to figures that do not provide the referenced information. For example, the text states that COCs were reported below cleanup goals in Area 99A groundwater and refers to Figure 2-21 which presents the Area 99A excavation extent and soil results. Please revise the text in Table 2-24 and the accompanying figures to provide a coherent discussion of previous investigations and the status of the cleanup.	Four references in the last row of Table 2-26 (formerly Table 2-24) were revised to refer to the correct figure numbers: Figure 2-26 (formerly Figure 2-25), for the performance groundwater monitoring results in Areas 99A and 99B, and Figure 2-27 (formerly Figure 2-26), for the performance soil gas monitoring results. The groundwater treatment area outlines and labels were also added to Figure 2-26 (called out as "Approximate Extent of Groundwater with COC Concentrations Exceeding Cleanup Goals"). No additional text changes were necessary to address this comment.
66	DTSC Specific Comment 21	Site 24	**Table 2-26: Demonstration of Completion – Site 24**: The text in the first row of the table states that source soil was removed and groundwater COC concentrations are decreasing. However, Figure 2-22 indicates some residual soil contamination remains, and Figure 2-25 shows that cis-1,2-dichloroethene and vinyl chloride concentrations at 24-TW-48 are increasing. Please revise Table 2-26 to more completely describe the status of completion with respect to residual contamination.	The first row of Table 2-28 (formerly Table 2-27) was revised to the following: *"The soil excavation and groundwater treatment portions of the RA were implemented to reduce concentrations of COCs in soil and groundwater and thus reduce concentrations in soil gas. The soil excavation portion of the RA removed source soil from the vadose zone **(see Section 2.4.4.1 for details about one minor exception caused by an adjacent gas line)**. The groundwater treatment portion of the RA is operating as designed with groundwater COC concentration **trend**s **estimated as stable or** decreasing. The performance soil gas monitoring program will be used to document the progress of the RA and to determine when cleanup goals for soil gas have been achieved. Since cleanup goals have not been met at the time Site 24 is to be transferred, the DON has completed a LUC RD that implements ICs to meet RAOs in the areas of the site where cleanup goals were not met. ICs will be maintained until the concentrations of hazardous substances in soil gas **are** ~~is~~ at levels that allow UU/UE."* Mann-Kendall analysis of groundwater concentrations at well 24-TW-48 presented in Appendix D of the 2018 basewide monitoring report (NOREAS, 2019b) suggested no trend for cis-1,2-dichloroethene or vinyl chloride. Although the most recent sample indicated a higher relative concentration, the data set overall suggests no trend for either chemical. The text above was revised to indicate chemical concentration trends are estimated as stable or decreasing.

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>67</td><td>DTSC Specific Comment 22</td><td>Site 24</td><td>Section 2.4.4.7 Site Inspection: The text concludes that the remedies' monitoring network was in place and no issues concerning the protectiveness of the remedies were noted. This conclusion conflicts with information provided in the site inspection form and photographs provided in Appendix A and B respectively. For example, the site inspection form notes that shipping containers were placed on top of wells making them inaccessible. The inspection form and photographs document that 24-SG-47 was buried under a soil pile. The monitoring network is an integral part of the remedy until unlimited use/unrestricted exposure (UU/UE) conditions are achieved for the site. Please revise Section 2.4.4.7 to accurately report the results of the site inspection. Please revise subsequent sections, for example Section 2.4.6 Site 24 Issues, Recommendations, and Follow-Up Actions, to provide accurate information based on the results of the site inspection.</td><td>The second paragraph of Section 2.4.4.8 (formerly Section 2.4.4.7) was revised to indicate the site inspection issues as follows:

"Observations made during the site inspection indicated that the remedies' monitoring network was in place. However, the site inspection identified monitoring wells that were inaccessible by equipment or other materials overlaying the well, some wells were observed to be missing bolts, and one well had been damaged as it was no longer level with the ground surface. The well has since been repaired and missing bolts have been replaced. No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP and implemented by the LUC RD."

Section 2.4.6 was revised to add the issue about ensuring all wells are accessible:

<table>
<tr><th rowspan="2">Issues</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Site inspection identified inaccessible monitoring wells.</td><td>No</td><td>No</td><td>Ensure wells are accessible prior to any monitoring event.</td><td>DON</td><td>DTSC</td><td>May 2021</td></tr>
</table>

The System Operations/O&M row of Table 2-30 (formerly Table 2-29) was revised as follows:

<table>
<tr><th>Question</th><th>Summary</th></tr>
<tr><td>System Operations/O&M</td><td>Yes. O&M issues were identified. Site inspection identified some inaccessible monitoring wells, missing bolts, and a damaged monitoring well box. The well has since been repaired and missing bolts have been replaced. <s>No O&M issues have been identified for Site 24.</s></td></tr>
</table></td></tr>
<tr><td>68</td><td>DTSC Specific Comment 23</td><td>Site 24</td><td>Table 2-29 Technical Evaluation – Question B (Site 24): The text in the last row of the table states that the remedies are progressing as expected with groundwater COC concentrations less than RGs or declining trends. The response does not include an evaluation of progress in meeting soil gas cleanup goals. The remedy selected includes meeting unrestricted use/unrestricted exposure (UU/UE) levels for Site 24 media except groundwater. Please expand this text to assess progress towards meeting UU/UE levels in soil gas. Include the estimated time frame for achieving UU/UE levels in soil gas accounting for the planned revision to the soil gas remediation goals.</td><td>Table 2-31 (formerly Table 2-29) has been revised to support the determination that soil gas RGs for Site 24 need to be revised to be protective. The Expected Progress Toward Meeting RAOs row in Table 2-31 (formerly Table 2-29) was revised to the following:

"The remedies <u>at Site 24</u> are progressing as expected. <u>ICs are in place and are working to prevent exposure.</u> Groundwater COC concentrations <s>at Site 24 indicate concentrations less than RGs or declining trends.</s> <u>are all at or below groundwater RGs, except cis-1,2-DCE (at well 24-TW-48R) and VC (at wells 24-TW-11, 24-TW-47R, and 24-TW-48R). Mann-Kendall trend analyses estimated no trend for wells 24-TW-48R and 24-TW-11 and insufficient data for well 24-TW-47R (NOREAS, 2019b). Soil gas concentrations for cis-1,2-DCE and VC were not reported above the residential RGs. Soil gas concentrations of PCE and TCE were reported above the residential RGs. Mann-Kendall trend analyses estimated decreasing, probably decreasing, stable, or no trends (NOREAS, 2019b). However, the review of the soil gas RGs in the ROD/Final RAP indicates that the soil gas RGs will be revised.</u>"

Progress toward meeting the current RGs is described in Section 2.4.4.6, Soil Gas Post-Treatment Summary. The Navy has made progress in meeting the RGs established in the ROD/Final RAP. However, the RGs will be revised, and the plume boundary will be delineated based on the new RGs, which will affect the timeframe for achieving UU/UE at Site 24. Progress in meeting the new RGs will be evaluated in annual basewide groundwater monitoring reports and subsequent Five-Year Reviews.</td></tr>
</table>

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>69</td><td>DTSC Specific Comment 24</td><td>Site 27</td><td>Site 27 Section 2.5 Clipper Cove Skeet Range: This section does not include information on land and resource use. Table 2-36 lists land use as industrial but Site 27 has been transferred to Treasure Island Development Authority. Please expand the text to include a section on current and future land and resource use.</td><td>Section 2.5.1.1, Land and Resource Use, was added to Section 2.5 with the following text:

"<u>Site 27 consists of offshore property in Clipper Cove. A portion of the Treasure Island Marina overlaps the western boundary of Site 27. Most of the site is open water and sediment, and the site was used as a former naval skeet range.</u>

<u>Ownership of Site 27 was transferred from the DON to TIDA on September 20, 2016. Current and future site users include the Treasure Island Marina, which includes three piers and numerous docked watercraft; Treasure Island Enterprises, an intended long-term lessee to redevelop the existing marina into a larger marina facility, then operate the redeveloped marina; and the Treasure Island Sailing Club, a non-profit organization that is expected to relocate to the TI shoreline and provide the public with access to sailing and watersports activities, including rental, boat storage, and educational opportunities (TIDA, 2017).</u>"

The Land Use column in Table 2-38 (formerly Table 2-36) was removed for consistency with other Remedy Summary tables in the document. And as noted above, a new Section 2.5.1.1 was added to describe Land and Resource Use and describes the site as being partially used as a marina.</td></tr>
<tr><td>70</td><td>DTSC Specific Comment 25</td><td>Site 27</td><td>Section 2.5.2.5 Implementation Status, Table 2-34 Demonstration of Completion – Site 27: The table does not evaluate the completion of the remedy as implemented (i.e., dredging to 1.5 ft bss with filter and armor layers). Please revise the table to explain the completion status of the remedy as implemented and consider the bathymetric survey results for the backfill area.</td><td>Table 2-36 (formerly Table 2-34) was corrected to indicate 1.5-feet of sediment was dredged.

