

Environmental Issues Management Plan

REPORT:

**Environmental Issues
Management Plan**

Berkeley Space Center Premises

Parcels 1A, 3, 5A, 5B, and 6A

Former NAS Moffett Field, California

Spring 2026

EKI C30022.00

Minor refinements to the proposed project (e.g., pile driving is no longer proposed as part of the project) were made after the preparation of the Environmental Issues Management Plan for the Berkeley Space Center at NASA Research Park. These refinements do not change the conclusions and/or recommendations in the Environmental Issues Management Plan.

ENVIRONMENTAL ISSUES MANAGEMENT PLAN

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Parcels 1A, 3, 5A, 5B, and 6A
Former NAS Moffett Field, California

Spring 2026

Prepared for:

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LIST OF ACRONYMS / ABBREVIATIONS

2022 Tiering Work Plan	<i>Site-Wide Vapor Intrusion Response Action Tiering Work Plan</i>
ACM	asbestos-containing materials
AFFF	aqueous film-forming foam
AST	aboveground storage tank
BAAQMD	Bay Area Air Quality Management District
BASMAA	Bay Area Stormwater Management Agencies Association
bgs	below ground surface
BMPs	best management practices
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene and xylenes
CAD	computer-aided design
Cal-EPA	California Environmental Protection Agency
CBC	California Building Code
CDF	controlled density fill
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-dichloroethene
CMC	California Mechanical Code
COPC	chemical of potential concern
CWMI	Chemical Waste Management, Inc.
1,1-DCA	1,1-dichloroethane
1,2-DCA	1,2-dichloroethane
1,1-DCE	1,1-dichloroethene
DERP	Defense Environmental Restoration Program
DHS	Department of Health Services
DNAPL	dense non-aqueous phase liquid
DTSC	Department of Toxic Substances Control
EATS	East-Side Aquifer Treatment System
EBS	Environmental Baseline Survey
EEC	Existing Environmental Conditions
EIMP	Environmental Issues Management Plan
EIS	Environmental Impact Statement
EKI	EKI Environment & Water, Inc.
ESL	Environmental Screening Level
FFA	Federal Facility Agreement
GAC	granular activated carbon
GC-MS	gas chromatograph coupled to a mass spectrometer
GWTS	groundwater treatment system
HAZWOPER	hazardous waste site operations
HDPE	high-density polyethylene
HHRA	Human Health Risk Assessment
HI	Hazard Index

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LIST OF ACRONYMS / ABBREVIATIONS (continued)

H&SP	health and safety plan
HVAC	heating, ventilation, and air conditioning
HVOC	halogenated volatile organic compound
IR	Installation Restoration
ISM	Incremental Sampling Methodology
ISD	incidental sewer discharge
ITRC	Interstate Technology Research Council
LCM	lead-containing material
LTA	lighter-than-air
LUC	land use restrictions and institutional controls
MCL	maximum contaminant level
MEW	Middlefield-Ellis-Whisman
MFA	Moffett Federal Airfield
mg/kg	milligrams per kilogram
MOU	Memorandum of Understanding
mph	miles per hour
MTBE	methyl tertiary butyl ether
NADP EIS	NASA Ames Development Plan Environmental Impact Statement
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NASA ARC	NASA Ames Research Center
NASA Moffett FFA	NASA-specific Moffett Field FFA
NAVFAC	Naval Facilities Engineering Systems Command
Navy	Department of the Navy
NEPA	National Environmental Policy Act
NEX	Naval Exchange
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NRP	NASA Research Park
NTCRA	Non-Time-Critical Removal Action
OMM	operations, maintenance, and monitoring
OMMMP	<i>Site-Wide Long-Term Vapor Intrusion Operation, Maintenance, Monitoring and Management Plan</i>
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
OVA	organic vapor analyzer
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PCM	PCB-containing material
PEL	Permissible Exposure Limit
PFOA	perfluorooctanoic acid
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid

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LIST OF ACRONYMS / ABBREVIATIONS (continued)

PFOS	perfluorooctanesulfonic acid
PID	photo-ionization detector
PISEC	Project Information and Summary of Environmental Conditions
POTW	Publicly-Owned Treatment Works
PPE	personal protective equipment
ppm	parts per million
ppmv	parts per million by volume
PPV	positive-pressure ventilation
Premises	An approximately 36-acre parcel that was formerly part of Naval Air Station Moffett Field in Santa Clara County, California
PRDs	permit registration documents
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSL	Regional Screening Level
SCVWD	Santa Clara Valley Water District
sf	square foot
Site	Naval Air Station Moffett Field Superfund Site
SMD	sub-membrane depressurization
SSD	sub-slab depressurization
SSV	sub-slab ventilation
STLC	Soluble Threshold Limit Concentration
SVOC	semi-volatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene
TCL	target concentration level
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TPHd	total petroleum hydrocarbons in the diesel range
TPHg	total petroleum hydrocarbons in the gasoline range
TPHmo	total petroleum hydrocarbons in the motor oil range
TSCA	Toxic Substances Control Act
TTLC	Total Threshold Limit Concentration
TTO	total toxic organics
trans-1,2-DCE	trans-1,2-dichloroethene
TCSA	Toxic Substances Control Act
TTLC	total threshold limit concentration
ug/L	micrograms per liter
ug/m ³	micrograms per cubic meter
UCBJV	University of California, Berkeley Joint Venture
U.S. EPA	United States Environmental Protection Agency
UST	underground storage tank

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LIST OF ACRONYMS / ABBREVIATIONS (continued)

VI	vapor intrusion
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region
WATS	West-Side Aquifers Treatment System
Weston	Roy F. Weston
WET	Waste Extraction Test

EXECUTIVE SUMMARY

The National Aeronautics and Space Administration (NASA) has entered into a lease (Lease) with Moffett Properties, LLC, (Master Lessee), which is a subsidiary of Moffett Partners, LLC a joint venture of The Regents of the University of California (UC Regents) and SKSP NRP, LLC, for an approximately 36-acre parcel (Premises) that was formerly part of Naval Air Station (NAS) Moffett Field in Santa Clara County, California (Figure 1). Moffett Properties, LLC intends to redevelop the Premises with new or replacement buildings, site improvements, and landscaping improvements (collectively, the “Project”) under the name “Berkeley Space Center.” The Premises is located within the NASA Research Park (NRP) portion of the Naval Air Station Moffett Field Superfund Site (Site) and soil and groundwater within the Premises have been impacted by historical use by the Navy, as well as by the migration of groundwater containing chlorinated volatile organic compounds (VOCs) from the upgradient Middlefield-Ellis-Whisman (MEW) Superfund Site located south of the Premises in the City of Mountain View.

Nearly all of the area known as Moffett Field, with the exception of two housing areas, was transferred to NASA in 1994. In accordance with the transfer documents and a 1994 Amendment to the Navy Moffett Field Federal Facilities Agreement (FFA), the Navy retained all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response authority for Moffett Field, while NASA became responsible for ongoing environmental operations. Additionally, as the land manager at Moffett Field after 1994, NASA is responsible for implementation of institutional controls for Navy response actions. In 2014, United States Environmental Protection Agency (U.S. EPA), the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), and NASA entered into a NASA-specific Moffett Field FFA (the “NASA Moffett FFA”) which sets forth NASA’s responsibilities at Moffett Field for addressing contamination within areas of contamination where NASA itself is responsible and for implementing institutional controls for the areas where it has responsibility as the land manager of NASA Research Park.

This Environmental Issues Management Plan (EIMP) provides a decision framework for the management of residual chemicals in soil, groundwater, and existing structures within the Premises during occupancy and development. The EIMP is intended to describe procedures to address the known remaining environmental conditions within the Premises, as well as contingency actions to be taken in the event that previously-unknown environmental conditions are encountered during development of the Premises. The purpose of the EIMP is to provide sufficient information to the Master Lessee, its tenants, and Project Developers,¹ to comply with land use restrictions and institutional controls (LUCs) and take reasonable steps with respect to environmental conditions within the Premises to help ensure that occupancy and development activities within the Premises

¹ In this document, Project Developer refers to the entity performing the project in question.

proceed in a coordinated matter with the ongoing response actions being undertaken by the Responsible Parties (i.e., Navy, MEW Companies, and NASA). In addition to activities to take place on the Premises, this EIMP applies to off-site improvements outside the Premises to support the development of the Premises.

It is the intent of the Master Lessee and NASA that the parties that have been named by U. S. EPA or the Water Board as the Responsible Parties for contamination at the Premises, and any other responsible parties, retain this responsibility and continue to perform their ongoing obligations such as, but not limited to, investigation, monitoring, remediation, operations, maintenance, and reporting, independent of the Master Lessee.² Figure 4 and Figure 5 illustrate the Responsible Parties for soil, groundwater, and vapor intrusion (VI) issues within the Premises.

During 2016, NASA assumed Lead Agency status and responsibility for operations, maintenance, and monitoring (OMM) responsibilities at Installation Restoration (IR) Site 1 and IR Site 22; in addition, NASA also assumed OMM responsibilities for IR Site 28.

The implementation of this EIMP by the Master Lessee, tenants, Project Developers, and other entities, is not intended to relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, this EIMP allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by another Responsible Party, but such actions will not result in Master Lessee becoming a Responsible Party. NASA will facilitate communication between the Master Lessee and/or Project Developer and the other Responsible Parties (Navy and MEW Companies) when requested.

The EIMP was developed with input from U.S. EPA and the Water Board as lead regulatory agencies³ for the Site to identify and describe the measures to be taken during Premises development to address environmental conditions within the Premises. By prescribing procedures to be followed if contaminated structures, soil, and groundwater are encountered during development activities within the Premises, the potential for delays due to environmental conditions can be reduced.

² Refer to the 1990 Federal Facility Agreement (FFA; U.S. EPA, 1990) as amended in 1993 (U.S. EPA, 1993); the 1992 Memorandum of Understanding (NASA/Navy, 1992) and 1993 clarification letter (Navy, 1993); the 2014 FFA (U.S. EPA, 2014c); and Records of Decision (ROD) for OU 2 (Navy, 1994), OU 5 (Navy, 1996), OU 1 (Navy, 1997), OU 00 (No Action Sites; Navy, 2002a), IR Site 22 Landfill (Navy, 2002b), IR Site 27 (Navy, 2005), IR Site 25 (Navy, 2010); Navy ROD Amendment (Navy, 2014); and MEW Superfund Study Area ROD Amendment (U.S. EPA, 2010).

³ With respect to the contamination within the MEW Superfund Study Area, the U.S. EPA is the lead regulatory agency and with respect to contamination within the Naval Air Station Moffett Field Superfund Site, the Navy is the Lead Agency and the U.S. EPA and Water Board are the lead environmental regulatory agencies.

The EIMP provides a baseline of minimum design considerations for new construction, risk management measures to be implemented during construction at the Site, post-construction risk management procedures for future subsurface activities at the Site, as well as procedures for long-term compliance with this EIMP, CERCLA, and other environmental requirements. All Master Lessee partners, tenants, Project Developers, and other entities with responsibility for activities within the Premises shall independently: (1) review available information concerning environmental conditions within the Premises; (2) determine the adequacy of this EIMP with respect to expected environmental conditions as well as the conditions actually encountered during development and the intended land use; (3) evaluate the current understanding of the health and environmental effects of identified chemicals of potential concern (COPCs), to the extent the understanding of health and environmental effects assumed in this EIMP may change; (4) comply with applicable policies, laws and regulations; and (5) establish management procedures to ensure that risk management measures are properly implemented and maintained.

In addition to the tasks listed above, the Master Lessee and NASA will: (1) inform the applicable regulatory agencies of any relevant changes within the Premises; and (2) ensure that the EIMP is reviewed by qualified environmental professionals and modified periodically, as necessary, to address relevant changes and seek review and approval from the applicable regulatory agencies for any relevant changes to the EIMP. Relevant changes include changes in environmental conditions, land uses, and/or applicable laws and regulations.

Existing Environmental Conditions

Numerous potential source areas within the Premises have been investigated and remediated by the Navy; these sources are primarily associated with underground storage tanks (USTs) and sumps that contained petroleum hydrocarbon products and/or chlorinated VOCs.

A large regional plume of chlorinated VOCs is present at the Premises. The primary source of this contamination is migration of contaminated groundwater from the upgradient MEW Superfund Site that has commingled with groundwater contamination from Navy chlorinated solvent sources located within the NRP and NASA sources within the NASA Ames Research Center (NASA ARC). In addition, petroleum hydrocarbons and fuel-related constituents, such as benzene, toluene, ethylbenzene and xylenes (BTEX), from sources at Moffett Field, have also impacted groundwater beneath the Premises. The companies remediating the MEW Superfund Site (MEW Companies) have installed and are operating a groundwater remediation system on the Premises and groundwater monitoring wells for groundwater remediation systems for the MEW companies and the Navy are located within the Premises.

As a result of investigations and remedial actions that have been performed within the Premises, the identified environmental conditions and primary COPCs that need to be considered during redevelopment are:

- the presence of chlorinated VOCs in groundwater and in soil within the Premises;
- the presence of total petroleum hydrocarbons and other fuel-related constituents, including BTEX compounds, in groundwater and in soil within the Premises;
- the presence of per- and polyfluoroalkyl substances (PFAS) compounds in groundwater within the Premises;
- the potential presence of elevated concentrations of polychlorinated biphenyls (PCBs) in soil surrounding buildings or transformers;
- the potential presence of elevated concentrations of lead in soil surrounding buildings;
- existing subsurface structures (e.g., sumps or tanks) that may need to be removed; and
- building materials containing hazardous materials (e.g., asbestos-containing materials, lead-based paint, and PCB-containing materials in existing buildings).

During all redevelopment activities within the Premises, the Project Developer will comply with LUCs and conduct development activities in a manner that is protective of on-site construction workers.

POTENTIAL EXPOSURE PATHWAYS

The Preferred Alternative in the 2002 Final Programmatic Environmental Impact Statement for the NASA ARC specified that all of the land that has become the Premises be designated for commercial/industrial land use only. The intended land uses for the Premises include research and development, classrooms, dormitory, hotel (short-term occupancy), and/or light industrial uses. As a result, the primary potential future receptors include (a) construction workers and maintenance workers; (b) indoor workers, such as office personnel, students, and lab workers; and (c) residents at the dormitories. Potential future receptors may be exposed to COPCs by one or more of the following pathways:

- inhalation of volatile chemicals from groundwater or soil;
- dermal absorption due to direct soil and/or groundwater contact;

- inhalation of airborne suspended soil particulates; and
- incidental soil ingestion.