<table>
<tr><th>RAO</th><th>Demonstration of Completion<s></s></th><th>RAO Met? (Yes/No)</th></tr>
<tr><td>Prevent or minimize ingestion of lead shot by diving ducks within 75-feet of the shoreline, where there is a complete exposure pathway under current conditions</td><td>Focused dredging within 75-feet of the shoreline removed lead shot within the top 1.5 <s>2.5</s> feet of sediment where diving ducks could be exposed. Backfill will prevent exposure to lead shot that may be buried deeper than 1.5 <s>2.5</s> feet beneath the sediment surface.</td><td>Yes</td></tr>
</table>

The text following Table 2-36 (formerly Table 2-34) describes how the remedy was implemented as designed. The following text was added to the end of the first paragraph:

"<u>After dredging was complete, engineered backfill was installed by placing 7,190 tons of sand followed by placing 8,519 tons of protective rock.</u>"</td></tr>
<tr><td>71</td><td>DTSC Specific Comment 26</td><td>Site 27</td><td>Section 2.5.2.5 Implementation Status, page 116: The text notes that institutional controls (ICs) to protect the remedy included signage and limits on vessel speed at Site 27 Clipper Cove. The inspection checklist in Appendix A and inspection photographs in Appendix B do not document the status of signage, or the mechanism or effectiveness of limits on vessel speed. Please revise this section and Table 2-36 to evaluate the status of ICs for Clipper Cove. Please expand Section 2.5.6 as appropriate based on the outcome of the IC evaluation.</td><td>The second paragraph of Section 2.5.4.2 was revised to note the lack of signage for the "No Wake Zone" and the "No Mooring Zone," as shown below:

"Observations made during the site inspection indicated that <s>the remedies were in place</s> <u>no structures had been emplaced within the armor layer. However, the site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."</u> <s>No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP.</s>"

The System Operations/O&M row of Table 2-39 (formerly Table 2-37) was also revised to note the lack of signage:

<table>
<tr><th>Question</th><th>Summary</th></tr>
<tr><td>System Operations/O&M</td><td><u>No</u><s>Yes</s>. <u>Site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."</u><s>No O&M issues have been identified for Site 27.</s></td></tr>
</table>

Please also see the Navy's response to Regional Water Board Comment #19 for detailed changes to Section 2.5.6.</td></tr>
</table>

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Number	Commenter	Site	Comment	Response
72	DTSC Specific Comment 27	Site 27	**Table 2-38 Technical Evaluation – Question B (Site 27)**: The table states that the Five-Year Review identified no changes in physical site conditions, but the Year 5 Bathymetric Survey identified elevation decreases of greater than 0.26 foot, outside the design tolerance range, in the backfill area. Please revise the technical evaluation to consider this information (see General Comment 7).	The Navy does not believe that there have been any changes to the physical site conditions (the engineered backfill or the two feet of sediment coverage in the non-backfilled areas) that result in exposure of lead shot to diving ducks and believes the decrease in elevation in the backfill area is caused by settlement. The evaluation of the results of the Year 5 bathymetric survey using the 0.33-foot performance objective did not show a decrease over 20 percent of the engineered backfilled area, indicating the area is in compliance with the decision rules contained in the RAWP (Tetra Tech EC, Inc., 2013 and Langan, 2020). See the Navy's response to Regional Water Board Comment #19 for a description of the evaluation of the bathymetric survey.
73	DTSC Specific Comment 28	Site 27	**Section 2.5.7 Site 27 Protectiveness Statement**: The protectiveness statement ignores the data collected for the dredge/backfill area during the Year 5 Bathymetric Monitoring Report. Please consider the results of the bathymetric surveys for the backfilled area in the protectiveness statement.	Please see the Navy's response to DTSC Specific Comment #27 regarding comparisons of the bathymetric surveys. The protectiveness statement for Site 27 was revised as detailed in the Navy's response to Regional Water Board Comment #19.
74	DTSC Specific Comment 29	Site 30	**Site 30 Section 2.6.2 Response Action Summary**: The last paragraph states that a subsequent risk assessment identified no chemicals of concern of the current and planned use of Site 30 as a daycare center. Please provide a specific reference for the risk assessment and explain what is meant by "subsequent". Please expand the response action summary to include contaminated soil removal prior to concrete pad construction.	The following text was added to Section 2.6.2: *"**This section provides the framework for the response actions undertaken at Site 30. The following text discusses the basis for taking action, summarizes the initial (pre-ROD/Final RAP) response actions that have occurred, the RAOs and components of the selected remedy, and describes the implementation status of the selected remedy.**"* The following information was added as the last paragraphs in Section 2.6.2.4: *"**In January 2003, as part of the TCRA that was performed to reduce potential exposure to subsurface debris and contaminated soil, the DON installed a 6-inch concrete pad adjacent to the daycare center to cover the 1,400 ft^2 area around and between the locations that contain elevated concentrations of dioxin in the subsurface soil. Dioxins were not detected in groundwater samples collected at Site 30.*** ***Although the concrete pad had been installed as an interim measure to prevent exposure when the TCRA was conducted, the results of a risk assessment completed subsequent to the installation of the concrete pad and presented in the 2006 RI Report evaluated risk to receptors should the concrete pad be removed and determined the risk to current daycare center receptors, including the daycare center child, was at or below the risk management range. No COCs were identified for the current and planned use of Site 30 as a daycare center or for the future construction worker scenario. Therefore, the exterior Site 30 concrete pad was not necessary as an exposure prevention barrier for the daycare center receptors (SulTech, 2006). ICs are necessary and are implemented as part of the remedy for the exterior Site 30 concrete pad to require that excavation below the concrete pad be conducted according to specific guidelines. Under the alternative land use scenarios for commercial/industrial or residential receptors, dioxin is the only designated COC for Site 30.**"*

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Number	Commenter	Site	Comment	Response
75	DTSC Specific Comment 30	Site 30	**Section 2.6.4.2 Site Inspection and Section 2.6.6 Site 30 Issues, Recommendations, and Follow-Up Actions**: These sections appear to conflict with observations in Appendix A on the condition of the wood floor in Building 502 and the adjacent concrete slab. Please expand these sections to summarize the observations provided in Appendix A and better explain why these signs of wear and tear do not indicate potential exposure. Appendix A states that weathering/erosion issues noted during the inspection should be addressed, but this recommendation is not included in Section 2.6.6. Please resolve this apparent conflict.	The second paragraph of Section 2.6.4.2 was revised as follows: *"Observations made during the site inspection indicated that the remedies in place **are functioning as intended and are effective at preventing exposure**. **The site inspection did not identify any issues with the Building 502 foundation slab, did not identify any unauthorized changes in land use, and did not identify any indication that contaminated soil had been brought to the surface of the site or was accessible. The site inspection noted minor weathering, erosion, and vegetation growth along the edges of the exterior Site 30 concrete slab, minor cracking near the utility cover, and signs of wear on interior wood floor panels, including minor separation between the floor panels in some areas, and signs of wear on rubber surface tiles within the children's outside playground area. These are not issues that affect the protectiveness of the remedy. The exterior Site 30 concrete pad is not an exposure prevention barrier, so weathering and erosion of the concrete pad do not affect exposure. Wear and tear on the interior floor panels and separation between the floor panels also does not affect exposure because the Building 502 foundation slab is still in place and no signs of cracks, holes, or penetrations in the foundation slab were noted. In addition, normal wear and tear on the children's outside playground area does not affect exposure. There are no groundwater wells on Site 30, so cracks identified near the utility cover are not related to Site 30 and do not affect the protectiveness of the Site 30 remedy.** No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP."*

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Number	Commenter	Site	Comment	Response
76	DTSC HERO Comment 1	Site 6	**IR Site 6**. a. Per-and polyfluoroalkyl substances (PFAS). Given the detection of PFOA and PFOS in groundwater, please include a discussion about the potential impact from the known concentrations of PFAS in the groundwater with respect to the previously conducted risk assessment for the construction worker. b. HERO has the following comments regarding PFAS sampling. i. Please address whether there are plans to sample soil and sediment for PFAS at IR Site 6. HERO recommends that both the soil and sediment at the base be sampled and characterized for PFAS to ensure there is no risk to human health from exposure to these compounds. ii. Please address whether or not any upgradient groundwater wells have been sampled for PFAS. iii. Please also discuss any future activities to address the detections of PFOA and PFOS in the groundwater at concentrations that exceed 70 ppt. c. **Section 2.1.5.2, Table 2-6 – Technical Evaluation – Question B**. i. Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria. Please remove the following sentence from page 25 of the report, "These regulations are not applicable to the remedial actions at these sites because the regulations apply to cleanups performed under the authority of the California Health and Safety Code and Site 6 is being addressed under the authority of CERCLA." The only regulation discussed prior to this sentence is the September 2018 Title 22, California Code of Regulations Sections 69021-69022 Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals regulation. The text states that this regulation is applicable. Please remove the sentence or clarify what regulation is not applicable. ii. Changes in Exposure Pathways. Please note that in August 2019, the California Water Resources Control Board Division of Drinking Water revised the notification levels for PFOS and PFOA to 6.5 ppt and 5.1 ppt, respectively. Please revise the text on page 26. d. **Section 2.1.7 – Protectiveness Statement**. HERO recommends addressing the long-term protectiveness of human health for the construction worker scenario given the detections of PFAS in groundwater. e. **Section 2.1.5.2 – Question B – Table 2-6 Technical Evaluation – Changes in Risk Assessment Methods and Table 2-8 – Groundwater Cleanup Goals**. Please note that HERO recommends a skin surface area for the construction worker of 6,032 square centimeters (cm^2) in our HERO HHRA Note 1[2]. Please revise the text on page 25, footnote in the table and ensure that the revised construction worker cleanup goals are also revised to account for the recommended skin surface area. *([2] https://dtsc.ca.gov/human-health-risk-hero/)*	a. There is limited information identifying health effects from inhalation or dermal exposures to PFOA or PFOS. The following text has been added as the second to last paragraph of the Changes in Exposure Pathways row of Table 2-6 (within Section 2.1.5.2): "***Screening levels for PFOA and PFOS protective of groundwater dermal and inhalation exposures to the construction worker are not available.***" b. i. As noted in the Navy's response to Regional Water Board Comment #8, the Navy will conduct a basewide PA in 2020 for PFAS at TI. The Navy will further evaluate media of concern and receptors during development of the RI report that is also planned for PFAS at Site 6. ii. Groundwater well 06-MW30 is upgradient of the suspected firefighting area but exhibits low concentrations of PFAS. The Navy resumed monitoring of the existing groundwater well network at Site 6 for PFAS and will delineate the plume. PFAS data at Site 6 will be documented in annual basewide groundwater monitoring reports, an RI, and, if necessary, follow on CERCLA documents. iii. The following revision was made to the second row of the table in Section 2.1.6 as a follow up action: "***The nature and extent of PFAS will be investigated and evaluated in an expedited manner through the CERCLA process, followed by all necessary response actions for protection of human health and the environment.*** ~~*Continue investigations into the nature and extent of PFOA and PFOS and evaluations into potential future exposures.*~~" In addition, a schedule for the PFAS investigation and evaluation at Site 6 was added as a footnote to the table in Section 2.1.6. c. i. The second sentence of the second paragraph in Table 2-6 (within Section 2.1.5.2), Changes in ARARs or TBC Criteria row, was revised to the following: "***The regulations at Cal. Code Regs. tit. 22 §§ 69020, 69021, and 69022 are not applicable to the RAs at Site 6 because Site 6 is being addressed under CERCLA and these regulations are applicable to sites being addressed under the authority of the California Health and Safety Code.*** ~~*These regulations are not applicable to the remedial actions at these sites because the regulations apply to cleanups performed under the authority of the California Health and Safety Code and Site 6 is being addressed under the authority of CERCLA.*~~"

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Number	Commenter	Site	Comment	Response
76 (cont'd)	DTSC HERO Comment 1 (cont'd)	Site 6 (cont'd)		ii. The second bullet in the Changes in Exposure Pathways row in Table 2-6 was revised to the following and two additional bullets were added: • *"In June 2018, OEHHA recommended interim notification levels **<u>of 14 ppt</u>** for PFOA (based on liver toxicity, as well as cancer risks) and **<u>13 ppt</u>** for PFOS (based on immunotoxicity). OEHHA made these recommendations following its review of currently available health-based advisories and standards and supporting documentation. ~~After independent review of the available information on the risks, the California State Water Resources Control Board's Division of Drinking Water established notification levels at concentrations of 13 ppt for PFOS and 14 ppt for PFOA, consistent with OEHHA's recommendations.~~* • ***<u>On February 6, 2020, the California State Water Resources Control Board's Division of Drinking Water issued updated drinking water response levels of 10 ppt for PFOA and 40 ppt for PFOS based on a running four-quarter average.</u>*** • ***<u>In May 2020, the Regional Water Board published interim final ESLs, including groundwater ESLs for human health seafood ingestion for PFOS (0.0047 ppt) and PFOA (0.022 ppt); saltwater direct exposure ecotoxicity for PFOS (2,600 ppt) and PFOA (540,000 ppt); and saltwater secondary poisoning from PFOS (75 ppt) and PFOA (4,400 ppt).</u>***" d. As detailed in the Navy's response to Regional Water Board Comment #9, the Navy has revised the protectiveness determination for Site 6 to "Protectiveness Deferred" based on potential exposure to PFAS. In addition, the groundwater RG for arsenic needs to be revised to be protective of construction worker exposure. e. The skin surface area was updated from 3,527 square centimeters (cm^2) to 6,032 cm^2 in Table 2-6 (Changes in Risk Assessment Methods row). "*Two fundamental changes in exposure assumptions for the construction worker include an increase in the assumed body weight (from 70 kg to 80 kg) and an increase in the skin surface area exposed to groundwater (from 2,375 cm^2 to ~~3,527~~ **<u>6,032</u>** cm^2)…*" Groundwater cleanup goals presented in Table 2-8 were revised to update the increased skin surface area and Note 2 was updated accordingly
77	DTSC HERO Comment 2	Site 12	**IR Site 12**. a. Please include a discussion regarding the 2018 work plan that addressed activities to conduct additional characterization of radiological material at Buildings 1131, 1306, 1204, and 9th Street Recreation area, sampling for lead, total PCBs, and dioxins in soil, a Feasibility Study Addendum to address contaminants at the SWDA areas and the revised human health risk and ecological risk assessment at the SWDAs to augment the existing risk assessments previously completed in the remedial investigations. b. **Figure 2-15**. There are numerous detections of arsenic in groundwater above the project screening level, yet these are not highlighted in the figure as indicted in the Note. Please review the figure and ensure all groundwater arsenic exceedances are highlighted.	a. Five-Year Reviews evaluate remedies that have been selected and implemented and that leave contamination in place. A site-wide remedy for radionuclides has not yet been selected nor is there a remedy for the chemical contamination in the SWDAs. The site-wide (except SWDAs) chemical remedy for soil is cleanup to unlimited use/unrestricted exposure (UU/UE); therefore, Five Year Reviews are not required for that remedy. No change was made to the Five-Year Review based on this comment. b. Figure 2-15 was revised to replace total arsenic results with dissolved arsenic results and to highlight dissolved concentrations of arsenic that exceed the RG. Note: Subsequent conversations between the DON, DTSC, and the Regional Water Board identified an issue regarding the protectiveness of the groundwater remedy for construction worker exposure to arsenic in groundwater. Recent changes in state toxicity criteria indicate that it cannot be determined if there is an unacceptable risk to construction workers from dermal contact with arsenic in groundwater. As a result, the DON identified the recent changes in state toxicity criteria for construction worker exposure to arsenic in groundwater as an issue for Site 12, recommended reevaluating potential risk to construction workers as a follow-up action, and changed the protectiveness determination for groundwater to protectiveness deferred.