VOCs are the primary COPCs found within the Premises. VOCs in groundwater and soil can volatilize into the pore spaces within unsaturated zone soils and migrate through the soil column and through cracks or penetrations in floors into enclosed indoor spaces, where they can be inhaled by potential receptors. The migration of COPCs from the subsurface into indoor air is called vapor intrusion. Vapor intrusion is the primary potentially complete exposure pathway that could affect future indoor residents and workers within all portions of the Premises.

Target Concentration Levels (TCLs)

Although cleanup standards have been developed for many areas at the Premises, to simplify implementation of the EIMP, TCLs were developed for soil, groundwater, sub-slab vapor, soil gas, and indoor air within the Premises using adopted cleanup levels in existing U.S. EPA decision documents (i.e., the 1989 *Record of Decision [ROD]* and the 2010 *Record of Decision Amendment for the Vapor Intrusion Pathway*; U.S. EPA, 1993; U.S. EPA; 2010) as well as the screening levels currently promulgated by applicable regulatory agencies (i.e., U.S. EPA's Regional Screening Levels [RSLs] and the Water Board's Environmental Screening Levels [ESLs]). These TCLs should be used to determine (a) groundwater management or disposal options (Section 6.1); (b) whether excavated soil can be reused as fill within the Premises and whether additional soil removal should be considered⁴ at locations where potential soil contamination is observed during development (as described further in Section 6.10); and (c) whether vapor intrusion mitigation measures (Section 5.3) may need to be installed in existing buildings.

The identified TCLs should also be protective⁵ of short-term construction workers, maintenance workers performing periodic subsurface activities, indoor workers and students within the Premises because the potential receptors and exposure assumptions used in developing the U.S. EPA's RSLs and the Water Board's ESLs are similar to (or more conservative than) those anticipated within the Premises. Neither the Master Lessee nor the Project Developer will be required to prepare a human health risk assessment for the

⁴ Should the construction project be located within the boundary of a previously closed site, the more stringent of the cleanup standards used to close the site and the TCLs will be used to determine whether additional excavation is required, unless otherwise agreed upon by the lead regulatory agency.

⁵ Human health risks are expressed as either (a) an incremental lifetime excess cancer risk or (b) a Hazard Index (HI) for non-cancer adverse health effects. Based on the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300.430), cancer risks are compared to a risk threshold between 10^{-6} (one-in-a-million) and 10^{-4} (one-in-ten-thousand), and the non-cancer HI is compared to a threshold level of 1, a level at or below which there are unlikely to be adverse health effects, even for sensitive populations.

proposed development unless such uses will result in more intensive exposure (e.g., consumption of homegrown produce) than typical uses identified above.

Based on historic soil and groundwater data collected within the Premises, TCLs were identified for several chlorinated VOCs, petroleum hydrocarbons and BTEX compounds, PAHs, PCBs, and Title 22 metals. In addition, PFAS compounds were detected in groundwater in sampling performed in 2021. Generally, in the absence of a ROD cleanup level, the selected TCL is the lower of the U.S. EPA's RSL (U.S. EPA, 2024c) and the Water Board's ESL (Water Board, 2025) assuming a commercial/industrial and residential land use scenarios.

TCLs for soil, groundwater, sub-slab soil vapors, soil gas, and indoor air are summarized below and listed in Tables 2, 3, and 4.

- For soils, with the exception of PCBs, Title 22 metals, and PFAS, the selected TCL is the lowest value from the RSLs under an industrial land use scenario or the ESLs under a commercial/industrial land use scenario where groundwater is a potential source of potable water (considering the direct contact, gross contamination, and groundwater protection pathways). The residential RSLs and ESLs (using same pathways) are used to develop the residential TCLs for soil.
- For PCBs, the TCL is the PCBs cleanup level promulgated in Toxic Substances Control Act (TSCA) in the Code of Federal Regulations (CFR; 40 CFR §761) for high occupancy areas.
- For Title 22 metals, the selected TCL is the lowest value from the (a) RSLs and (b) ESLs to account for potential dermal contact and incidental soil ingestion, unless that value is less than (c) background concentrations for metals in soil (Scott, 1995), in which case the soil TCL will be the background value.
- For COPCs not listed in Table 2, the lowest of the current RSLs and ESLs should be used as the TCL.
- For groundwater, the selected commercial and residential TCLs (Table 3) are the values from the 1989 MEW ROD; in the absence of a value in the 1989 MEW ROD, lowest value from the California Maximum Contaminant Levels (MCLs; SWRCB, 2024),⁶ the Water Board's (2025) Groundwater Vapor Intrusion Human Health Risk Level for shallow groundwater under a Commercial/Industrial Land Use Scenario or Residential Land Use Scenario, as applicable, gross contamination, and

⁶Federal MCLs were not included as TCLs for groundwater because California EPA MCLs are more stringent.

odor nuisance levels under a drinking water scenario.⁷ For COPCs not listed in Table 3, the lowest of the current RSLs and ESLs should be used as the TCL.

- For sub-slab soil vapors and soil gas, the selected commercial and residential TCLs (Table 4) are the lowest of (a) the U.S. EPA RSL for ambient air under a residential or industrial land use scenario, as applicable, multiplied by an attenuation factor of approximately 33 (i.e., 1/0.03) between indoor air and sub-slab soil vapor (U.S. EPA, 2015a) and (b) the Water Board ESL for sub-slab vapor / soil gas (Water Board, 2025). For COPCs not listed in Table 4, the lowest of the current indoor air RSLs multiplied by an attenuation factor of 33 and the sub-slab vapor / soil gas ESLs should be used as the TCL.
- For indoor air, the selected TCL (Table 4) is the 2010 Vapor Intrusion (VI) ROD Amendment indoor air cleanup level; in the absence of a ROD value, the lowest of the applicable U.S. EPA RSL and the Water Board ESL is used. For COPCs not listed in Table 4, the lowest of the current RSLs, ESLs values should be used as the TCL.

Cleanup levels for sites that are being addressed as part of the NAS Moffett Field Superfund Site and the MEW Superfund Site are those determined by the CERCLA lead agency and presented in the applicable NAS Moffett Field Superfund Site cleanup documents.

RISK MANAGEMENT

As discussed below, the measures described in Sections 5, 6, and 7 of the EIMP are intended to address the potential risks from the inhalation of volatile chemicals from impacted soil, groundwater, soil gas or sub-slab vapors, direct contact with impacted soil, groundwater, or impacted building materials, the inhalation of airborne particulates, and the ingestion of impacted soil or groundwater such that human health is protected during and after development of the Premises.

Redevelopment within the Premises must be conducted in a manner that protects remedial and monitoring systems in place to the extent possible. Certain components of the existing remedial and monitoring systems, including wells and treatment system piping, will need to be relocated, modified, or replaced to accommodate the redevelopment; these accommodations will be performed as necessary with minimal interference to the implementation of selected Site remedies. NASA will notify U.S. EPA

⁷ As the purpose of the groundwater TCL is to determine the appropriate management option for dewatering water produced during development activities (e.g., on-site dust control, discharge to storm drains, to the sanitary sewer, treatment at the West-Side Aquifers Treatment System (WATS), or offsite disposal), the Water Board Estuary Aquatic Habitat Goals were not considered applicable. Rather, discharge to storm drains and sanitary sewers typically have permitted discharge criteria and the Project Developer will comply with the permitted discharge criteria.

and Water Board regarding relevant redevelopment and construction activities within the Premises.

Risk Management Design Considerations for New Construction

Measures to Reduce Potential Exposure to VOCs in Indoor Air

Without mitigation, COPCs in groundwater in some areas within the Premises could potentially result in human health risks above the above-described TCLs in indoor air through vapor intrusion. These risks stem primarily from the migration of trichloroethene (TCE) in shallow groundwater or soil gas. In its *ROD Amendment for the Vapor Intrusion Pathway at the MEW Superfund Study Area* (2010 VI ROD Amendment; U.S. EPA, 2010), the U.S. EPA defined the MEW VI Study Area (Figure 5) based on the approximate extent of the 5 microgram per liter (ug/L) TCE in groundwater contour and developed different response actions for existing and future residential and commercial buildings within this area.

As specified in the 2010 VI ROD Amendment, the selected remedy for existing buildings within the MEW Site VI Study Area with TCE or other Site contaminants of concern at concentrations in indoor air above the applicable cleanup levels is the installation of an appropriate sub-slab/sub-membrane ventilation system, monitoring, and institutional controls, or, for commercial buildings (with the agreement of the property owner⁸), the use of the building's heating, ventilation, and air conditioning systems to mitigate vapor intrusion. For future buildings located within the MEW Site VI Study Area, the selected remedy is the installation of a vapor barrier, a sub-slab ventilation system that can be made active or the installation of an active sub-slab ventilation system, and indoor air sampling to confirm that there is no vapor intrusion risk. See Section 5.3.2 in this EIMP for discussion of the selected remedies and other engineering controls that may be used to mitigate the potential for vapor intrusion into existing buildings with written approval from the U.S. EPA.

Long-term VI Monitoring Plans for the MEW Site VI Study Area will be developed by the Responsible Parties in accordance with the 2010 VI ROD Amendment and VI Statement of Work. The Long-Term VI Monitoring Plan for the MEW Companies was prepared in 2023 and submitted to the U.S. EPA, but has not yet been approved (Geosyntec, 2023a). The Master Lessee and Project Developer will allow access to the appropriate Responsible Party (Navy or MEW Companies) and the U.S. EPA to conduct the appropriate building-specific monitoring to ensure the implemented VI remedy's effectiveness per the terms of the Settlement Agreement and Covenant Not to Sue that is currently in preparation.

⁸ For purposes of the EIMP, within the Premises, the Master Lessee is assumed to be the entity to approve of the use of HVAC as a remedy within a given building, rather than the property owner (i.e., NASA).

Measures to Mitigate Groundwater Movement

Due to the groundwater contamination in the aquifer underlying the Premises, measures must be taken to prevent new construction from creating potential pathways for migration of COPCs in groundwater or soil gas. Utility lines installed in trenches or horizontal boreholes in areas where contaminated groundwater or soil gas could potentially flow through utility line backfill material must include the use of low permeability backfill or cutoff walls to reduce potential contaminant migration. Similarly, if new construction requires piles that extend to depths greater than 20 feet (i.e., potentially below the shallow aquifer impacted by COPCs), the design must be evaluated for potential for driving impacted soil deeper or creating conduits for downward contaminant migration, and mitigation measures must be included in their design, if necessary. In both situations, the Project Developer will prepare a design report for review by NASA (and for Santa Clara Valley Water District review in the case of construction piles) describing the measures that will be taken and demonstrating their effectiveness in preventing potential migration of COPCs. The Project Developer will also submit the design report to the applicable regulatory agencies for review and concurrence.

Protecting Existing Site Remedies

Close coordination between the Project Developer, the Navy, and/or the MEW Companies, as the case may be, and the applicable regulatory agencies, must occur during the design and construction phase of development to ensure that measures are taken to protect implemented Site remedies (or remedies still being investigated or that are under development) for groundwater (i.e., existing remediation systems⁹ and their monitoring wells); any regulatory agency-approved modifications or disturbances¹⁰ to the implemented Site remedies will be appropriately repaired. Procedures have been developed to allow for the modification of the existing remediation systems and their monitoring wells if potential conflicts occur between the planned development and the location of the existing systems; these procedures are presented in further detail in the EIMP. Any such modifications are subject to approval by U.S. EPA, the Water Board, and the Navy and/or the MEW Companies, as the case may be. The cost of implementing any necessary system modifications will be the responsibility of the Project Developer.

⁹ Conveyance piping and extraction wells associated with the MEW Companies GWTS is located within the Premises (Figures 2 and 3), and several of the monitoring wells associated with WATS are located within the Premises. NASA has taken over responsibility of the operations, monitoring and maintenance of the WATS from the Navy. Navy monitoring wells are also located within the Premises.

¹⁰ Any disturbances to the implemented Site remedies must be timely reported to the Responsible Party, NASA, the U.S. EPA, and Water Board.

Preparation of Project Information and Summary of Environmental Conditions

For each phase of the development project, a Project Information and Summary of Environmental Conditions (PISEC) will be prepared by the Project Developer in advance of any development activities and provided to the MEW Companies, NASA, the U.S. EPA, and the Water Board. Based on the current Masterplan, it is anticipated that project phasing will occur in clusters of two to four buildings per phase. The PISEC will include the following:

- Project Description, including a description of the planned development activities for the phase of the project and key health and safety information, as appropriate;
- Identification of Project Roles, including contact information for the Project Developer, contractors, consultants, and oversight agency;
- Project schedule, including start date, phasing, and anticipated durations;
- Deviations from the EIMP, if any;
- Summary of Environmental Conditions;
- Applicable Land Use Restrictions and Institutional Controls; and
- References.

The PISEC for each area must be approved by the appropriate regulatory agencies (U.S. EPA and Water Board) prior to the start of construction activities.

Risk Management During Construction

This EIMP summarizes risk management measures to be implemented during construction to mitigate potential risks to human health and the environment from COPCs. These measures include:

- review of available information (e.g., LUCs, Table 1, and Figure 6) to identify COPCs;
- development and implementation of a Site-specific health and safety plan (H&SP) that describes health and safety training requirements for on-site workers, personal protective equipment to be used, and other precautions to be undertaken to minimize direct contact with soil, groundwater, and soil vapors;
- implementation of construction impact mitigation measures, such as implementing dust and odor control measures, decontaminating construction and

transportation equipment, implementing storm water pollution controls, and sampling and analyzing groundwater extracted during construction to determine appropriate storage and disposal practices;

- proper management of asbestos-containing material (ACM); debris and structures containing lead-based paint and/or PCB-containing paint; and PCB-containing equipment or building materials that are removed during development within the Premises;
- procedures for the management of abandoned USTs, sumps, pipes, and buried drums or containers that may be encountered during development activities within the Premises;
- procedures for the management of dewatering water generated during construction activities;
- procedures for protecting implemented remedies and the existing groundwater remediation systems (including monitoring wells) during development activities within the Premises and implementing any approved modifications to the remediation systems and/or remedies; and
- procedures for the management of soil potentially impacted by COPCs that is handled during construction activities. The soil management protocols include screening procedures to identify and manage COPC-impacted soil that is excavated during development within the Premises, as well as contingency procedures to be followed in the event that previously unknown soil contamination is encountered.

In general,¹¹ the Project Developer shall conduct the necessary environmental sampling and screening of soil and groundwater during development within the Premises. The Project Developer will also be responsible for the necessary excavation and reconsolidation or removal of potentially impacted soil or groundwater encountered within construction limits/boundaries during construction, as well as subsurface structures, such as USTs that are encountered within construction areas during construction excavation. The Project Developer will dispose of potentially impacted soils and subsurface structures at a permitted off-site facility in accordance with all applicable laws and regulations; NASA will be designated as generator of the wastes and will sign all

¹¹ The implementation of this EIMP by Master Lessee, tenants, Project Developers, and other entities, does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, this EIMP allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party, but such actions will not result in Master Lessee becoming a Responsible Party.

waste manifests. Soil containing concentrations of heavy metals above TCLs may be reconsolidated under buildings or hardscape with agency approval.