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Number	Commenter	Site	Comment	Response
78	DTSC HERO Comment 3	Site 21	**IR Site 21**. a. Please include a discussion regarding the indoor air sampling at Building 3. b. **Section 2.3.5.2, Table 2-22 – Technical Evaluation – Question B**. i. Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria. Please see Comment 1.c.i above regarding removing the sentence from page 68 of the report, "These regulations are not applicable to the remedial actions at these sites because the regulations apply to cleanups performed under the authority of the California Health and Safety Code and Site 21 is being addressed under the authority of CERCLA." Please remove the sentence or clarify what regulation is not applicable. ii. Changes in Toxicity, and Other Contaminant Characteristics. Please provide additional details regarding the statement, "The concentrations detected in the 2015 compared against current screening levels indicates that revision of the groundwater RGs is not necessary with the focus moving to soil gas assessments." With respect to vinyl chloride, a revised RG as shown in Table 2-23, is several times lower than the maximum detected groundwater concentration of vinyl chloride and the RG for the construction worker is not the same as the RG for vapor intrusion to indoor air. iii. Changes in Risk Assessment Methods. 1. Please include in the text on page 69 a discussion of the changes in the exposure parameters, body weight and skin surface area for the construction worker. iv. Please address whether RGs will be developed for vapor intrusion to indoor air from soil gas. c. **Table 2-23 – Groundwater Cleanup Goals**. Please note that HERO recommends a skin surface area for the construction worker of 6,032 cm^2, please see Comment 1.e. Please revise the footnote in the table and ensure that the revised construction worker cleanup goals are revised to account for the recommended skin surface area. d. **Table 2-16 – Site 21 Risk-Based Concentrations and RGs for Groundwater**. The negative sign is missing from the '10^5' under Note a of Table 2-16. Please revise and add the negative sign.	a. As noted in the Navy's response to Regional Water Board Comment #2, detail was added as the last paragraph of Section 2.3.4.1 to describe the 2019 indoor air evaluation conducted by Langan at Building 3 in Site 21. b. i. The second sentence of the second paragraph in the ARAR or TBC Criteria row of Table 2-23 (formerly Table 2-22) was revised as follows: "***The regulations at Cal. Code Regs. tit. 22 §§ 69020, 69021, and 69022 are not applicable to the RAs at Site 21 because Site 21 is being addressed under CERCLA and these regulations are applicable to sites being addressed under the authority of the California Health and Safety Code.*** ~~*These regulations are not applicable to the RA at this Site because the regulations apply to cleanups performed under the authority of the California Health and Safety Code and Site 21 is being addressed under the authority of CERCLA.*~~" ii. The concentration for vinyl chloride presented on Table 2-23 (formerly Table 2-22) is based on a vapor intrusion exposure for the commercial/industrial worker. However, the 2012 HHRA addendum identified vinyl chloride in soil gas as a COC only for the future resident; vinyl chloride was not identified as a COC for current or future commercial/industrial workers. Only PCE was identified as a COC for the construction worker based on dermal exposure to groundwater in a construction trench. In 2015, the maximum detection of vinyl chloride in groundwater was 6.3 µg/L, which is below the RG and the current USEPA criteria, but above the current Regional Water Board groundwater vapor intrusion screening level of 1.4 µg/L. However, since vinyl chloride was identified for vapor intrusion risk, soil gas, not groundwater, is the preferred medium for evaluating vapor intrusion risks and no revision to the groundwater RG for vinyl chloride is necessary. Table 2-23 (formerly Table 2-22), Changes in Toxicity and Other Contaminant Characteristics, was revised to include this information. Table 2-24 (formerly Table 2-23), Site 21 Groundwater Cleanup Goals, was revised to present values based on current toxicity criteria and exposure parameters. Additional changes were made to Table 2-24 (formerly Table 2-23) to replace certain values with the acronym "NE" (not established) for chemicals that did not form the basis of the RG in the ROD/Final RAP for that receptor. For example, the RG established in the Site 21 ROD/Final RAP for vinyl chloride was based on a groundwater to vapor intrusion exposure pathway for the industrial worker but was not based on exposure to groundwater in a trench by a construction worker. Alternatively, the RG established in the Site 21 ROD/Final RAP for TCE was based on exposure to groundwater in a trench by a construction worker, but was not based on the groundwater to vapor intrusion exposure pathway by an industrial worker. iii. The following text has been added to the end of the Changes in Risk Assessment Methods row of Table 2-23 (formerly Table 2-22): *"**In addition, changes in exposure parameters for the evaluation of the construction worker include adult body weight increasing from 70 kg to 80 kg, and skin surface area increasing from 5,700 cm^2 to 6,032 cm^2. Similarly, changes in exposure parameters for the evaluation of commercial/industrial workers and residents include an adult body weight increasing from 70 kg to 80 kg. Lastly, the exposure duration for the adult resident decreased from 24 years to 20 years.**"* iv. Soil gas RGs will not be established. However, a new table, Table 2-25: Site 21 Soil Gas Screening Levels, was added to the Five-Year Review to show the COCs, the soil gas screening levels that were attached to the 2013 ROD/Final RAP, and current screening criteria using the revised default AF of 0.03.

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Number	Commenter	Site	Comment	Response
78 (cont'd)	DTSC HERO Comment 3 (cont'd)	Site 21 (cont'd)		c. The skin surface area was updated from 3,527 cm^2 to 6,032 cm^2 in Table 2-24 (formerly Table 2-23), and the change was noted in Note 3. Groundwater cleanup goals presented in Table 2-24 (formerly Table 2-23) were revised to include the increased skin surface area. d. Table 2-17 (formerly Table 2-16) was edited to include the negative sign as noted in the comment. In addition, the 10^{-5} and 10^{-6} call outs in "Note a" were changed to 1E-05 and 1E-06 for consistency with other tables in the document. Note: The Site 21 groundwater RGs that were selected in the ROD/Final RAP were based on a cancer risk of 1E-05 for non-residential receptors (for example, construction workers) and 1E-06 for residential receptors. Table 2-17 (formerly Table 2-16) and Table 2-24 (formerly Table 2-23) present the Site 21 groundwater RGs. The RGs for groundwater at Site 21 may differ from RGs for groundwater at Site 24 because the RGs selected in the Site 24 ROD/Final RAP were based on a cancer risk of 1E-06 for both non-residential and residential receptors. Table 2-27 (formerly Table 2-25) and Table 2-32 (formerly Table 2-30) present the Site 24 groundwater RGs. The basis of the RGs is provided as a footnote to each of the tables.
79	DTSC HERO Comment 4	Site 24	**IR Site 24**. a. **Section 2.4.5.2, Table 2-29 – Technical Evaluation – Question B**. i. Changes in Applicable or Relevant and Appropriate Requirements or TBC Criteria. Please see Comments 1.c.i and 3.b.i above regarding removing the sentence from page 93 of the report, "These regulations are not applicable to the remedial actions at these sites because the regulations apply to cleanups performed under the authority of the California Health and Safety Code and Site 24 is being addressed under the authority of CERCLA." Please remove the sentence or clarify what regulation is not applicable. ii. Changes in Risk Assessment Methods. 1. Please revise the text to reflect that HERO recommends a surface area of 6,032 cm^2 for the construction worker and not 3,527 cm^2. See Comment 4.b, below. b. **Table 2-30 – Groundwater Cleanup Goals**. Please note that HERO recommends a skin surface area for the construction worker of 6,032 cm^2, please see Comment 1.e. Please revise the footnote in the table and ensure that the revised construction worker cleanup goals are revised to account for the recommended skin surface area.	a. i. The subject sentence in the ARAR or TBC Criteria row of Table 2-31 (formerly Table 2-30) was revised as follows: "***The regulations at Cal. Code Regs. tit. 22 §§ 69020, 69021, and 69022 are not applicable to the RAs at Site 24 because Site 24 is being addressed under CERCLA and these regulations are applicable to sites being addressed under the authority of the California Health and Safety Code.*** ~~*These regulations are not applicable to the RAs at these sites because the regulations apply to cleanups performed under the authority of the California Health and Safety Code and Site 24 is being addressed under the authority of CERCLA.*~~" ii. The last sentence of the first paragraph in the Changes in Risk Assessment Methods row of Table 2-31 (formerly Table 2-29) was revised to reflect the updated skin surface area: *"Two exposure factors for the construction worker have been revised since the risk assessment was finalized: the adult body weight has changed from 70 kg to 80 kg and the skin surface area exposed to groundwater in the trench for the construction worker has changed from 5,700 cm^2 to* ~~*3,527*~~ ***6,032*** *cm^2 (DTSC, 2019)."* b. The skin surface area was updated from 3,527 cm^2 to 6,032 cm^2 in Note 3 of Table 2-32 (formerly Table 2-30).
80	DTSC HERO Comment 5	Site 30	**IR Site 30**. a. **Section 2.6.5.2, Table 2-45 – Technical Evaluation – Question B**. i. Changes in Risk Assessment Methods. 1. For completeness, please include a discussion in the table regarding the changes in the exposure parameters used in the risk assessment. HERO acknowledges that the changes in exposure parameters does not affect the RG for dioxin, as the RG is based on ambient levels.	The second paragraph of the Changes in Exposure Pathways row in Table 2-47 (formerly Table 2-45) was revised to the following: *"****Both*** ~~*T*~~***t****he* ~~*exposure assumptions,*~~ *cleanup level* ***based on an ambient concentration***~~*,*~~ *and RAOs used at the time of the remedy selection are still valid.* ***Some exposure assumptions have been revised since the Site 30 risk assessment was completed, such as adult body weight increasing from 70 kg to 80 kg or the skin surface area exposed to groundwater in the trench by a construction worker increasing from 5,700 cm^2 to 6,032 cm^2. However, the RG for dioxin is based on an ambient concentration and is not affected by these exposure assumptions.****"*
81	CDFW-OSPR General Comment 1	All Sites	CDFW-OSPR appreciates the opportunity to provide guidance on the planned cleanup at NAVSTA TI. This memorandum will serve to inform the Navy of our continuing interest in coordinating and resolving any natural resource issues, as one of the designated State natural resource trustees.	Thank you for your interest and support.

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Number	Commenter	Site	Comment	Response
82	CDFW-OSPR General Comment 2	All Sites	For all appropriate sections which already have RODs, all sections should include a first subsection "*Remedy Selection*" which would summarize the ROD, and provide the following information for each ROD: i) Summary description of the ROD, ii) Remedial Action Objective (RAO), and iii) Selected remedies (including any appropriate institutional controls [ICs]), before the actual remedial actions are described. If there is a remedy implementation at some point, then a description of the completed construction of the remedy system should be provided together with its operating conditions (including all associated discharge permits where appropriate), and whether or not it was determined to be Operating Properly and Successfully (OPS) or completed with a Remedial Action Completion Report (RACR). If it is OPS, provide the number of years of Operations and Maintenance (O&M), the O&M operating conditions including any discharge requirements, and all performance criteria as determined in RAOs. These summaries would serve as the basis for the data review section, which then in turn serves as the basis to answer Questions A-C for each of the sites included in the Five-Year Review document.	The requested information is provided in the "Response Action Summary," which is the second subsection for each site detailed in Section 2.0. For example, "Response Action Summary" is provided in Section 2.1.2 for Site 6, Section 2.2.2 for Site 12, and so forth. The "Response Action Summary" sections precede the data review and technical assessment questions as indicated in the comment. No revisions were made to the Five-Year Review text to address this comment.
83	CDFW-OSPR General Comment 3	All Sites	In the "*Five-Year Review Process*," the list of documents reviewed should include all the references cited in each section. At the very least, it should include a comprehensive list of all CERCLA process (Remedial Investigation [RI]/FS, ROD, Remedial Design/Remedial Action [RD/RA], O&M) final documents for each section. Documents for evaluation of ARARs and Risk Assessments should be identified here, with a brief discussion on the ARAR and Human Health and Ecological Risk Assessment changes summarized.	Pursuant to the 2016 USEPA Five-Year Review Template, the Five-Year Review process section discusses community notification, involvement and site interviews; data collected since the last Five-Year Review, and the site inspection. This Five-Year Review report for TI follows the USEPA Five-Year Review Template, except that community notification, involvement, and site interviews were moved to the front of the document since this is a multi-site document and unnecessary duplication within each site was avoided. Tables included with each site list the site-specific previous investigations, actions, remedy implementation, and long-term monitoring. Tables 2-1, 2-10, 2-16, 2-26, 2-35, and 2-41 include the lists of relevant CERCLA documents. No revisions were made to the Five-Year Review text to address this comment.

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr>
<td>84</td>
<td>CDFW-OSPR General Comment 4</td>
<td>Site 27</td>
<td>CDFW-OSPR has concerns that information presented or referenced in the current document does not indicate the selected remedy for Site 27, is functioning as intended.

The basis for the Navy's chosen remedy (removing sediment located within 75 feet from the shore) is to eliminate the complete exposure pathway to diving ducks "since (1) all sediment that contains lead shot within the top 2.5 feet will be removed; (2) lead shot in the remaining offshore area of Site 27 is buried under at least 2 feet of sediment, which is not accessible to diving ducks" (DON, 2012). CDFW-OSPR has concerns with both 1 and 2 of the Navy's statement based on additional information contained in the current document.

(1) The Navy's remedy included backfilling the dredged area within 75 feet of the shore with "sand and gravel to create a filter layer with an approximate thickness of 0.5 foot" followed by backfilling with "rock to create a protective armor layer having an approximate thickness of 1.0 foot" (Tetra Tech, 2013). The backfill layers were to have a "minimum of 0.33 foot of filter layer material" and a protective armor layer "with a minimum thickness of 0.75 foot except in areas where riprap was present" (Navy, 2014). The Navy's bathymetric survey data (Figures 4-4 and 4-5 [Navy, 2014]) show filter and rock armor layers post dredging based on minimum thicknesses for both layers. Figure 6-2 (Year 1 Survey vs. Predredge Conditions Difference) in the current document show green areas between the minimum and maximum allowable layer thickness for the backfill area, as does Figure 5 (Year 5 vs Year 1 Survey Differences). CDFW-OSPR concern is that cumulative differences (-0.25 ft. + -0.25 ft. = -0.5 ft.) between post dredge bathymetric surveys and the 5 year bathymetric survey may not confirm that the minimum thickness of the filter and armor layers remain and that settling of these layers has not occurred. Please provide additional information and/or data to show that the minimum layer of filter material (0.33 ft) and armor (0.75 ft) remains over sediments containing lead shot within 75 feet of the shoreline and that settling of these layers has not occurred.

(2) The Navy's remedy for protection of diving ducks to lead shot present in sediments in Clipper Cove, further out that 150 ft. from the shoreline based on eight samples from within the remainder of Site 27 (Tetra Tech, 2010), is to implement site-wide ICs to "restrict disturbance of the remaining sediment, which will prevent or minimize re-suspension of lead shot from deeper sediments in the undredged portion of the site" (Navy, 2012). IC's established for Clipper Cove include including a "No Wake" zone within the entire ARIC and an "No Mooring" or no-anchor area over the durable cover and prohibitions against operating vessels at a speed greater than 25 percent (MMEC, 2015). CDFW-OSPR is providing images (Attachments 1 and 2 of Attachment A) showing boats in Clipper Cove in violation of ICs.