Groundwater produced during dewatering of excavations will be either (a) used for dust control within the Premises, (b) with permission of the Responsible Party for any existing or future groundwater treatment system (depending on the area in which the excavation occurs and the COPCs detected in groundwater), transported to such groundwater treatment system for treatment and ultimate disposal, or (c) discharged to the sanitary sewer (if a discharge permit can be obtained). Should the Project Developer be unable to dispose of the dewatering water by one of the options listed above, the Project Developer will arrange for the treatment and/or disposal of this water at a permitted off-site facility and NASA will be designated as generator of the wastes and will sign all waste manifests.

Post-Construction Risk Management

The EIMP also describes precautions that will be implemented by NASA, Master Lessee, Project Developers, and tenants (i.e., the interested parties) to mitigate long-term risks to human health and the environment related to potential exposure to COPCs during periods of normal non-construction activity. These precautions include:

- NASA, Master Lessee, or Project Developers, as appropriate, will notify future property managers and tenants of known environmental conditions within the Premises, LUCs, and the requirements of the EIMP via a statement of environmental conditions, which will include the key requirements specified in the EIMP;
- Master Lessee will conduct additional risk analysis and modify the EIMP, as appropriate, if any relevant change in land use is proposed for the Premises, if there is a relevant change in any of the implemented remedies within the Premises, or if any significant change in toxicity values or screening levels for COPCs occurs;
- Master Lessee will not permit groundwater within the Premises to be used for drinking water or any other purpose not allowed pursuant to this EIMP (i.e., dust control) unless its use is approved by NASA, the U.S. EPA, the Water Board, and the Santa Clara Valley Water District; exceptions include treated groundwater used for irrigation, industrial heating or cooling, or toilet water;
- Master Lessee will ensure that health and safety procedures similar to those described for construction activities at the Premises are followed for future activities that disturb subsurface soil (e.g., utility repairs) within the Premises. In addition, the Master Lessee will ensure that other procedures developed for construction activities (e.g., soil management) are also followed;

- Master Lessee will review all VI monitoring reports prepared by Responsible Parties who inspect maintain and monitor same, as they pertain to buildings located within the Premises;
- Master Lessee shall ensure compliance with LUCs within the Premises;
- Master Lessee and tenants will cooperate with NASA, the Navy, the MEW Companies, applicable regulatory agencies, and any other entities involved in the remediation of, or that are responsible to remediate, existing or future contamination to provide reasonable access to known or suspected areas of contamination or other areas upon which any containment system, treatment system, monitoring system, or other environmental response action is installed or implemented (or will be installed or implemented) for the purposes of complying with environmental law and requirements provided that such work be undertaken in a manner that will minimize interference with the Master Lessee and tenants;
- The Responsible Party will perform ongoing operation and maintenance as needed to verify the continued adequacy of implemented remedy, as required by environmental decision documents or the regulatory agencies; and,
- NASA and Master Lessee will monitor changes in COPC toxicity parameters to assess if additional or lesser mitigation may be needed based on an updated understanding of chemical toxicity of reported COPCs within the Premises.

Master Lessee will review and evaluate ongoing environmental monitoring data to determine if there are any relevant changes in environmental conditions and update the EIMP as necessary to address:

- new environmental conditions identified based on data review and COPCs not addressed in the existing EIMP;
- updated available toxicological data regarding the potential health effects of COPCs;
- changes in any of the implemented remedies within the Premises;
- implementation of a new remedy; and,
- information regarding any intended changes in land use.

1. INTRODUCTION

This Environmental Issues Management Plan (EIMP) is intended to describe procedures to address known environmental conditions and contingency actions to be taken in the event that previously unknown environmental conditions are encountered during occupancy and development at the Premises Leasehold, an approximately 36-acre parcel (Premises) that was part of NASA Research Park (NRP) portion of the former Naval Air Station (NAS) Moffett Field in Santa Clara County, California (Figure 1), which the National Aeronautics and Space Administration (NASA) has leased to Moffett Properties, LLC, (Master Lessee), which is a subsidiary of Moffett Partners, LLC a joint venture of The Regents of the University of California (UC Regents) and SKSP NRP, LLC, .The purpose of the EIMP is to provide sufficient information to the Master Lessee, its tenants, and Project Developers,¹² to comply with land use restrictions and institutional controls (LUCs) within the Naval Air Station Moffett Field Superfund Site (Site) and take reasonable steps with respect to environmental conditions within the Premises to help ensure that development activities within the Premises do not exacerbate environmental conditions or adversely impact ongoing response actions by the Responsible Parties (i.e., Navy, MEW Companies, and NASA).

The EIMP provides a decision framework to manage residual chemicals in soil, groundwater, and existing structures within the Premises in a manner that is (a) satisfactory to the United States Environmental Protection Agency (U.S. EPA) and the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) as lead regulatory agencies, and other involved regulatory agencies with oversight authority, (b) protective of human health and the environment, and (c) consistent with planned future land uses. This EIMP contains the following:

- a description of the Premises background, including a brief history of usage and a brief summary of identified remaining environmental conditions (Section 2);
- a brief description of current and planned land use within the Premises (Section 0);
- a summary of potential exposure pathways and target concentration levels (TCLs) (Section 4);
- a description of risk management measures to be considered during design for new construction planned within the Premises (Section 5);
- a description of short-term risk management protocols to be implemented during construction within the Premises, which includes worker health and safety

¹² In this document, Project Developer refers to the entity performing the project in question.

planning requirements, construction impact mitigation measures, and soil and dewatering water management protocols, and compliance with LUCs (Section 6); and

- a description of post-construction risk management protocols for mitigation of any long-term risks to human health and the environment, which includes protocols for future subsurface activities within the Premises, and procedures to ensure long-term compliance with this EIMP, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities and remedies, and other environmental requirements (Section 7).

In addition to activities to take place on the Premises, this EIMP applies to off-site improvements outside the Premises to support the development of the Premises.

This EIMP was based on the EIMP prepared for NRP in 2005 (EKI, 2005) but has been updated to reflect current regulatory requirements and to address the Premises, not the entire NRP.

1.1. Representations

The risk management protocols specified in this EIMP are based on a current understanding of Site environmental conditions and current policies, laws, and regulations. No representation is made as to the applicability of this EIMP with respect to future Site conditions, as conditions may change or new information may become available.

This EIMP is based on data and documentation provided by MEW, NASA, and others with regard to the existing environmental conditions within the Premises. The accuracy of this information has been assumed in the preparation of this document. Information and opinions contained herein are preliminary and are for use only in further planning.

EKI Environment & Water, Inc. (EKI) shall have no responsibility for the discovery, presence, handling, removal, disposal, or exposure of persons to hazardous materials in any form within the Premises. Hazardous materials are deemed to include, but not be limited to: petroleum products, asbestos, asbestos-containing products, lead, polychlorinated biphenyl (PCBs), and any other substances identified as hazardous or toxic by the U.S. EPA or the California Environmental Protection Agency (Cal-EPA).

1.2. Development-Related Tasks and Obligations

Master Lessee, tenants, Project Developers, and other entities with responsibility for development-related activities within the Premises shall have a continuing obligation to:

- Review available information concerning environmental conditions within the Premises;

- determine the adequacy of this EIMP with respect to expected environmental conditions as well as the conditions actually encountered during development and the intended land use;
- evaluate the current understanding of the health effects of identified chemicals of potential concern (COPCs), to the extent information about health effects assumed in this EIMP may change;
- comply with applicable policies, laws, and regulations, and all CERCLA Site remedies (to the extent not allocated to other parties); and
- establish management procedures for inspection, maintenance, and monitoring of the risk management measures that are implemented and to establish protocols for future subsurface activity to ensure long-term compliance with the EIMP.

In addition to the tasks listed above, the Master Lessee and NASA will:

- inform the applicable regulatory agencies of any material relevant changes within the Premises;
- ensure that the EIMP is reviewed by qualified environmental professionals and modified periodically, as necessary, to address relevant changes and seek review and approval from the applicable regulatory agencies for any relevant changes to the EIMP. Relevant changes include significant changes in environmental conditions, land uses and/or applicable laws and regulations.

It is the intent of the Master Lessee and NASA that the parties that have been named by U.S. EPA or the Water Board as the Responsible Parties or are the Responsible Party under statutory or common law for contamination at the Premises retain this responsibility and continue to perform their ongoing obligations such as, but not limited to, monitoring, remediation, operations, maintenance, and reporting, independent of the Master Lessee. Figures 4 and 5 illustrate the Responsible Parties for soil, groundwater, and vapor intrusion issues within the Premises.

More specifically, on December 22, 1992, the Navy and NASA signed a Memorandum of Understanding (MOU) which states that the Navy is responsible for the investigation and remediation of its environmental contamination notwithstanding its transfer of the NAS Moffett Field to NASA. In addition to the groundwater contamination, the MOU includes Navy responsibility for petroleum in the soil and groundwater, and for lead in the soil caused by lead-based paint on the buildings. The MOU was further clarified by the Navy in a letter signed on 4 October 1993, which states that “The Navy’s obligations under the MOU shall include taking possession of and properly managing any contaminated soil or groundwater that has been left in place, in accordance with a CERCLA, Resource Conservation and Recovery Act (RCRA), or other cleanup remedy, but subsequently upon

its excavation, disturbance, or discharge by NASA or a tenant of NASA during development for reuse of Moffett Field becomes hazardous waste, or requires treatment prior to discharge.” Accordingly, Figure 5 reflects that the Navy and MEW companies are the Responsible Parties for the Premises.

In letters dated 23 October 2015 and 22 December 2015, NASA confirmed to the U.S. EPA that NASA has agreed to assume the role of the Lead Agency and had assumed the Navy’s obligations with respect to Installation Restoration (IR) Site 29 (defined as including the above ground frame and concrete floor of Hangar 1, existing exposed surface soils located outside the eastern side of Hangar 1, the door opening mechanisms, and the stormwater trench that surrounds Hangar 1); NASA has not accepted responsibility for any of the contamination that may exist in the soil or groundwater beneath Hangar 1 (NASA, 2015a; NASA, 2015b). NASA, the U.S. EPA, and the Water Board have agreed to amend the November 2014 NASA Federal Facility Agreement (FFA) Site Management Plan to include the IR Site 29 obligations.

During 2016, NASA assumed Lead Agency status and operations, maintenance, and monitoring (OMM) responsibilities for IR Site 28, the West-Side Aquifers.¹³

The implementation of this EIMP by NASA, Master Lessee, tenants, Project Developers, and other entities does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, this EIMP allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party, but such actions will not result in Master Lessee becoming a Responsible Party. NASA will facilitate communication between the Master Lessee and/or Project Developer and the Responsible Party when requested.

¹³ The Navy retains the role of Lead Agency for vapor intrusion risks and activities at IR Site 28.

2. SITE BACKGROUND

2.1. Setting

The Premises (Figure 1) is an approximately 36-acre property that is located on the NRP portion of the former NAS Moffett Field in Santa Clara County, California, approximately 35 miles south of San Francisco and 10 miles north of San Jose. The Premises is surrounded by other current and former portions of NAS Moffett Field: to the south are other portions of the NASA Research Park (NRP), to the west is the Wescoat Housing development area, to the north is the Shenandoah Plaza development area, and to the east is the NAS Moffett Field airfield.

The NRP is located near the southwestern edge of San Francisco Bay on nearly flat fluvial basin deposits. The elevation of the NRP ranges from approximately 33 feet above mean sea level to 21 feet above mean sea level (IT, 1993). The predominant surface features are man-made structures including buildings, roads, and parking lots.

The areas north of NAS Moffett Field were previously tidal salt marshes and mud flats of San Francisco Bay. However, these marshes and mud flats have been eliminated or greatly altered by diking and filling (IT, 1993).

There are no streams on the NRP, although streams are present to the east (Coyote Creek and Guadalupe Slough) and to the west (Stevens Creek). Surface water features include stormwater drainage ditches, several small ponds, seasonal marshes, and stormwater retention ponds (PRC, 1996).

For discussion of current and proposed future land uses, see Sections 3.1 and 3.2.

2.1.1. Hydrogeology

The Santa Clara Valley Basin is a large, northwest trending structural depression between the San Andreas and Hayward faults. The valley is bordered on the west by the Santa Cruz Mountains and on the east by the Diablo Range. Regionally, the Santa Clara Valley contains up to 1,500 feet of interbedded alluvial, fluvial, and estuarine deposits (Tetra Tech, 1998).

The shallow aquifer (upper 250 feet) is subdivided into the A, B, and C aquifers. The A aquifer consists of sands and gravels found between approximately 15 feet below ground surface (bgs) and approximately 77 feet bgs (SES-TECH, 2018).¹⁴

¹⁴ The Middlefield-Ellis-Whisman (MEW) Companies refer to the A1-aquifer zone as the “A” aquifer zone and the A2-aquifer zone as the “B1” aquifer.

The A-aquifer is divided into the A1- and A2- aquifer zones by a discontinuous low-permeability horizon (A1/A2 aquitard); the shallow A1-aquifer zone extends to approximately 35 to 40 feet bgs and the lower A2-aquifer zone extends to approximately 45 to 77 feet bgs, depending on the location. In general, the groundwater flow direction in the A aquifer is toward San Francisco Bay (north) with a horizontal gradient of 0.004 to 0.005 feet per foot. Vertical gradients between the A1- and A2- aquifer zones are weak and locally variable. Depth to groundwater ranges from 5 to 12 feet bgs (Tetra Tech, 1998).

The A/B aquitard is a discontinuous clay zone generally encountered between the depths of approximately 45 to 85 feet bgs (SES-TECH, 2018); the aquitard may be locally continuous under the western portion of NASA Ames Research Center (ARC) (PRC, 1996). The B aquifer (approximately 70-160 feet bgs) includes permeable deposits characterized by interbedded fine- to medium-grained sands, and clayey sands. Significant upward vertical gradients exist between the B aquifer and the overlying A2-aquifer in the ARC. A laterally extensive clay aquitard (B/C aquitard) effectively isolates the C aquifer from the overlying B aquifer (160 to 250 feet bgs) (Tetra Tech, 1998).

2.2. History

Before it was commissioned as the Sunnyvale Naval Air Station in 1933, the former NAS Moffett Field was used for agriculture. Between 1933 and 1994, the station was operated continuously by the U.S. Military; on 1 July 1994, the U.S. Military transferred the NAS Moffett Field to NASA. It was transferred from the Navy to the Army Air Corps for use as a training base in 1935, but was later returned to Navy control.