CDFW-OSPR has concerns that re-suspension of lead shot from deeper sediments may have occurred or is occurring and requests the TIDA conduct sediment sampling of sediments further offshore than 150 ft. to ensure lead shot remains inaccessible to diving ducks (i.e. deeper than 2 ft.). See Attachment A (including Attachments 1 and 2).</td>
<td>(1) Table 2-39 (formerly Table 2-38) was revised as follows:

<table>
<tr><th>Question</th><th>Summary</th></tr>
<tr><td>RA Performance</td><td>Yes. A comparison of the Year 1 and Year 5 Bathymetric Surveys, site inspections, and interviews with personnel knowledgeable about the site indicates that the remedy as outlined in the ROD/Final RAP is functioning as intended. The 1.5-foot thick engineered backfill is in place within most of the backfill area. In the areas where the engineered backfill may be less than 1.5-feet, there is still 1.0- to 1.25-feet of engineered backfill across the backfill area. Two feet of sediment coverage is in place in the remaining offshore area of Site 27.~~A review of documents, site inspections, and interviews with personnel knowledgeable about the site indicates that the remedy as outlined in the ROD/Final RAP is functioning as designed.~~</td></tr>
<tr><td>System Operations/O&M</td><td>No~~Yes~~. Site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone."~~No O&M issues have been identified for Site 27.~~</td></tr>
<tr><td>Implementation of Institutional Controls</td><td>Yes. The ROD/Final RAP selected ICs, including post-remedy monitoring, as a component of the remedy. The ICs and post-remedy monitoring are described in the LUC RD and LUC RD Addendum and are contained in the transfer deed and CRUP dated September 20, 2016, transferring Site 27 to TIDA. In accordance with these documents, the IC objectives associated with Site 27 are to allow for the development of a new marina, restrict the disturbance of the sediment, restrict the disturbance of the filter and armor layers that will adversely impact the integrity of the remedy, and prepare an SMP describing specific implementation actions. The post-remedy monitoring includes completion of bathymetric surveys in Year 1, after the protective armor layers were constructed, and every five years thereafter.

The DON completed the Year 1 Bathymetric Survey (MMEC 2015) and conducted the annual LUC inspections in 2015, 2016 and 2017. TIDA completed the SMP, the Year 5 Bathymetric Survey, and conducted the annual LUC inspections in 2018 and 2019 (Langan, 2017, 2018, 2019a, 2019b). As of the 2019 LUC inspection, no structures had been emplaced within the armor layer.

~~On September 20, 2016, Site 27 was transferred to the TIDA. In accordance with the Site 27 CRUP, ICs and LUCs associated with Site 27 require on-going annual inspections and monitoring. The DON previously conducted annual IC/LUC compliance monitoring in 2015, 2016 and 2017. TIDA conducted the annual IC/LUC compliance inspection in 2018 (TIDA, 2018).~~

~~The ROD/Final RAP requires implementation of land use restrictions to limit potential ingestion of lead shot by diving ducks foraging for food or grit. As of the 2018 LUC inspection, a visual inspection did not yield any signs of disturbance of the armor layer. Additionally, there were no signs during the 2018 inspection that areas of the armor layer were used as a boating anchorage or that any structures had been emplaced within the armor layer.~~

The IC performance objectives are currently being met. However, IC implementation actions identified in the SMP have not been completed (signage for the "No Wake Zone" and "No Mooring Zone") and may not be enforced. These are identified in the System Operations/O&M section of this table. ~~by access restrictions created by natural conditions (shallow water near shore) that minimize access by vessels that could potentially damage the rock armor layer. No activities were observed that would have violated the ICs.~~</td></tr>
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84 (cont'd)	CDFW-OSPR General Comment 4 (cont'd)	Site 27 (cont'd)		Please also see the Navy's response to Regional Water Board Comment #19 for detailed changes to Section 2.5.6. (2) Table 2-39 (formerly Table 2-38) was revised as shown above in response to (1). In addition, Section 2.5.6 was revised as shown in the Navy's response to Regional Water Board Comment #19.
85	CDFW-OSPR Specific Comment 1	Executive Summary	**Page ES-1. Executive Summary (ES)**. For each area in ES, CDFW recommends introductory background summary be organized as follows: – Location, history of contamination, RI/FS, ROD with contaminants of concern and RAOs, RD/RA, O&M. General ES should include the following information: – Goal of the FYR and the triggering action for this review – General summary of this FYR (background, data analysis, site visit and community interview) For each Area, provide a short summary of RI/FS, RAOs in RODs and remedy selected to meet RAOs, RA and O&M status, ARAR change, ICs status, general protectiveness, and what to be done during the next FYR to meet RAOs.	The Navy has prepared the NAVSTA TI second Five-Year Review per the 2016 USEPA guidance for Five-Year Review documents. Information requested in the comment is presented in Sections 1.0 and 2.0 of the Five-Year Review. No revisions to the Executive Summary are necessary.
86	CDFW-OSPR Specific Comment 2	Executive Summary	**Page ES-2. Table ES-1: Summary of Protectiveness Determination for Sites at Former Naval Station Treasure Island**. The Navy indicates "Protective" under the "Protectiveness Determination" for Site 27, Clipper Cove Skeet Range. See General Comment 4, above and Attachment A.	Please refer to the Navy's response to CDFW-OSPR General Comment #4.
87	CDFW-OSPR Specific Comment 3	Executive Summary	**Page ES-3. Issues and Recommendations**. The Navy states that "[n]*o issues have been identified for these Sites that would affect current or future protectiveness of the remedy. No recommendations or follow-up actions have been identified*" for Sites 12, 21, 27, and 30. See General Comment 4, above, Attachment A and comments related to Site 27 below.	Comment noted. Please see the Navy's responses to CDFW-OSPR General Comment #4, and Specific Comments #5 and #14.
88	CDFW-OSPR Specific Comment 4	Abbrevia-tions & Acronyms	**Pages x through xii, List of Abbreviations & Acronyms**. Please include the acronyms RIP and ACOM, used in the document along with the definitions in this section.	The acronyms for RIP (remedy in place) and ACM (asbestos-containing materials) have been added to the List of Abbreviations & Acronyms. The Navy assumes ACOM referenced in the comment is a typographical error as ACOM is not found in the report.
89	CDFW-OSPR Specific Comment 5	Site 27	**Page 4. Table 1-1: CERCLA Sites**. This table identifies Site 27 as "Clipper Cover Skeet Range". Previous documents identify Site 27 as "Clipper Cove Skeet Range". Please correct.	References to "Clipper Cover" are incorrect and have been revised to "Clipper Cove" in Table 1-1 and in the Section 2.5 header.
90	CDFW-OSPR Specific Comment 6	All Sites	**Page 13. Figure 1-1. Site Location Map**. CDFW-OSPR requests the Navy identify the locations of all IR Sites on this or an additional map to provide special representation regarding distances between IR Sites.	Figure 1-1 was revised to show the CERCLA sites listed in Table 1-1 for only Treasure Island because no sites on Yerba Buena Island required evaluated in this Five-Year Review.
91	CDFW-OSPR Specific Comment 7	Site 6	**Page 35. Figure 2-6. Site 6, Extent of Excavation & Confirmation Sample Results**. Please correct the figure to identify the analytes, sample identification numbers, and results. It appears that sample (identification) numbers have been entered rather than the analyte name(s).	The result boxes on Figure 2-6 already indicate the analyte, sample identification number, and result. An example result box was added to the legend to explain the components of the result boxes for clarity. In addition, confirmation results for manganese, when collected from Subarea 3, were added to Figure 2-6.