The original mission of the naval air station was to serve as a base for the West Coast dirigibles of the lighter-than-air program (LTA). By 1950 when jet aircraft were introduced, NAS Moffett Field was the largest naval air transport base on the West Coast and became the first all-weather NAS. Between 1973 and 1994, the mission of NAS Moffett Field was to support anti-submarine warfare training and patrol squadrons (PRC, 1996). No heavy manufacturing or major aircraft maintenance was conducted during this last period of operation of NAS Moffett Field, although some maintenance activity occurred (Harding, 2000).

In 1987, the U.S. EPA placed NAS Moffett Field on the National Priority List and on 10 September 1990 the Navy signed a Federal Facility Agreement (FFA; U.S. EPA, 1990) with the EPA and the Water Board to conduct remedial actions at NAS Moffett Field pursuant to CERCLA regulations. This agreement was amended in December 1993 (U.S. EPA, 1993).

In 1991, NAS Moffett Field was designated for closure as an active military base under the Department of Defense Base Realignment and Closure (BRAC) Program. Except for military housing units and associated facilities that were transferred to Onizuka Air Force

Base and an off-site area (the NAVAIR manor) that was sold to the City of Sunnyvale, NAS Moffett Field was transferred to NASA in 1994 and renamed Moffett Federal Airfield (PRC, 1996).

Between 1994 and 2010, the Navy issued eight Records of Decision (RODs) which set forth selected remedies for specific areas of the NAS Moffett Field Superfund Site, including Operable Unit (OU) 2 (Navy, 1994), OU 5 (Navy, 1996), OU 1 (Navy, 1997), OU 00 (No Action Sites) (Navy, 2002a), IR Site 22 Landfill (Navy, 2002b), IR Site 27 (Navy, 2005), IR Site 25 (Navy, 2010), and one ROD Amendment (Navy, 2014) and the U.S. EPA has issued one ROD Amendment for the MEW Superfund Study Area (U.S. EPA, 2010). In 2014, NASA signed an FFA with the U.S. EPA and the Water Board to address its CERCLA responsibilities at NASA Ames Research Center and the portion of the NAS Moffett Field Superfund Site (listed on the National Priorities List, or NPL, in 1987) currently owned by NASA (U.S. EPA, 2014c). These responsibilities include both NASA's cleanup responsibilities and its responsibilities for implementing LUCs at the NAS Moffett Field Superfund Site.

2.3. Summary of Known Environmental Conditions and Potential Chemicals of Concern within the Premises

Environmental investigations, removal actions, and remedial actions have been implemented at former NAS Moffett Field since 1984. The following is a list of types of potential COPCs that have been detected in soil or groundwater samples within the Premises at least once above background levels:

- volatile organic compounds (VOCs);
- purgeable and extractable total petroleum hydrocarbons (TPH);
- benzene, ethylbenzene, toluene, and xylenes (BTEX);
- semi-volatile organic compounds (SVOCs);
- PCBs;
- metals; and
- PFAS.

As a result of investigations that were performed within the Premises, the identified environmental conditions and primary COPCs that should be considered during redevelopment are:

- the presence of chlorinated VOCs in groundwater and soil within the Premises;

- the presence of total petroleum hydrocarbons and other fuel-related constituents, including BTEX compounds, in groundwater and soil within the Premises;
- the presence of PFAS compounds in groundwater within the Premises;
- the potential presence of elevated concentrations of PCBs in soil surrounding buildings and transformers;
- the potential presence of elevated concentrations of lead in soil surrounding buildings;
- existing subsurface structures (e.g., sumps or tanks) that may need to be removed; and
- building materials containing hazardous materials (e.g., asbestos-containing materials, lead-based paint, and PCB-containing materials in existing buildings).

A large regional plume of chlorinated VOCs is present at the Premises. The source of this contamination is migration of contaminated groundwater from the upgradient MEW Superfund Site (see Section 2.4.7) that has commingled with groundwater contamination from chlorinated solvent sources on the Premises and other portions of NAS Moffett Field. In addition, petroleum hydrocarbons and fuel-related constituents, such as BTEX compounds from sources at the Premises have also impacted groundwater beneath the Premises.

Numerous potential source areas have been investigated and remediated within the Premises, primarily releases associated with underground storage tanks and sumps that contained petroleum hydrocarbon products, although a few source areas of chlorinated VOC contamination have also been investigated and are being remediated.

Other conditions that must be considered during redevelopment within the Premises, such as existing subsurface structures (e.g., sumps or tanks) or hazardous materials associated with existing buildings (e.g., asbestos-containing materials, lead-based paint, and PCBs in building materials), are summarized in Sections 2.5 and 2.6.

2.4. Summary of Premises Investigations and Remedial Actions

This section summarizes the investigations and remedial actions that have been conducted within the Premises. This summary is provided only for information purposes. The Project Developer should review original source documents and data as part of its own assessment and evaluation of expected conditions during development activities within the Premises. Available documents are described in Section 2.4.1.

2.4.1. Available Documents

Numerous investigations of soil and groundwater conditions have occurred within the Premises and are summarized in various technical memoranda, remedial investigation and feasibility study reports and other documents. A list of documents reviewed is provided in Section 8.

AECOM Technical Services, Inc. prepared an Environmental Baseline Survey (EBS) on behalf of NASA in 2019 that describes the parcels included in the Premises and surrounding area (AECOM, 2019). The EBS incorporates data from multiple investigations conducted at the property, historical records, and records of remedial activities conducted at the property.

2.4.2. Installation Restoration Program

The Navy, as part of its IR Program, has been investigating and remediating soil and groundwater impacted by past use of chemicals at former NAS Moffett Field. The Navy's remedial program was initiated in 1984 when an initial assessment study of former NAS Moffett Field was completed in response to the Defense Environmental Restoration Program (DERP). NAS Moffett Field was placed on the NPL by the U.S. EPA in 1987 and the investigation and remediation of NAS Moffett Field became subject to CERCLA. The Navy began conducting a Remedial Investigation/Feasibility Study (RI/FS) for NAS Moffett Field coordinating its actions through an FFA with U.S. EPA and the Cal-EPA including the Department of Toxic Substances Control (DTSC), and Water Board (U.S. EPA, 1990). Initially, a total of 19 sites were identified in NAS Moffett Field for investigation. Subsequent investigations identified ten additional sites for further study as part of the IR process.

As described above and pursuant to the terms of the MOU, the Navy is responsible for the investigation and remediation of its environmental contamination including groundwater contamination, petroleum in the soil and groundwater, and for lead in the soil caused by lead-based paint on the buildings (NASA/Navy, 1992).

After the initial phases of the Navy's remedial investigation were conducted, the Navy, U.S. EPA, DTSC, and Water Board agreed to organize the RI/FS process into separate Operable Unit areas to address specific areas of NAS Moffett Field. In addition, in 1993, all IR Sites containing only petroleum and petroleum constituents were removed from the CERCLA process and are being managed according to applicable state regulations (PRC, 1996).

In 2014, NASA signed an FFA with the U.S. EPA and the Water Board to address its CERCLA responsibilities at NASA ARC and the portion of the NAS Moffett Field Superfund Site (listed on the NPL in 1987) currently owned by NASA (U.S. EPA, 2014c). These

responsibilities include both NASA's cleanup responsibilities and its responsibilities for implementing LUCs at the NAS Moffett Field Superfund Site.

Section 2.4.7 provides a summary of the COPCs detected in groundwater from the MEW Superfund Site and in the West Side Aquifers, as well as a description of groundwater remedial actions that have been implemented. Section 2.4.5.4 lists the CERCLA IR Sites located within Parcel 5A/5B of the Premises, additional information on these sites is presented in Table 1.

2.4.3. Parcel 1A

Parcel 1A contains buildings constructed in the 1950s and 1980s, as described in the EBS (AECOM, 2019); none of the buildings are included on the National Register of Historic Places (NRHP). The parcel includes two barracks buildings (Buildings 148 and 149) constructed in 1953, a portion of a NASA lodge (Building 583A) constructed in 1985, and a small portion of an administration building (Building 583C) constructed in 1985. The barracks are currently mothballed and the lodge and administration buildings are currently used as dormitories.

Prior to 1994, cleaning supplies were stored in Building 583C, and from 1994 to 2000, solids contaminated with absorbent oil were stored in Buildings 583A and 583C. Oil-filled transformers are located in Building 149 (an oil-filled transformer located in Building 583C is not within the parcel boundary). Asbestos-containing materials and lead-based paint were detected in interior and/or exterior building materials in all parcel buildings in 2001 (AECOM, 2019).

PCBs were detected in the transformers in Building 149 at 505,000 to 542,000 parts per million (ppm) in 1993; the transformers were replaced with a single oil-containing transformer without PCBs. Three oil fuse capacitors also contained PCBs at 14 to 17 ppm in 1993; the locations of these transformers within the parcel are not described in the EBS.

No Navy remediation sites are located in Parcel 1A. The parcel is located within the MEW Vapor Intrusion Study Area (Figure 6). As shown on Figures 2 and 3, 5 wells are located in Parcel 1A.

2.4.3.1. Indoor Air

Indoor air in Buildings 583A and 583C was sampled in 2011 to meet requirements in the 2010 Vapor Intrusion (VI) ROD Amendment (Haley & Aldrich, 2013). According to the EBS, indoor air has not been sampled in Buildings 148 and 149, which are not currently occupied.

Building 583A is a 12,900 square foot three-story structure without a basement and, in 2011, was used as a hotel. In 2011, two indoor air samples and one outdoor air sample were collected from the building; the two indoor air samples were collected from occupied hotel rooms. The building does not have central heating, ventilation, and air conditioning (HVAC); each room has an individual wall-mounted heater. Trichloroethene (TCE) was detected in indoor air at concentrations of 0.035 and 0.054 micrograms per cubic meter (ug/m^3), below the 2010 ROD Indoor Air Cleanup Level of $5 \text{ ug}/\text{m}^3$. The outdoor air sample contained TCE at $0.079 \text{ ug}/\text{m}^3$. In February 2023, an additional round of indoor and outdoor air sampling was conducted with the HVAC off. TCE, PCE, cis-1,2-DCE, and 1,1-DCE were detected in indoor air at concentrations up to $0.16 \text{ ug}/\text{m}^3$, $0.050 \text{ ug}/\text{m}^3$, $0.061 \text{ ug}/\text{m}^3$, and $0.041 \text{ ug}/\text{m}^3$, well below the respective 2010 ROD Indoor Air Cleanup Levels of $5 \text{ ug}/\text{m}^3$, $2 \text{ ug}/\text{m}^3$, $210 \text{ ug}/\text{m}^3$, and $700 \text{ ug}/\text{m}^3$ (Geosyntec, 2023c).

Building 583C is a 13,100 square foot single-story building without a basement and, in 2011, was used as a classroom and meeting room. In 2011, three indoor air samples and one outdoor air sample were collected from the building; the indoor air samples were collected from a kitchen, an open meeting area, and a conference room. The HVAC system was not turned off during sampling. TCE was detected in indoor air at concentrations of 0.065 to $0.33 \text{ ug}/\text{m}^3$, below the 2010 ROD Indoor Air Cleanup Level of $5 \text{ ug}/\text{m}^3$. The outdoor air sample contained TCE at $0.041 \text{ ug}/\text{m}^3$. Cis-1,2-dichloroethene (cis-1,2-DCE) was also detected in two of the indoor air samples at concentrations of 0.078 to $0.13 \text{ ug}/\text{m}^3$, below the 2010 ROD Indoor Air Cleanup Level of $210 \text{ ug}/\text{m}^3$.

The 2022 Geosyntec Vapor Intrusion Tiering Work Plan indicates that Building 583C is not occupied and to be demolished, and therefore are not tiered for vapor intrusion purposes (Geosyntec, 2022).

2.4.4. Parcel 3

Parcel 3 contains buildings constructed in the 1940s and 1980s, as described in the EBS (AECOM, 2019); none of the buildings are included on the NRHP. The parcel includes a Navy ROICC administration building (Building 107) constructed in 1948, a swimming pool (Building 108) and dressing room (Building 109) constructed in 1948, and an administration building (Building 555) constructed in 1984. The Navy ROICC building is reportedly currently used as housing, the swimming pool and dressing room are currently in use, and the administration building is occupied by offices.

Prior to 1994, gasoline, batteries, solvents, cleaners, and hazardous waste consisting of waste oil and solvents were stored in Building 555. Swimming pool chemicals such as sodium hypochlorite, muriatic acid, carbon dioxide, and soda ash are stored in Building 109. Sodium hypochlorite is reportedly stored in a 500-gallon aboveground storage tank (AST) at Building 109 (Tank 135). The other buildings did not reportedly contain chemicals or hazardous materials (AECOM, 2019). Asbestos-containing materials were detected in floor mastic, roofing materials, wall-board, HVAC duct-joint compound, paper insulation,

pipe elbows, pipe insulation, floor tile, and ceiling-mastic in Buildings 107, 109, and 555 in 2001. Lead-based paint was detected in exterior paint on Buildings 107 and 109 in 2001.

As described further below, three underground storage tanks (USTs) were located on Parcel 3. In addition, indoor air sampling was performed in accordance with the 2010 VI ROD Amendment. As shown on Figures 2 and 3, no wells are located in Parcel 3. Building 555 was sampled by the Navy in January 2023 (Titan, 2023).

2.4.4.1. Tanks 86A and 86B

Two USTs were located southwest of Building 107, one 5,000-gallon steel UST for gasoline (Tank 86A) and one 7,000-gallon steel UST for diesel fuel (Tank 86B) (Water Board, 2000). Both tanks were installed in 1948 and removed in January 1993. A total of 206 cubic yards of soil containing TPH was excavated from around the tanks as part of tank removal. Total petroleum hydrocarbons in the gasoline range (TPHg) and BTEX were detected in groundwater downgradient (north) of the tanks in 1995 and 1996 at concentrations up to 910 micrograms per liter (ug/L) for TPHg, 28 ug/L for benzene, 0.4 ug/L for toluene, 0.2 ug/L for xylenes, and 6 ug/L for ethylbenzene. The TPHg concentrations were above the TCL of 100 ug/L, but decreased to below the detection limit of 50 ug/L by 1997. The tanks were closed in a No Further Action letter from the Water Board in August 2000 (Water Board, 2000).

2.4.4.2. Tank 110

Tank 110 was a 2,000-gallon steel UST for diesel storage located north of Building 109. The tank was installed at an unknown date and was removed in April 1994 (Water Board, 2000). An unknown quantity of soil as excavated and removed along with the tank, and soil and groundwater did not reportedly contain detectable concentrations of TPH or BTEX. The tank was closed in a No Further Action letter from the Water Board in August 2000 (Water Board, 2000).