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Number	Commenter	Site	Comment	Response
92	CDFW-OSPR Specific Comment 8	Site 12	**Pages 42 through 50. Section 2.2 Site 12 – TI Housing Area (Old Bunker Area)**. Site 12 groundwater wells within the tidal mixing zone indicate exceedances of RGs for metals (Figure 2-15). Should groundwater containing Site COCs impact waters, the State Fish and Game Code section 5650 (a) would be an ARAR. CDFW-OSPR requests the TIDA ensure groundwater containing any substance deleterious to fish, mammals, plant life or bird life does not reach San Francisco Bay. California F&G Code section 45 defines "*fish*" as "*wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals*."	The only RG established for metals in the Gateview Arsenic/TPH Area is for arsenic (36 µg/L). Arsenic was not detected above the reporting limit at four shoreline wells (12-MW34 through 12-MW37) in December 2018 indicating that arsenic is not discharging to the Bay at concentrations above the RG. Figure 2-15 was revised to show the groundwater monitoring results for arsenic for the four shoreline wells (12-MW34 through 12-MW37). The ROD/Final RAP for Site 12 did not select California Fish and Game Code Section (§) 5650 as an Applicable or Relevant and Appropriate Requirement (ARAR). ARARs are "frozen" when selected in the ROD/Final RAP and requirements not identified as ARARs in the ROD/Final RAP must be achieved only when determined to be necessary to ensure that the remedy is protective of human health and the environment (National Oil and Hazardous Substances Pollution Contingency Plan at 40 Code of Federal Regulations § 300.430(f)(ii)[B]). California Fish and Game Code § 5650 is not necessary for the protection of the environment. The remediation goal selected in the ROD/Final RAP is an ARAR-based goal from the California Toxics Rule. Achieving this goal is protective of the aquatic receptors in the Bay. No changes were made to the Five-Year Review in response to this comment.
93	CDFW-OSPR Specific Comment 9	Site 12	**Page 48. Section 2.2.4.2 Site Inspection**. The Navy states that "[o]*bservations made during the site inspection indicated that the monitoring network and security measures were in place. Missing bolts or damaged well boxes were noted in some of the monitoring wells. No issues concerning the protectiveness of the remedies were noted".* Photograph 40 (Appendix B), labeled: "*View of partially collapsed fencing at central portion of RAD control area western boundary of Site 12 SWDA Westside, looking northeast (1/10/2019)*" appears to contradict the Navy's statement regarding security measures being in place. Additionally, the ice plant shown growing through the collapsed fencing would appear to indicate that the fencing has been collapsed for a length of time, allowing access to a restricted area where radiological contamination remains. CDFW-OSPR requests the Navy repair the fence to prevent access to the restricted area and explain if the fencing is part of any LUC for Site 12.	The second paragraph of Section 2.2.4.2 was revised as shown below to indicate the actions Navy took to fix the collapsed fencing at Site 12. Please note the damaged well box identified in the site inspection was located within a solid waste disposal area, which is not subject to this Five-Year Review; thus, text related to damaged well boxes at Site 12 was removed from the text. "*Observations made during the site inspection indicated that the monitoring network and security measures were in place. Missing bolts* ~~*or damaged well boxes*~~ *were noted in some of the monitoring wells.* ***In addition, partially collapsed fencing was observed during the site inspection at the central portion of the radiologically controlled area along the western boundary of Site 12 SWDA Westside; the fencing was repaired by the DON in fall 2019. Well bolts were replaced by the Navy.*** *No issues concerning the protectiveness of the remedies were noted."* As noted above, the fencing in question has been repaired. Ongoing weekly inspections are completed for the radiologically controlled areas to ensure site security.

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<table>
<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>94</td><td>CDFW-OSPR Specific Comment 10</td><td>Site 21</td><td>Page 67. Table 2-21: Technical Evaluation – Question A (Site 21). The Navy's summary of the RA performance question includes the following statement, "[t]he levels of PCE and TCE are similar to levels detected in 2015". Table 2-20 (Site 21 Soil Gas Mann-Kendall Results) shows increasing trends for TCE at three of the five locations, while PCE trends are increasing at two of the five locations. Please confirm and if necessary, revise the statement as necessary.</td><td>As noted in the Navy's response to Regional Water Board Comment #16, Table 2-21 (formerly Table 2-20) was revised to correct the observed, estimated trends in soil gas concentrations.

The RA Performance row of Table 2-22 (formerly Table 2-21) was revised as follows:

<table>
<tr><th>Question</th><th>Summary</th></tr>
<tr><td>RA Performance</td><td>Yes. Groundwater monitoring was discontinued in 2016 because groundwater monitoring conducted in 2014 and 2015 indicated that VOC concentrations were lower than RGs. The network of soil gas monitoring wells provides sufficient data to assess the condition of soil gas at the site. The soil gas results continue to ~~details~~ indicate the need for ICs and a deed notice.

In 2018, TCE concentrations in soil gas at 21-SG-05 were identified as probably increasing and TCE and PCE concentrations in soil gas at 21-SG-31 were identified as increasing. In 2018, TCE concentrations at 21-SG-05 were similar to historical concentrations of TCE measured in 2014 and 2015. PCE and TCE concentrations in soil gas at 21-SG-31 have increased from concentrations reported in 2014 and 2015; however, the concentrations measured in 2018 remain below the current commercial/industrial worker soil gas SSSL. PCE and TCE concentrations at the other three soil gas sample wells are similar to concentrations measured in 2014 and 2015. ~~The levels of PCE and TCE are similar to levels detected in 2015. The TIDA may choose to sample indoor air and any data generated would be reported in a subsequent Five-Year Review.~~</td></tr>
</table>

The third paragraph of Section 2.3.4.1 was also revised to refer to the Site 21 soil gas analytical results presented in Table D-7 in Appendix D, as shown in the Navy's response to Langan/TIDA Comment #7.</td></tr>
<tr><td>95</td><td>CDFW-OSPR Specific Comment 11</td><td>Site 24</td><td>Page 78. Section 2.4.1.1 Land and Resource Use. The Navy states that future development at Site 24 will include residential areas with "[m]ost residential parking will be in subsurface garages within residential buildings". The Navy has stated that the average depth to the water table is approximately 6.5-feet below ground surface (bgs) and that the tidal mixing ranges from 60 to 150 feet inland from the shoreline (Section 1.2.4). Please clarify if these garages will be below the water table within areas where tidal mixing occurs.</td><td>The Navy is not aware of the specific locations for the planned subsurface garages. Green building specifications for flood prevention presented on Page 337 of the 2011 Design for Redevelopment state "Finished first floor and garage entrances should be elevated to a minimum of 42" above current Base Flood Elevation (BFE). This includes an allowance for 36" sea level rise and 6" freeboard." No revisions were made as a result of this comment.</td></tr>
</table>

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<tr><th>Number</th><th>Commenter</th><th>Site</th><th>Comment</th><th>Response</th></tr>
<tr><td>96</td><td>CDFW-OSPR Specific Comment 12</td><td>Site 24</td><td>Page 83. Table 2-25: Site 24 Cleanup Goals. The table contains no superscripts, yet the "Notes" include superscripts. Please update the table to include the needed superscripts.</td><td>Table 2-27 (formerly Table 2-25) was revised to include superscripts in the soil gas and groundwater cleanup goals column headers to provide reference to "Notes" section, as shown below.
<table>
<tr><th>Receptor</th><th>COC</th><th>Soil Gas Cleanup Goals (µg/m^3) [1]</th><th>Groundwater Cleanup Goals (µg/L) [2]</th></tr>
<tr><td rowspan="4">Commercial/ Industrial Worker</td><td>cis-1,2-DCE</td><td>209,217</td><td>NE</td></tr>
<tr><td>PCE</td><td>2,862</td><td>NE</td></tr>
<tr><td>TCE</td><td>3,970</td><td>NE</td></tr>
<tr><td>VC</td><td>188</td><td>NE</td></tr>
<tr><td rowspan="4">Construction Worker</td><td>cis-1,2-DCE</td><td>NE</td><td>230</td></tr>
<tr><td>PCE</td><td>NE</td><td>210</td></tr>
<tr><td>TCE</td><td>NE</td><td>42</td></tr>
<tr><td>VC</td><td>NE</td><td>15</td></tr>
<tr><td rowspan="4">Resident (Adult and Child)</td><td>cis-1,2-DCE</td><td>46,408</td><td>NE</td></tr>
<tr><td>PCE</td><td>533</td><td>NE</td></tr>
<tr><td>TCE</td><td>615</td><td>NE</td></tr>
<tr><td>VC</td><td>31</td><td>NE</td></tr>
</table>
Source: DON, 2015a
Notes:
1. Soil gas cleanup goals developed for future commercial/industrial and residential receptors are based on a cancer risk of 1E-06 and an HI of 1.
2. Groundwater cleanup goals were developed based on a cancer risk of 1E-06 and an HI of 1. For the future construction worker, groundwater concentrations are protective of the dermal and inhalation pathways under a trench scenario.</td></tr>
<tr><td>97</td><td>CDFW-OSPR Specific Comment 13</td><td>Site 24</td><td>Page 91. Section 2.4.4.7 Site Inspection. The Navy states that "[o]bservations made during the site inspection indicated that the remedies' monitoring network was in place. No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP and implemented by the LUC RD". Site inspection information and photographs (Appendix A and B) indicate that the following wells were not observed to be "in place": wells 24-SG36, 24-SB46, 24-IW21, 24-EW29, 24-BB82, 24-BB80 (Shipping containers placed on top of these wells, preventing well inspections); commercial packing crates on top of well 24-SB26 and well 24-SG27 was covered by a soil pile preventing these wells from being inspected (See Figures 2-25 and 2-26). Without actual observations of the wells, the Navy would be unable to detect if "issues concerning the protectiveness of the remedies" were present. Please revise to accurately reflect that not all wells were inspected and confirmed to have "[n]o issues" and include a discussion on the possible effect on the remedy should these wells have "issues."</td><td>The second paragraph of Section 2.4.4.8 (formerly 2.4.4.7) was revised to indicate the site inspection issues as follows:
"Observations made during the site inspection indicated that the remedies' monitoring network was in place. However, the site inspection identified monitoring wells that were inaccessible by equipment or other materials overlaying the well, some wells were observed to be missing bolts, and one well had been damaged as it was no longer level with the ground surface. The well has since been repaired and missing bolts have been replaced. ~~No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP and implemented by the LUC RD.~~"
Section 2.4.6 was revised as shown below to add a row for the issue about ensuring all wells are accessible:
<table>
<tr><th rowspan="2">Issues</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Site inspection identified inaccessible monitoring wells.</td><td>No</td><td>No</td><td>Ensure wells are accessible prior to any monitoring event.</td><td>DON</td><td>DTSC</td><td>May 2021</td></tr>
</table></td></tr>
<tr><td>98</td><td>CDFW-OSPR Specific Comment 14</td><td>Site 27</td><td>Pages 111 through 126. Section 2.5 Site 27 – Clipper Cover [sic] Skeet Range. See General Comment 4 and Attachment A.</td><td>Comment noted. Please see the Navy's response to CDFW-OSPR General Comment #4.</td></tr>
</table>

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<tr><td>99</td><td>CDFW-OSPR Specific Comment 15</td><td>Site 30</td><td>Pages 127 through 134. Section 2.6 Site 30 – Daycare Center. Table 2-43: Site 30 Remedy Summary. The RAOs for "Soil" for the Commercial Current and Future Land Use scenario appear to be incomplete. Please update and complete or explain the meaning as currently stated.</td><td>Table 2-45 (formerly Table 2-43) was revised to remove the current and future land use column for consistency with other Remedy Summary tables in the document.</td></tr>
<tr><td>100</td><td>CDFW-OSPR Specific Comment 16</td><td>Appendix A</td><td>Appendix A: Site Inspection Checklist. Site Inspection Checklists for every site contain the following inaccuracies:
a. Sections for "Local regulatory authorities and response agencies" and "Other interviews (optional)" for every site all contain the entry "See Appendix A" for "Report Attached". The Navy is referring the reader/reviewer to the current appendix (Site Inspection Checklist) which contains this reference for each site but does not include any interview report(s) or information on such interviews. Should the reference be to Appendix C Interview Record and Interview Documentation? Please correct.
b. I. [sic] Site Information, section for "Attachments" for every site contain the instruction: "see Figure 2 of main report". The main report contains no "Figure 2", it does contain Figures 2-1 through 2-35. Please correct figure references.</td><td>a. Forms in Appendix A were revised to refer to the interviews included in Appendix C.
b. Forms in Appendix A were revised to refer to the proper figures in the Five-Year Review.</td></tr>
<tr><td>101</td><td>CDFW-OSPR Specific Comment 17</td><td>Appendix A</td><td>Appendix A: Site Inspection Checklist.
a. <u>Site 24. Section XI. Overall Observations. D. Opportunities for Optimization</u>. This section includes the following as an opportunity for optimizing monitoring and operation of the remedy: "Ensure all wells are accessible at all times". CDFW-OSPR requests the Navy include this information in its discussion of Site 24 in the main body of the report. See also Specific Comment 13.
b. <u>Site 27</u>.
i. Section V. Access and Institutional Controls.
– The Navy indicates "N/A [not applicable]" yet provides information other than N/A for B (Other Access Restrictions), C (Institutional Controls) and D (General). Based on these it appears that "Access and Institutional Controls" are applicable. Please correct or explain.
– B, Other Access Restrictions. The Navy indicates the presence of "[s]igns and other security measures". CDFW-OSPR requests the Navy provide photographs of the signage which should include signs indicating "No Wake", "5 MPH Zone", and "No Anchorage". Such signage is required to ensure the remedy remains protective of diving ducks.
ii. Section VII. Covers. Again, the Navy indicates "N/A", yet provides information on "Settlement", "Cracks", "Erosion" and "Holes" which contain information other than N/A for B (Other Access Restrictions), C (Institutional Controls), and D (General). Based on information contained in Sections V.B, V.C.2, VII.A.6, and VII.A.8 the cover is "underwater". Please explain how it was determined that the information presented for "Settlement", "Cracks", "Erosion" and "Holes" is accurate and correct.
See General Comment 4, Attachment A, and previous comments related to Site 27 above.</td><td>a. The observation and optimization recommendation noted in Appendix A for Site 24 to "ensure all wells are accessible prior to any monitoring event" was added as a new row to Section 2.4.6, as shown below.
<table>
<tr><th rowspan="2">Issues</th><th colspan="2">Affects Protectiveness (Yes/No)</th><th rowspan="2">Recommendation and Follow-up Actions</th><th rowspan="2">Party Responsible</th><th rowspan="2">Oversight Agency</th><th rowspan="2">Milestone Date</th></tr>
<tr><th>Current</th><th>Future</th></tr>
<tr><td>Site inspection identified inaccessible monitoring wells.</td><td>No</td><td>No</td><td>Ensure wells are accessible prior to any monitoring event.</td><td>DON</td><td>DTSC</td><td>May 2021</td></tr>
</table>
b. i. The Navy acknowledges that Section V of the site inspection form has marked "NA" for Access and Institutional Controls; however, ICs were evaluated in the site inspection and the "NA" did not hinder the inspection. No change was made in response to this comment.
In addition, Section 2.5.6 was revised as shown in the Navy's response to Regional Water Board Comment #19 to add additional Recommendation and Follow-Up Actions.
ii. The Navy acknowledges that Section VII of the site inspection form has marked "NA" for Covers; however, the cover was visually evaluated from the shoreline, so the NA did not hinder the inspection. No change was made to the site inspection checklist in response to this comment. However, the following edits were made to the main text of the Five-Year Review report.
The second paragraph of Section 2.5.4.2 was revised to the following:
"Observations made during the site inspection indicated that ~~the remedies were in place~~ <u>no structures had been emplaced within the armor layer. However, the site inspection indicated a lack of signage for the "No Wake Zone" and the "No Mooring Zone.</u> ~~No issues concerning the protectiveness of the remedies were noted. No activities were observed that would have violated ICs required in the ROD/Final RAP.~~"
In addition, Table 2-39 (formerly Table 2-38) was revised to reflect the visual site inspection results. Please see the Navy's response to CDFW-OSPR General Comment #4.</td></tr>
</table>

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Number	Commenter	Site	Comment	Response
102	CDFW-OSPR Specific Comment 18	Appendix B	**Appendix B: Site Inspection Photographs**. CDFW-OSPR requests the Navy provide photographs of locks on locked gates and restricted access/activities signs for Sites and areas where restricted access or other measures are part of the LUCs or ICs.	No Five-Year Review sites on NAVSTA TI require fencing or restricted access as part of the remedy or LUCs. The only fencing with gates that restrict access surround open CERCLA sites or radiologically controlled areas. No photographs were added to the Five-Year Review report as a result of this comment.

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