2.4.4.3. Indoor Air

Indoor air in Building 109 was reportedly sampled in 2015 with the HVAC on and off in order to meet requirements in the 2010 VI ROD Amendment. The concentrations of chemical of concern detected in 2015 are reportedly below the 2010 ROD Indoor Air Cleanup Levels (AECOM, 2019). Building 109 is unoccupied and planned to be demolished, and therefore has not been sampled recently and is not tiered for vapor intrusion purposes (Geosyntec, 2024b).

Building 107 was sampled in 2012, 2014, 2016, 2017, 2018, and 2019, with the HVAC system on and off (Titan, 2023). TCE was detected at a maximum concentration of 0.19 ug/m³ and PCE was detected at a maximum concentration of 0.24 ug/m³ in Building 107;

these concentrations are below the 2010 ROD indoor air cleanup levels of 5 ug/m³ and 2 ug/m³, respectively (Titan, 2023).

Building 555 was sampled in January 2023 in two sampling events, once with the HVAC system on and once with the HVAC system off. Two indoor air samples and one outdoor air sample were collected during each event. TCE was detected at a maximum concentration of 0.97 ug/m³, below the 2010 ROD Indoor Air Cleanup Level of 5 ug/m³ (Titan, 2023).

2.4.4.4. Soil Gas

In addition to indoor air sampling, the Navy collected samples of soil gas from a location immediately south of Building 555 in June-July 2013 (Titan, 2023). During the 2013 sampling event, PCE was detected in soil gas at 560 ug/m³ and TCE was detected in soil gas at 36,000 ug/m³, both concentrations are well above the residential and commercial soil gas TCLs for these compounds (residential TCLs of 67 ug/m³ for PCE and 170 ug/m³ for TCE).

2.4.5. Parcel 5A/5B

Parcels 5A and 5B contain eight buildings constructed in the 1940s through the mid-1980s, as described in the EBS (AECOM, 2019); none of the buildings are included on the NRHP. The parcel includes an electrical substation (Building 104) constructed in 1943, a Naval Exchange (NEX) service station (Building 503 or the NEX service station) constructed in 1966, an EM Club storage building (Building 526) constructed in 1970, a storage facility (Building 529) constructed in 1970, a bachelor's enlisted quarters (Building 547E) constructed in 1974, the Partner Technology facility (Building 554) constructed in 1975, an administration building (Building 556) constructed in 1984, the Lunar Science Research Facility (Building 596) constructed in 1985, and a recreation center (Building 944) constructed in 1941. The electrical substation is currently in use, and the Navy Exchange service station is currently used as a research office. The EM Club storage building (Building 526), storage facility (Building 529), and bachelor's enlisted quarters are all mothballed; no indoor air sampling has been performed at these buildings. The Partner Technology facility is currently used as an office, the administration building is used as an office, and the Lunar Science research Facility is used as an exchange. The recreation center is used as a recreation hall, and the building is partially condemned.

Prior to 1994, hazardous materials and waste were stored at buildings 104, 503, 529, 556, and 596. Hazardous materials and waste stored included solvents, batteries, waste oil, used oil, transmission and brake fluid, dry cleaning solvent, laundry chemicals, photo lab chemicals, cleaning supplies, and degreasers. From 1994 to 2000, hazardous waste was stored in Buildings 529 and 944, including compressed gas cylinders, batteries, contaminated water, and mastic remover with asbestos. No hazardous materials are currently stored on the parcels, but oil-filled transformers are located in Buildings 104,

554, 556, 596, and 944. One PCB-containing transformer is located in Building 104 (PCBs detected at 33 and 34 ppm in 1995 and 1995), three PCB-containing transformers are located in Building 503 (PCBs detected at 17 to 27 ppm in 1993), one PCB-containing transformer is located at Building 547E (PCB concentration not available) and one PCB-containing transformer is located east of Building 596 (PCB concentration not available).

Asbestos-containing materials were detected in floor mastic, roofing materials, wall-board, ceiling material, floor tile, baseboard adhesive, and stucco in Buildings in all eight buildings on the parcels in 2001. Lead-based paint was detected in interior and/or exterior paint on Buildings 104, 503, 529, 547E, 554, and 944 in 2001.

As described further below, a number of USTs, ASTs, and sumps were located on Parcels 5A/B. As shown on Figures 2 and 3, 45 wells are located in Parcels 5A/5B. In addition, indoor air sampling was performed in accordance with the 2010 VI ROD Amendment at the occupied buildings (Section 2.4.5.5).

2.4.5.1. Tanks 108 & 109 and Sump 41B (NEX Service Station)

Several USTs, ASTs, and sumps were previously located at Parcels 5A/5B. The tanks and sumps associated with IR Sites 14-North and 15 are discussed in the respective sections below. Two ASTs and a sump (Tanks 108 and 109 and Sump 41B) were located immediately southwest of Building 503 (Navy, 2011). The ASTs were steel and used to store lubricating oil (Tank 108) and transmission fluid (Tank 109) and were removed from the site at an unknown date. Sump 41B received waste from the floor drains in the service bays of Building 503 and was removed from the site in January 1993. During removal of the sump, two soil samples were collected from the excavation and analyzed for TPHg and BTEX; no compounds were detected in these soil samples above the Navy's site cleanup standards, and the excavation was backfilled with clean fill. In 2001, soil and groundwater samples were collected around the tanks and sump and analyzed for TPH, VOCs, and PAHs. No compounds were detected in soil above Navy site cleanup levels, and the detection of TPHg in groundwater was determined to be due to the presence of VOCs from the MEW regional plume. The concentrations of VOCs detected in groundwater were also consistent with the MEW regional plume. Additional soil and groundwater samples were collected from this area in 2008 and 2009, and corroborated earlier findings that concentrations of TPH, VOCs, and metals in soil are below Navy site cleanup levels or typical of the MEW regional plume and not associated with releases from the site. The tanks and sump were closed in a No Further Action letter from the Water Board dated 20 December 2011 (Water Board, 2011b), the letter specifies that the area cannot be used for residential land use, and groundwater at the site cannot be used for drinking water.

2.4.5.2. Tanks 33 through 40 and Sump 42 (NEX Service Station)

At Building 503, eight USTs and one sump were removed from 1990 to 1993 (Tanks 33

through 40 and Sump 42). Sump 42 was used as a vapor condensation sump at the NEX service station and is also part of IR Site 15 as described below. It was removed along with four nearby USTs (Tanks 33 through 36) in 1990. During the tank removal, floating product was noted in the groundwater that seeped into the excavation. While excavated soil from the tank and sump removal contained up to 1,200 mg/kg TPHg and 2.7 mg/kg benzene, soil samples collected from beneath the sump and associated piping contained only low concentrations of TPHg and benzene (32 mg/kg and 0.2 mg/kg, respectively). As an interim measure, the excavation was lined with plastic and the soil was used to backfill the excavation. In 2009, additional soil investigation was conducted to characterize the soil used to backfill back in 1990. TPH, BTEX, and methyl tertiary butyl ether (MTBE) were not detected in these samples at concentrations above the Navy site cleanup standards. Tanks 37 through 40 were removed from 1992 to 1993. During removal of these tanks, TPHg, TPHd, and BTEX were detected in soil and groundwater at concentrations above the Navy site cleanup standards (Water Board, 2011c).

Four groundwater monitoring wells were installed at the site in 1994, and TPHg, benzene, MTBE, and naphthalene were detected in groundwater at concentrations above the respective Navy site cleanup standards. Groundwater monitoring was continued until 2010. VOC analyses for the MEW regional plume compounds were added to groundwater sampling around 2009-2010. In 2010, three additional grab groundwater boreholes were also advanced downgradient (north) of the former UST locations. Soil and groundwater samples collected in these grab groundwater boreholes did not contain VOCs, TPHg, or BTEX at concentrations above the Navy site cleanup standards.

Tanks 33 through 40 were replaced with three 10,000-gallon ASTs in 1999, which were subsequently removed in 2011, along with a 500-gallon waste oil tank. A 1,700-gallon oil-water separator and sump and a 100-gallon oil-water separator were removed from the Building 503 area in 2011. Tanks 33 through 40 and Sump 42 were closed in a letter from the Water Board dated 21 December 2011 (Water Board, 2011c) confirming no further action related to the petroleum release; the letter specifies that the area cannot be used for residential land use, and groundwater at the site cannot be used for drinking water.

2.4.5.3. Hydraulic Lifts, Waste Oil Line, and Subgrade Clarifier (NEX Service Station)

Confirmation soil samples collected from the removal actions of the hydraulic lifts, waste oil line, and subgrade clarifier from Building 503 contained hydraulic oil at concentrations up to 22,000 mg/kg, above the Water Board Environmental Screening Level (ESL) of 500 mg/kg (CE2-Kleinfelder, 2015). Free product was also observed near one of the lift locations.

In 2011, soil samples in the NEX Service Station area contained hydraulic oil above site cleanup standard below hydraulic lifts and a hydraulic oil reservoir tank. Gasoline, motor

oil, and lead were also detected in soil at concentrations below the cleanup standards. Additional soil samples collected in 2012 contained no compounds above the Navy site cleanup standards.

Groundwater sampling conducted in 2014 and 2015 confirmed the presence of TPH in the hydraulic oil-range and total petroleum hydrocarbons in the motor oil range (TPHmo) at concentrations up to 300 ug/L and 220 ug/L, respectively, above the Water Board ESL of 100 ug/L (CE2-Kleinfelder, 2015).

The Water Board issued a No Further Action letter for the hydraulic lifts, waste oil line, and clarifier dated 14 December 2015 (Water Board, 2015), with the following conditions:

- the site will not be used for residential land use;
- future grading, excavation, trenching, or groundwater contract during construction must be conducted pursuant to a soil management plan approved by the Water Board;
- the Water Board must be notified of any land or groundwater use change; and
- any monitoring wells no longer in use must be destroyed.

Implementation of this EIMP is intended to address the conditions listed above, except for a land use change to residential. If residential land use is planned for the NEX Service Station area, the Master Lessee will have to work with the Water Board to identify additional investigations and/or remedial actions that may be necessary to allow for residential land use.

2.4.5.4. CERCLA Sites

Parcels 5A and 5B contain three CERCLA-related sites (IR Site 14-North, IR Site 15, and IR Site 18) and are adjacent to and affected by an additional CERCLA site (IR Site 28).

IR Site 14-North

IR Site 14-North is in the vacant parking lot in the northeastern portion of the parcels and is associated with a fuel oil UST (Tank 67) and solvent tank (Tank 68) from a former dry cleaning facility (Building 88). Before its removal in May 1990, Tank 67 was used to store fuel oil for the Building 88 boiler. The results of analyses of soil samples collected during the tank removal indicated only low levels of VOCs (maximum concentration of TCE of 0.1 milligrams per kilogram (mg/kg)). Total petroleum hydrocarbons in the diesel range (TPHd) was detected (0.15 mg/kg) in only a single soil sample from a pipe trench excavation (PRC, 1991b).

Tank 68 was reportedly a 2,000-gallon UST used to store waste solvents and was closed in place (IT Corp., 1993). Tank 68 was later removed during Building 88 remediation in the mid-1990s as discussed further below. Investigations did not identify significant

contamination associated with Tank 68 (PRC, 1996). Leaking solvent from the tanks are believed to have contributed to dense non-aqueous phase liquid (DNAPL) contamination in the area.

A remedial action was conducted at Building 88 in 1994 and 1995. The building, foundation, underground piping, Tank 68 and Sump 91 (a sump located on the northern side of former Building 88 which collected water from the building's floor drains) were demolished and removed. Confirmation sampling after the removal of Tank 68 and Sump 91 did not indicate any significant contamination. Low residual VOC concentrations were detected in confirmation soil samples collected from the Tank 68 (maximum tetrachloroethene, or PCE, concentration of 0.130 mg/kg) and Sump 91 (maximum PCE concentration of 0.003 mg/kg) excavations. Therefore, no additional soil removal was performed in these areas (PRC, 1995). Tank 68 and Sump 91 have not received regulatory agency closure and are considered to be part of IR Site 28.

Tank 67 was closed in an NFA letter from the Water Board in August 2000 (Water Board, 2000).

IR Site 15

IR Site 15 includes sumps located around the former Moffett Federal Airfield, two of which are located within or adjacent to the Premises. At Parcels 5A/5B, IR Site 15 sumps include the following: a sump tank (referred to as Sump or Tank 25, located immediately northeast of the Parcel boundary) and sump (Sump 42 located within the Parcel 5A/B boundary) removed in the 1990s.

Sump 25 previously collected wastewater generated by aircraft washing activities south of Hangar 1 and was removed in May 1994. A confirmation soil sample collected from the Tank 25 excavation contained purgeable TPH at 5,800 mg/kg and TPHd at 9,500 mg/kg. A water sample collected from the excavation contained 100 ug/L purgeable TPH as jet fuel and 3,300 ug/L extractable TPH as motor fuel (PRC, 1996). Sump 25 was closed by the Water Board in a letter dated 8 December 2011 (Water Board, 2011a) the letter specifies that the area cannot be used for residential land use, and groundwater at the site cannot be used for drinking water. Sump 42 was closed along with Tanks 33 through 40, as described in Section 2.4.5.2 above.

IR Site 18

IR Site 18 includes Sump 66, Tank 67, Tank 68, and Sump 91, and is located in the parking lot near IR Site 14-North. Sump 66 collected wastewater from the dry-cleaning facility located in the former Building 88 and Sump 91 collected water from the Building 88 floor drains. Tank 68 was a concrete UST that was used for collecting and storing dry cleaning fluids (waste solvents and petroleum products) generated by operations in Building 88; Tank 68 was closed in place in 1987 (Tetra Tech, 2008). Between 1994 and 1995, a

remedial action was conducted at Building 88 to remove (1) Building 88 and its foundation and (2) Tank 68 and Sump 91 and their associated underground piping.

Sump 66 was removed in 1990 and the excavated soil was stockpiled for treatment with other contaminated soil from NAS Moffett Field. Sample data from the excavation did not indicate significant contaminant levels, with PCE detected in only one of three soil samples at a concentration of 0.02 mg/kg; however, previous investigation of this area indicated concentrations of PCE as high as 6.9 mg/kg (PRC, 1991b). TCE concentrations in groundwater at IR Site 18 indicate elevated concentrations of TCE above cleanup level of 5 ug/L, however, the entire area is also affected by TCE in the regional MEW Superfund Site plume. Sump 66 is considered a potential source of VOC contamination contributing to the groundwater being treated by the West-Side Aquifers Treatment System in IR Site 28, as described below, and has not received regulatory closure. Sump 66 is considered to be part of IR Site 28 by the regulatory agencies.

While low concentrations of VOCs were detected in the confirmation soil samples collected following the removal of Tank 68 (maximum PCE concentration of 0.130 mg/kg) and Sump 91 (maximum PCE concentration of 0.003 mg/kg), the reported concentrations were below site cleanup goals and therefore no additional soil removal was performed (PRC, 1995).

Soil samples were collected from beneath Building 88 after removal of the floor, foundation, and underground piping; in these samples, PCE was reported at concentrations up to 1 mg/kg and the primary source of this contamination was believed to be the floor drains that were located within the building. Areas where PCE concentrations were greater than 0.5 mg/kg (i.e., the MEW ROD soil cleanup standard) were excavated; in total, approximately 400 cubic yards of unsaturated soil was excavated and while PCE concentrations at the floor of the excavation still exceeded the soil cleanup standard, no additional excavation was performed.

Building 88, Sump 66, Tank 68, and Sump 91 have not received regulatory agency closure and potential impacts from these sources are being addressed as part of the remedy for IR Site 28.

IR Site 28

In addition to the investigation, remediation, and closure of IR Sites 14-North and 18 described above and associated with former Building 88, releases of PCE associated with operation of the dry cleaner at former Building 88 have affected regional groundwater and are currently being managed by the Navy with oversight by the Water Board and U.S. EPA.

Groundwater containing PCE originating from Building 88 is being treated by the West-Side Aquifers Treatment System (WATS). As described in Section 2.4.7 below, the

WATS treats groundwater associated with the traffic island area (which is part of IR Site 28), which is located immediately northeast of Parcel 5A/5B and is believed to be impacted from a PCE release from the sanitary sewer line that serviced Building 88 and leaked in the vicinity of the traffic island area (Figure 6). The southwestern side of IR Site 28 includes WATS extraction wells downgradient of Building 88. The U.S. EPA indicated to the Navy that additional work would be needed to adequately address chlorinated VOCs originating from Building 88 as part of IR Site 28, including expansion of the WATS with additional extraction wells (U.S. EPA, 2018). Based on the U.S. EPA comments, the Navy replaced source control extraction well EA1-1 and installed three new source control extraction near the Premises in 2023 (wells EA1-7, EA2-4, and EA2-5 on Figures 2 and 3). The Navy also conducted enhanced aerobic bioremediation/in-situ chemical reduction injection activities (U.S. EPA, 2024b).

2.4.5.5. Indoor Air

Indoor air in Buildings 503, 554, 596, and 944 were sampled in 2011 to meet requirements in the 2010 VI ROD Amendment (Haley & Aldrich, 2013). Building 104 is a small utility building and not occupied. Buildings 526, 529, and 547E are vacant and have not been sampled.

Building 503 is an 11,700 square foot single-story structure without a basement that contained a shop, research and teaching area, and an office area. The concrete building slab had been removed in parts of the southern portion of the building; only the northern portion of the building was occupied. The building does not have central HVAC and is naturally ventilated. In 2011, two indoor air samples and one outdoor air sample were collected from the building; the indoor air samples were collected from the office area and shop area. TCE was detected in indoor air at concentrations of 0.19 and 0.40 ug/m³, below the 2010 ROD Indoor Air Cleanup Level of 5 ug/m³. The outdoor air sample contained TCE at 0.031 ug/m³. PCE and cis-1,2-DCE were also detected in indoor air at concentrations up to 0.42 ug/m³ and 0.16 ug/m³, respectively. The PCE and cis-1,2-DCE concentrations are below 2010 ROD Indoor Air Cleanup Levels of 2 ug/m³ and 210 ug/m³, respectively. An additional round of indoor air sampling was conducted in February 2023. TCE, PCE, and cis-1,2-DCE were detected in one indoor air sample in 2023 at concentrations of 0.29 ug/m³, 0.35 ug/m³, and 0.14 ug/m³, consistent with the 2011 sample results and below the 2010 ROD Indoor Air Cleanup Levels (Geosyntec, 2023b).

Building 554 is a 23,900 square foot single-story structure without a basement that contained a shop, car maintenance area, and an office area. The building does not have central HVAC and is naturally ventilated. In 2011, two indoor air samples and one outdoor air sample were collected from the building; the indoor air samples were collected from southern and northern portions of the building. TCE was detected in indoor air at concentrations of 0.23 and 0.58 ug/m³, below the 2010 ROD Indoor Air Cleanup Level of 5 ug/m³. The outdoor air sample contained TCE at 0.031 ug/m³. Additional indoor air sampling was conducted in February 2023 and January 2024. TCE, PCE, and cis-1,2-DCE

were detected in multiple samples collected in 2023 and 2024; concentrations were below the 2010 ROD Indoor Air Cleanup Levels (Geosyntec, 2024a).

Building 556 is a 8,000 square foot two story structure without a basement that contained an office area. Sampling was conducted in March 2016 with the HVAC on and in February 2020 with the HVAC off from four locations within the building and one outdoor air sample. No VOCs were detected in the indoor air samples during either event. Additional indoor air sampling was conducted in February 2023 with the HVAC on and February 2024 with the HVAC off. TCE was detected in samples collected in February 2023 at concentrations below the 2010 ROD Indoor Air Cleanup Levels. TCE and PCE were detected in samples collected in February 2024; TCE and PCE detections were below the 2010 ROD Indoor Air Cleanup Levels, with the exception of one PCE detection at a concentration of 2.1 ug/m³. Based on other lines of evidence documented during the 2024 sampling event, an indoor source other than vapor intrusion from the subsurface was suspected for TCE and PCE (Geosyntec, 2024c).

Building 596 is a 4,600 square foot single story structure without a basement used for research and was formerly a fast-food restaurant. The HVAC system was not turned off during sampling. In 2011, two indoor air samples and one outdoor air sample were collected from the building; the indoor air samples were collected from an office area and film storage area. TCE was detected in indoor air at concentrations of 1.0 and 1.9 ug/m³, below the 2010 ROD Indoor Air Cleanup Level of 5 ug/m³. The outdoor air sample contained TCE at 0.098 ug/m³. Cis-1,2-DCE was also detected in indoor air at concentrations up to 0.16 ug/m³, below the 2010 ROD Indoor Air Cleanup Level of 210 ug/m³.

Building 944 is a 9,800 square foot single story structure without a basement, with a recreational area in the southern portion of the building. While the building has central HVAC units, it is not clear if the HVAC was turned off for indoor air sampling. In 2011 during indoor air sampling, two indoor air samples and one outdoor air sample were collected from the building; the indoor air samples were collected from the kitchen area and near an HVAC inlet. No VOCs were detected in the indoor air samples.

Buildings 596 and 944 are unoccupied and planned to be demolished, and therefore not tiered for vapor intrusion purposes (Geosyntec, 2024b).

2.4.6. Parcel 6A

Parcel 6A contains Building 476 which was constructed in 1954, as described in the EBS (AECOM, 2019); the building is not included on the NRHP. The building was a Navy Exchange/mixed use facility and is currently condemned and unoccupied.

No hazardous materials or waste has been stored at Building 476. Two oil-filled transformers are located at the building (T-7 and T-8), neither transformer is known to

contain PCBs. Asbestos-containing materials were detected in pipe elbows, pipe insulation, tank insulation, floor tile, mastic, roofing composite, and wall-board in Building 476 in 2001. Lead-based paint was detected in bathroom wall tile, baseboard, and doors in Building 476 in 2001. As shown on Figures 2 and 3, no wells are located in Parcel 6A.

2.4.6.1. Indoor Air

Indoor air in Building 476 has not been sampled.

2.4.7. MEW Superfund Site and West Side Aquifers Groundwater Contamination

The West Side Aquifers, which underlies the Premises, was identified as one of the original Operable Units for NAS Moffett Field. In October 1992, U.S. EPA determined that the aquifers within this area were affected by regional groundwater contamination migrating from a group of companies located within an area south of Moffett Field and bounded by East Middlefield Road, Ellis Street, Whisman Road, and U.S. Highway 101; this area is commonly referred to as the MEW Superfund Site. The Navy, the U.S. EPA, and the State of California agreed that the area would be treated in accordance with the 1989 MEW ROD already written for the MEW Superfund Site, which selected appropriate actions for soil and groundwater remediation to address groundwater within the aquifer impacted by VOCs (PRC, 1996).

A regional plume of chlorinated VOCs within the shallow aquifers (A1/A2) has migrated north from the MEW Site located south of U.S. Highway 101 and extends approximately 5,000 feet north of U.S. Highway 101 (PRC, 1996) slightly west of the Premises (Appendix A). The area of contamination underlies the entire Premises. The primary chemicals of concern are TCE and cis-1,2-DCE, although several other VOCs are frequently detected including 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethene (1,1-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), 1,1-dichloroethane (1,1-DCA), PCE and vinyl chloride. Figure 2-13 in Appendix A shows the approximate extent of TCE contamination at the West Side A1-aquifer as of September/October 2024.

The MEW Companies have constructed a regional groundwater recovery system that began routine operation in October 1998 (Tetra Tech, 1999). The regional groundwater remediation system consists of 15 groundwater extraction wells that pump groundwater to a treatment system located on the north side of Wescoat Road and east of McCord Avenue between Buildings 16 and 510 (see Figures 2, 3, and 6). The Groundwater Treatment System (GWTS) consists of two low-profile air strippers in series with vapor-phase granular activated carbon (GAC) used to treat off-gas from the lead air stripper (Locus, 1999). The MEW Companies' regional groundwater recovery system layout of extraction wells, conveyance pipelines, and treatment system is shown on Figures 2, 3, and 6. The MEW regional extraction wells and piping located in the Premises and shown on Figures 2 and 3. The groundwater cleanup levels for the MEW Site chemicals of concern are listed in the 1989 MEW ROD and are included in Table 3 (U.S. EPA, 1989).

The Navy's remedial Investigation of the West Side Aquifers was completed in 1992. Results of the investigation indicated that contamination from several source areas at NAS Moffett Field had impacted groundwater (IR Site 28) and commingled with the regional groundwater plume migrating from the MEW Superfund Site. The primary sources potentially contributing to the regional groundwater plume are located within the eastern portion Premises, such as the dry cleaner located at the former Building 88 (IR Site 18) and fuel operations at IR Site 9 located north of the Premises (PRC, 1996). In 2008 (Tetra Tech EC, 2008), the Navy identified a sanitary sewer line beneath the traffic island area just northeast of the Premises as a potential source area; this sanitary sewer line received wastewater from the former Building 88 (Figure 6 and Section 2.4.5.4).

The Navy, through negotiations with U.S. EPA and the MEW Companies, agreed to remediate a portion of the regional groundwater contamination plume and in 1993, the Navy adopted the 1989 MEW ROD (U.S. EPA, 1989) to address the Navy's source areas and the resulting groundwater contamination that had commingled with the MEW regional groundwater plume (U.S. EPA, 1993).

Downgradient of the Navy plume, the most frequently detected VOCs include TCE and cis-1,2-DCE, with lesser amounts of PCE and vinyl chloride. PCE is found in both the A1- and A2-aquifers, but is confined primarily to the area downgradient from the former Building 88 dry cleaning facility and traffic island area. Vinyl chloride was most frequently detected in areas that also contain fuel-related contamination and is likely the result of cometabolic biodegradation (PRC, 1997). Groundwater contaminated by fuel-related chemicals is limited to the shallow A1-aquifer zone, with the old fuel farm (Building 29) and old NEX service station (Building 31) being the primary sources. Another localized area of contamination by fuel-related chemicals is associated with Tanks 19 and 20, which are located just outside the south east corner of the Premises near the Ellis Street entrance (Figure 6).

From 1993 to 1997, the Navy operated three small groundwater extraction and treatment systems as source control measures within the West-Side Aquifers area to address VOCs and fuel-related chemicals from source areas at Buildings 29, 31, and 88 (IR Sites 9 and 18). Groundwater was extracted from converted 4-inch monitoring wells. In addition, water was pumped from two sumps to collect groundwater that had infiltrated into the storm drain system. The groundwater was treated by either liquid-phase GAC or a low-profile air stripping system. In 1997, the Navy began construction of the WATS (Figures 2, 3, and 6) to extract and treat groundwater impacted by VOCs and petroleum hydrocarbons in the A1- and A2- aquifer zones. The Navy began operating the WATS in 1998, which currently treats groundwater pumped from six A1-aquifer zone extraction wells, three A2-aquifer zone wells, and the storm drain sumps (SES-TECH, 2018).

Extracted groundwater is treated using an advanced oxidation process and GAC units; after treatment, the water is discharged to the Moffett storm drain system that conveys

the water to a settling basin and ultimately discharges to NASA's Eastern Diked Marsh and Storm Water Retention Ponds (SES-TECH, 2018). As shown on Figures 2, 3 and 6, none of the piping associated with the WATS nor the WATS itself are located within the Premises. Some of the monitoring wells are located within the Premises.

NASA and the MEW Companies entered into an Allocation and Settlement Agreement (NASA/MEW Companies, 1998) to allocate responsibility for soil and groundwater remediation north of Highway 101; Figure 4 identifies the party responsible for soil and groundwater remediation in different areas north of U.S. Highway 101. Although the Navy participated in negotiations of the Allocation and Settlement Agreement, the Navy is not a party to the document. However, EKI understands that the Navy generally fulfills the obligations described as those of the Navy under the Allocation and Settlement Agreement.

In 2010, to address the vapor intrusion pathway for the MEW Superfund Study Area, the U.S. EPA amended the 1989 MEW ROD. In its *ROD Amendment for Vapor Intrusion Pathway at the MEW Superfund Study Area* (2010 VI ROD Amendment; U.S. EPA, 2010) the U.S. EPA defined the MEW Site Vapor Intrusion (VI) Study Area based on the approximate extent of the 5 ug/L TCE in groundwater contour and developed a series of Tiered Response Actions for existing and future commercial and residential buildings located within the MEW VI Study Area. In December 2011, as part of a dispute resolution process, the U.S. EPA prepared a map of the vapor intrusion study area north of U.S. Highway 101 and identified which parties were responsible for implementing the selected remedy within the various portions of the MEW VI Study Area (Figure 5). The MEW VI Study Area has been subsequently updated by U.S. EPA to reflect changes in TCE concentrations in groundwater as shown on Figure 5. Figures depicting VOC concentrations in groundwater as of 2024 are included in Appendix A.

2.4.8. Survey of Lead in Soil

As further discussed in Section 2.6.2, lead-based paints were previously used at Moffett Field. In 1993, Chemical Waste Management, Inc. (CWMI) conducted a facility wide investigation to assess the potential presence of lead in soil surrounding buildings that may have used lead-based paints on exterior surfaces (CWMI, 1993). CWMI collected 332 discrete surface soil samples from within 2 feet of the periphery of 96 buildings. The sample collection strategy involved the collection of a single discrete sample from each 30-foot long sample cell alongside the building perimeter. These samples were analyzed for total lead and for soluble lead using the Waste Extraction Test (WET) if the total lead concentration was in excess of 50 milligrams per kilogram (mg/kg). The survey showed that the soils around most of the buildings were impacted by lead (i.e., lead was detected above background levels) and at many buildings, lead concentrations were detected at levels above the then-current U.S. EPA Region IX residential land use Preliminary Remediation Goal (PRG) of 400 mg/kg (U.S. EPA, 2002a; the current Water Board ESLs under residential and commercial land use scenarios are 80 mg/kg and 500 mg/kg,

respectively). The total lead concentration at several locations also exceeded the then-current U.S. EPA industrial land use PRG of 1,000 mg/kg, which is also the concentration (Total Threshold Limit Concentration [TTLC]) at which excavated soil would be considered hazardous waste under California hazardous waste regulations if it were excavated and disposed. Soluble lead levels analyzed with the WET test exceeded the Soluble Threshold Limit Concentration (STLC) of 5 mg/L at several locations, as well. Detections of lead at levels above the TTLC and STLC levels were generally more sporadic.

A major limitation to the CWMI work was the use of discrete soil samples to establish the presence or absence of lead contamination instead of composite samples. Because of the sporadic way in which lead-based paint chips can be distributed in the soil, results from discrete soil samples can be highly variable depending on whether paint chips are present or absent in the sample. A multiple-increment composite (as discussed in the Interstate Technology Research Council's (ITRC) Incremental Sampling Methodology (ISM) guidance document (ITRC, 2020) would likely be more representative of bulk soil conditions in each 30-foot sample cell. In addition, since the CWMI study was designed to only provide an overview of lead concentrations in surface soil surrounding buildings at Moffett Field, no data were collected regarding the lateral and vertical extent of elevated levels of lead detected in the soils.

A more detailed follow-up investigation was conducted by Roy F. Weston (Weston) for the U.S. EPA (Weston, 1998). One hundred twenty discrete surface soil samples were collected from selected areas around ten buildings and one former building site, most of which had detectable lead-based paint on their exteriors. Insofar as the samples were collected along short transects, the Weston study provided some data on the lateral extent of lead contamination away from a building source. Samples collected as far away as 7.5 feet from the building wall were found at some locations to contain lead above the TTLC or STLC levels.

The Weston study is similar to the CWMI study in terms of limitations. Discrete sample data were collected instead of multi-increment composite data. Also, there were no data generated defining the depth to which the lead contamination had penetrated. Although horizontal transect sampling was performed, the sampling transects were not extended far enough to give an indication of the maximum lateral distance within which elevated concentrations of lead could still be encountered.

Following the CWMI and Weston studies, another lead survey was conducted by Benchmark in 2001 using an x-ray fluorescence spectrometer to screen interior and exterior paint, and soil samples were collected from around most of the NRP buildings (AECOM, 2019). The results for buildings on each parcel are summarized in Sections 2.4.3 through 2.4.6. Lead was detected in paint samples in most of the Premises buildings, but was not detected in any of the soil samples collected at concentrations above the residential U.S. EPA PRG in any soil samples collected at the Premises (AECOM, 2019).

2.4.9. Per- and Polyfluoroalkyl Substances (PFAS)

Tetra Tech conducted an assessment of PFAS at NASA ARC, including NASA Research Park, to evaluate PFAS in soil, groundwater, and surface water (Tetra Tech, 2021). The site inspection was performed on behalf of NASA. Historical uses and releases of PFAS at NASA ARC include:

- aqueous film-forming foam (AFFF) from firefighting, firefighting exercises, and accidental releases;
- former unlined landfills;
- effluent from wastewater treatment plants treating TCE and other VOCs;
- hydraulic fuel disposal; and
- brine from an industrial wastewater pretreatment plant.

Following the assessment, Tetra Tech performed a site investigation to evaluate PFAS in groundwater at NASA ARC (Tetra Tech, 2023a). In July 2021, Tetra Tech collected groundwater samples from three sampling locations upgradient (south) of the Premises within the MEW plume and one location cross-gradient (west) of the Premises within the MEW plume and analyzed the samples for PFAS compounds. In addition, Tetra Tech collected a sample of the influent and effluent wastewater for the MEW GWTS north of Wescoat Road and east of McCord Avenue, which receives wastewater from extraction wells within the Premises.

Multiple PFAS compounds were detected in groundwater samples above the TCLs within the MEW plume to the south, southwest, and west of the Premises, and PFAS was detected in both the influent and effluent of the MEW GWTS above the TCLs; no samples were collected within the Premises parcels during this investigation.

In a follow-up investigation conducted on behalf of the MEW companies, groundwater samples were collected from each of the individual groundwater extraction wells connected to the MEW GWTS in November 2021 and analyzed for PFAS compounds, including four groundwater extraction wells located within the Premises (SLB, 2022). The sampling results showed multiple PFAS compounds above the TCLs in extraction wells located within the Premises:

- Perfluorooctanoic acid (PFOA) at up to 7.3 nanograms per liter (ng/L);
- Perfluorooctanesulfonic acid (PFOS) at up to 14 ng/L; and
- Perfluorobutanesulfonic acid (PFBS) at up to 16 ng/L.

The MEW companies indicated that the majority of PFAS captured by the MEW GWTS was being extracted from an extraction well downgradient of the Premises, north of Hangar 1.

NASA plans to collect and analyze additional groundwater samples for PFAS from the MEW extraction wells (Tetra Tech, 2023b). NASA staff have indicated that PFAS will be assessed further through the CERCLA process.

2.5. Summary of Existing Subsurface Structures That May Require Removal

All known sumps and USTs within the Premises have been removed and the Navy has conducted investigations to evaluate and characterize the extent of potential contamination. Remedial actions have been conducted at many of the former UST locations and closure of these sites has been received from the Water Board for all sumps and USTs that have been removed; however, U.S. EPA, the Water Board, and NASA have requested that the Navy perform further investigation and remediation of the residual contamination from PCE related to the former dry cleaner (Building 88) and sanitary sewer line on the northern Parcel 5A/5B boundary (U.S. EPA, 2018).

2.6. Summary of Hazardous Materials Associated With Existing Structures And Current Operations within the Premises

Many of the existing buildings within the Premises contain hazardous materials, such as asbestos-containing materials, lead-based paints, and electrical equipment containing PCBs. In addition, hazardous materials have been or are being stored within the Premises. The following sections describe hazardous materials associated with existing structures or operations within the Premises.

2.6.1. Asbestos-Containing Materials

Many of the existing buildings within the Premises are known to contain asbestos-containing materials (ACM) as a result of base-wide asbestos surveys conducted by Tetra Tech in 1993 and Benchmark in 2001 (AECOM, 2019), and sampling of several individual buildings that was conducted as a result of building modifications being performed. In addition to the buildings with confirmed or suspect ACM present, other buildings are assumed to likely contain ACM due to their age (Harding, 2000).

Hard copy reports of the asbestos surveys conducted to date within the Premises are located in the NASA ARC Occupational Safety Health & Medical Services Office.

2.6.2. Lead-Based Paints

Given the age of buildings within the Premises and the common usage of lead-based paints prior to 1978, it is assumed that the majority of buildings/structures within the Premises contain lead and will require mitigation during demolition for redevelopment. Soil sampling has also been previously conducted around the perimeter of buildings that may have had lead-based paints used on exterior surfaces.

2.6.3. PCBs in Electrical Equipment and Building Materials

Transformers or capacitors containing PCBs at concentrations above the Department of Health Services (DHS) regulated concentration for hazardous waste (50 ppm) were historically used within the Premises.

The NASA Environmental Services Office performs quarterly inspections, completes Annual Document Logs, and submits transformer registration of equipment with PCBs at greater than or equal to 50 ppm to the U.S. EPA in compliance with the Toxic Substances Control Act (TSCA) in 40 CFR 761. PCBs were detected in the transformers in Building 149, three oil fuse capacitors at unspecified locations in Parcel 1A, one PCB-containing transformer in Building 104, three transformers located in Building 503, one transformer located at Building 547E, and one transformer located east of Building 596.

In addition to PCB-containing transformers or capacitors, buildings with fluorescent lighting may contain PCB light ballasts (Harding, 2000) and PCBs may be present in building materials, such as caulk and paint. PCBs in caulk and paint can diffuse into porous building materials, including concrete (U.S. EPA, 2015b).

2.6.4. Other Hazardous Materials and Hazardous Waste

Sodium hypochlorite is reportedly stored in a 500-gallon AST at Building 109 (Tank 135). No other active ASTs or USTs are known to be located in the Premises.

3. CURRENT LAND USE AND PLANNED DEVELOPMENT OF PREMISES

3.1. Current Land Use

The Premises is approximately 36 acres in size and comprises buildings, roadways, and parking lot areas in the NRP portion of NAS Moffett Field (Figures 2 and 3). All land within the Premises is designated for commercial/industrial land use only. Several buildings are still in use as office space, research laboratories, dormitories, a swimming pool, and recreation hall.

3.2. Planned Land Use

The planned land use for the Premises is a combination of office space, research laboratories, meeting space, and dormitories, as described in the Masterplan (Moffett Partners LLC, 2026). The current Masterplan includes 2,320,000 square feet (sf) of building space: 350,000 sf of office space; 1.39 million sf of laboratory, research, and development space; 260,000 sf of academic space; 25,000 sf of conference space; 90,000 sf of ground floor active uses; 75,000 sf of short term lodging; and 130,000 sf of student faculty housing. The housing elements include hotel or academic year dormitory use, and are not intended as long-term housing. The specific uses of the proposed development have yet to be finalized and are subject to change during the redevelopment process. The proposed land use includes all-new construction across the Premises; none of the existing buildings will be retained as part of the Premises development.

In general, because of issues regarding chemicals of potential concern in soil and groundwater at the Premises, Project Developers should design planned construction projects with a minimum of soil excavation (i.e., without basement or other subgrade floors). However, soil excavation and trenching are expected to occur in conjunction with installation of utility lines, elevator pits, and building foundations.

4. POTENTIAL EXPOSURE PATHWAYS AND TARGET CONCENTRATION LEVELS

As described in Section 2, soil and groundwater within the Premises have been impacted by chemicals, primarily chlorinated VOCs, petroleum hydrocarbons, BTEX, lead, and PFAS compounds. The 2005 NRP EIMP provided a general summary of the exposure pathways that were potentially associated with planned development within the NRP area and TCLs for groundwater and soil. This EIMP: (a) provides an updated description of exposure pathways, (b) discusses the soil and groundwater TCLs provided in the 2005 NRP EIMP, (c) provides updated TCLs for groundwater and soil, and (d) provides TCLs for indoor air, soil vapor, and sub-slab vapor.

4.1. Potential Exposure Pathways

The permitted uses specified in the Lease include residential and commercial/industrial land uses.

Based on the permitted uses specified in the Lease, primary potential future receptors include (a) short-term residents in hotels or dormitories (i.e., unrestricted use),¹⁵ (b) indoor workers, such as teachers, students, office personnel and lab workers, and (c) construction workers and maintenance workers.

Potential future receptors may be exposed to COPCs by one or more of the following pathways:

- inhalation of volatile chemicals from groundwater, soil vapor, or soil;
- dermal absorption due to direct soil and/or groundwater contact;
- inhalation of airborne suspended soil particulates; and
- incidental soil ingestion.

These pathways are described more fully below.

VOCs are the primary COPCs found within the Premises. VOCs in groundwater and soil can volatilize into the pore spaces within unsaturated zone soils and migrate through the soil column and through cracks or penetration in floors into enclosed indoor spaces, where they can be inhaled by potential receptors. The migration of COPCs from the subsurface into indoor air is called vapor intrusion. This is the primary potentially

¹⁵ U.S. EPA has indicated that any overnight use would be treated as unrestricted or residential land use with respect to the application of cleanup levels or TCLs.

complete exposure pathway that could affect future indoor workers within the Premises. This mechanism is illustrated on Figure 8 and discussed further in Section 5.3.1. The same mechanism can also lead to exposure to COPCs in ambient outdoor air; however, due to dilution by typical winds in the area, potential exposures are much less than in enclosed spaces. Construction workers and maintenance workers may also be exposed to COPCs through the inhalation pathway during soil excavation or trenching activities that may expose soil or groundwater containing COPCs directly to ambient air leading to increased volatilization of COPCs.

Exposure to COPCs can also occur through dermal absorption due to direct contact with soil or groundwater containing COPCs. COPCs can then be absorbed through the skin. This potentially complete exposure pathway could affect construction workers and maintenance workers within the Premises, particularly when excavation or trenching or other activities involve disturbance of the subsurface and expose workers to direct contact with soil or groundwater containing COPCs.

Potential exposure through inhalation of airborne suspended soil particles can occur when the wind lifts soil particles into ambient air that are subsequently inhaled by potential receptors. COPCs sorbed to the soil particles can be absorbed into the bloodstream when inhaled.

Incidental ingestion of soil particles can also occur, primarily through hand-to-mouth contact after the hand comes in contact with soil containing COPCs.

4.2. 2005 NRP EIMP Target Concentration Levels

Groundwater TCLs were based on maximum concentration limits (MCLs) for drinking water at the time of the 2005 EIMP.

Soil TCLs derived for COPCs in the 2005 NRP EIMP are summarized below.

- For chlorinated VOCs, the soil cleanup levels set in the MEW ROD (U.S. EPA, 1989) were used as TCLs for the NRP.
- For petroleum hydrocarbons and BTEX, the cleanup levels for petroleum contamination in soil at Moffett Federal Airfield (MFA) negotiated by the Navy and State of California in 1994 (Tetra Tech, 1998) were used as TCLs for the NRP.
- For PCBs, the soil TCL of 1 mg/kg was established by the DTSC for the NASA ARC (Cal-EPA, 1998) and consistent with the PCBs cleanup level promulgated in TSCA regulations (40 CFR §761) for high occupancy areas.
- For metals, the soil TCLs were the lowest value from (a) Environmental Screening Levels (ESLs) for residential soils to account for potential dermal contact or

incidental soil ingestion (Water Board, 2025) or (b) U.S. EPA PRGs for residential soil (U.S. EPA, 2002a), unless that value is less than (c) background concentrations for metals in soil (Mactec, 2003), in which case the soil TCL was the background value.

- For other COPCs, the lowest value from the ESLs and PRGs was used as TCLs for the NRP.

4.3. Target Concentration Levels

Updated and revised TCLs described below were developed for indoor air, soil, groundwater, sub-slab vapor and soil gas within the Premises.

Indoor air TCLs were developed using: (1) indoor air cleanup levels from the 2010 VI ROD Amendment (U.S. EPA, 2010) for MEW COPCs, and (2) for chemicals not included in the MEW 2010 VI ROD, indoor air cleanup levels for residential and commercial buildings are based on the more stringent of the values currently included in the U.S. EPA's RSLs, which replaced the U.S. EPA's PRGs, and the Water Board's ESLs.

For soil, groundwater, soil gas, and sub-slab vapor, the Premises TCLs are based on the more stringent of the values currently included in the U.S. EPA's RSLs and the Water Board's ESLs. These values are included in Tables 2, 3, and 4 and are discussed below. In addition, the groundwater TCLs include the 2010 VI ROD Amendment cleanup levels.

These TCLs should be used to determine the following: (a) groundwater management or disposal options (Section 6.3.4) and (b) whether excavated soil from construction areas can be reused as fill within the Premises and whether additional soil removal should be considered¹⁶ within the limits of construction at locations where potential soil contamination is observed during development (as described further in Section 6.10). At the Premises, the 2010 VI ROD Amendment sets forth requirements for vapor intrusion mitigation measures (Section 5.3.2).

The identified TCLs should be protective¹⁷ of temporary and short-term residents, short-term construction workers, maintenance workers performing periodic subsurface activities, indoor instructors and workers within the Premises because the exposure pathways, potential receptors, and exposure assumptions used in developing the U.S.

¹⁶ Should the construction project be located within the boundary of a previously closed site, the more stringent of the cleanup standards used to close the site and the applicable TCLs will be used to determine whether additional excavation is required, unless otherwise agreed upon by the lead regulatory agency.

¹⁷ Human health risks are expressed as either (a) an incremental lifetime excess cancer risk or (b) a HI for non-cancer adverse health effects. Based on the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300.430), cancer risks are compared to a risk threshold between 10^{-6} (one-in-a-million) and 10^{-4} (one-in-ten-thousand), and the non-cancer HI is compared to a threshold level of 1, a level at or below which there are unlikely to be adverse health effects, even for sensitive populations.

EPA's RSLs and the Water Board's ESLs are similar to (or more conservative than) those anticipated within the Premises. Unless specific unique exposure assumptions that could result in more intensive exposure to workers or other populations are identified for a component of the development within the proposed Project, neither the Master Lessee nor the Project Developer will be required to prepare a human health risk assessment for the proposed development.¹⁸

The use of the Water Board commercial/industrial land use ESLs or residential land use ESLs, as appropriate, within the Premises is justified as the exposure pathways and potential receptors used to develop the ESLs are similar to the expected exposure pathways and potential receptors within the Premises. In addition, as anticipated exposure parameters (e.g., exposure frequency, exposure time, exposure duration, ingestion rate, etc.) for individuals other than commercial/industrial workers within the Premises are significantly lower than the default values used to develop the Tier 1 ESL (e.g., for commercial/industrial workers the assumed exposure time, exposure frequency, and exposure duration are 8 hours per day, 250 days per year, over a 25 year period, respectively and for residential occupants the assumed exposure time, exposure frequency, and exposure duration are 24 hours per day, 350 days per year, over a 26 year period, respectively), the use of the Water Board's Tier 1 ESLs as a cleanup levels within the Premises should be protective of all potential future receptors.

Based on historic soil and groundwater data collected within the Premises, TCLs were identified for several chlorinated VOCs, petroleum hydrocarbons and BTEX compounds, PAHs, PCBs, Title 22 metals, and select PFAS compounds¹⁹ (for groundwater only). The TCLs for commercial/industrial and residential land use scenarios are summarized below and listed in Tables 2, 3, and 4.

- For soils, with the exception of PCBs and Title 22 metals, the selected TCL is the lowest value from the U.S. EPA RSLs (U.S. EPA, 2024c) under an industrial land use scenario or a residential land use scenario²⁰ or the Water Board Environmental Screening Levels (ESLs; Summary of Soil ESLs, Water Board, 2025) under a commercial/industrial land use or residential land use scenario where groundwater is a potential source of potable water (considering the direct contact, gross contamination, and groundwater protection pathways).

¹⁸ Should a unique exposure pathway be identified for a component of the development within the proposed Project, either the Master Lessee or the Project Developer will prepare a human health risk assessment for the proposed development.

¹⁹ Revision of this EIMP to identify TCLs for additional PFAS compounds may be necessary in the future if and when additional regulatory screening levels for PFAS compounds are developed. Refer to Section 7.7 for information regarding periodic EIMP updates.

²⁰ Select RSLs were modified based on the California Environmental Protection Agency Human and Ecological Risk Office's Human Health Risk Assessment (HHRA) Note 3 (Cal-EPA, 2022).

- For PCBs, the TCL is the PCB cleanup level promulgated in TSCA regulations (40 CFR §761) for high occupancy areas.
- For Title 22 metals, the selected TCL is the lowest value from the (a) RSLs and (b) ESLs to account for potential dermal contact and incidental soil ingestion, unless that value is less than (c) background concentrations for metals in soil near the Premises (Scott, 1995), in which case the soil TCL will be the background value.
- For COPCs not listed in Table 2, the lowest of the current RSLs (as adjusted by DTSC's HHRA Note 3, as applicable) and ESLs should be used as the TCL.
- For groundwater, the hierarchy for selected TCLs (Table 3) is the 1989 MEW ROD cleanup level then the California MCLs (SWRCB, 2024). Absent a ROD cleanup level or MCL, the TCL is the lowest value from the Water Board's (2025) Groundwater Vapor Intrusion Human Health Risk Level for shallow groundwater and the Direct Exposure Human Health Risk Levels both under a Commercial/Industrial Land Use Scenario or Residential Land Use Scenario, gross contamination, and odor nuisance levels under a drinking water scenario.²¹ For COPCs not listed in Table 3, the lowest of the current RSLs and ESLs (excluding aquatic habitat goals) should be used as the TCL.
- For sub-slab soil vapors and soil gas, the selected TCL (Table 4) is the lowest of (a) the U.S. EPA RSL for ambient air under an industrial land use scenario or residential land use scenario (U.S. EPA, 2024c), as modified by HHRA Note 3, multiplied by an attenuation factor of approximately 33 (i.e., 1/0.03) between indoor air and sub-slab soil vapor (U.S. EPA, 2015a) and (b) the Water Board ESL for sub-slab vapor / soil gas (Water Board, 2025). For COPCs not listed in Table 4, the lowest of the current indoor air RSLs multiplied by an attenuation factor of 33 and the sub-slab vapor / soil gas ESLs should be used as the TCL.
- For indoor air, the MEW 2010 VI ROD Amendment values were selected as the TCL. For COPCs without MEW Study Area VI cleanup levels, the selected TCL (Table 4) is the lower of the U.S. EPA RSL (U.S. EPA, 2024c) as modified by HHRA Note 3 and the Water Board ESL (Water Board, 2025). For COPCs not listed in Table 4, the lower of the current RSLs, as modified by HHRA Note 3 and ESLs should be used as the TCL.

²¹ As the purpose of the groundwater TCL is to determine the appropriate management option for dewatering water produced during development activities (e.g., on-site dust control, discharge to storm drains, to the sanitary sewer, treatment at the WATS groundwater extraction and treatment systems, or offsite disposal), the Water Board Estuary Aquatic Habitat Goals were not considered applicable. Rather, discharge to storm drains and sanitary sewers typically have permitted discharge criteria and the Project Developer will comply with the permitted discharge criteria.

Additional information on the Water Board ESLs, U.S. EPA RSLs, and California MCLs is presented below.

4.3.1. Water Board ESLs

The Water Board's ESLs are conservative guideline concentrations developed by the Water Board for screening of environmental data collected at a site. According to the Water Board, risks to human health and the environment can generally be considered to be insignificant at sites where concentrations do not exceed the ESLs. The ESLs shown in Tables 2 through 4 address the protection of human health from the potential ingestion, inhalation, and dermal contact of chemicals in soil and groundwater, as well as protection of groundwater quality (Water Board, 2025). Unlike the U.S. EPA RSLs, described below, the ESLs for volatile compounds in groundwater are based in part on consideration of the vapor intrusion exposure pathway.

4.3.2. U.S. EPA RSLs

The U.S. EPA RSLs (U.S. EPA, 2024c) are intended to address human health concerns related to the ingestion, inhalation, and dermal exposure to chemicals in soil, air, and water. If available, the DTSC HHRA Note 3-modified RSLs (also known as DTSC screening levels; Cal-EPA, 2022) should be used for a given COPC so the TCLs reflect California toxicity factors, which can be more stringent than U.S. EPA toxicity factors that are used to calculate the U.S. EPA RSLs.

4.3.3. California MCLs

California MCLs²² for drinking water are intended to address human health concerns related to the ingestion of chemicals in water (SWRCB, 2024).

4.3.4. Background Metals Concentrations in Soil

The background metal concentrations in soil listed in Table 2 were obtained from *Background Metal Concentrations in Soil in Northern Santa Clara County, California* (Scott, C.M., 1995). The background concentrations presented in Table 2 are the maximum values observed in the background metal dataset and are selected as the TCLs for metals when the background concentration is higher than the RSL or ESL listed in Table 2.

²² Federal MCLs are generally not included as TCLs for groundwater because California MCLs are more stringent. For PFAS compounds, which have Federal MCLs but do not yet have California MCLs, Federal MCLs (U.S. EPA, 2024a) are shown in Table 3.

5. RISK MANAGEMENT DESIGN CONSIDERATIONS

New buildings and utilities that are installed as part of the Project will be constructed with mitigation measures that will assist in limiting exposures to chemicals in soil, soil gas, and groundwater,²³ and in limiting future migration of groundwater containing chemicals of concern. In some cases, the integration of mitigation measures into new construction can increase effectiveness and reduce costs, as compared to adding mitigation measures to existing facilities. Mitigation measures that are required in new construction within the Premises are described in the Sections 5.3 through 5.5.²⁴

In addition, as described previously, the MEW Companies have constructed and are currently operating groundwater extraction wells and associated conveyance piping and monitoring wells within the Premises, and the Navy has implemented several Site remedies within the Premises, including the installation of groundwater monitoring wells. As such, redevelopment within the Premises must be conducted in coordination with the MEW Companies and the Navy to allow for removal and replacement of groundwater monitoring wells, groundwater extraction wells, and associated conveyance piping. Section 5.6 describes procedures that must be followed to coordinate development activities within the Premises with the Navy²⁵ and MEW Companies' existing remediation systems and other implemented Site remedies.

NASA will notify U.S. EPA and Water Board regarding relevant redevelopment and construction activities within the Premises. Relevant redevelopment and construction activities would include the following: (1) subsurface work in areas with known unsaturated zone soil contamination, (2) new buildings within the Premises, which all overlies VOC impacted areas, and (3) construction that could result in disturbance of existing remedies.

²³ In general, because of issues regarding chemicals of potential concern in soil and groundwater at the Premises, Project Developers should design planned construction projects with a minimum of soil excavation (i.e., without basements or other subgrade floors).

²⁴ It is the intent of the Master Lessee and NASA that the parties that have been named by U. S. EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy and MEW Companies) for contamination at the Premises retain this responsibility and continue to perform their obligations independent of the Master Lessee. The implementation of the mitigation measures discussed in Sections 5.3, 5.4, and 5.5 by the Master Lessee, the Project Developer, and/or NASA does not relieve the Responsible Parties of their responsibilities and obligations, and such actions will not result in Master Lessee or the Project Developer becoming a Responsible Party. NASA will facilitate communication between the Master Lessee/Project Developer and the Responsible Party when requested.

²⁵ NASA is responsible for the operation, monitoring, and maintenance of the WATS system and associated monitoring wells as shown on Figures 2, 3, and 6. Thus, coordination with respect to these wells will be initiated with NASA who will then coordinate with the Navy.

5.1. Land Use Considerations

The Premises project is undergoing an environmental review process under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Once that process is completed, the land use plan should generally allow for unrestricted or residential land use within the Premises. If any residential use is planned within the IR Site 15 boundary, the Master Lessee will work with the Water Board to evaluate if additional investigation and/or remediation is needed at IR Site 15-N to allow for residential use.

5.2. Assessment of Vapor Intrusion Potential and Presence of Potential VOC Source Areas

As part of the planning for new development areas, U.S. EPA is requiring soil gas and shallow groundwater investigations to be performed within the Premises. The objectives of the soil gas and shallow groundwater investigations are to obtain current data within planned development areas to better understand the vapor intrusion potential and to evaluate if potential VOC source(s) in soil and/or shallow groundwater are present that could warrant remedial action prior to development. The Project Developer or Responsible Parties will prepare and implement a soil gas and shallow groundwater investigation work plan for review and approval by U.S. EPA.

Master Lessee will look to the Responsible Party to implement additional remedial measures if required by U.S. EPA based on the results of the soil gas and groundwater investigation, or the Master Lessee may opt to self-perform.

5.3. Measures to Address VOC Vapor Intrusion into New Construction and Existing Buildings

In the 2010 ROD Amendment for the VI Pathway for the MEW Superfund Site (U.S. EPA, 2010), the U.S. EPA defined the MEW VI Study Area based on the approximate extent of the 5 ug/L TCE in groundwater contour in the shallow A/A1 aquifer zone. As shown on Figure 7, the Premises is almost entirely within the MEW VI Study Area. The majority of the Premises is within the MEW Companies Area of Responsibility, while a portion of the northern areas of Parcels 3 and 5A/5B are within the Navy Area of Responsibility (see Figure 5). For the proposed development at the Premises, mitigation measures will be required to reduce vapor intrusion as described in the 2010 VI ROD Amendment (U.S. EPA, 2010).

Implementation of the mitigation measures discussed in Section 5.3.2 by the Master Lessee and/or the Project Developer does not relieve the MEW Companies or Navy of their responsibilities and obligations, and such actions will not result in the Master Lessee or the Project Developer becoming a Responsible Party. NASA will facilitate

communication between the Navy and the Master Lessee and/or Project Developer when requested.

5.3.1. The Vapor Intrusion Process

The vapor intrusion process occurs through several chemical transport processes, as summarized below. A generalized illustration of the vapor intrusion process is shown on Figure 8.

The vapor intrusion process begins when VOCs in soil or groundwater volatilize into soil gas in the subsurface. The degree to which VOCs volatilize into soil gas depends on the chemical properties, i.e., VOCs with higher vapor pressures, lower water solubilities, and less tendency to adsorb to soil particles tend to partition into soil gas more readily than other VOCs. Chlorinated solvents such as those found in groundwater within the Premises readily partition into soil gas.

Once in the soil gas, VOCs may migrate upwards or laterally by both diffusion and convection. In general, VOCs diffuse more readily in drier, granular soil than in wetter, clayey and silty soil. Diffusion is a relatively slow transport process as compared to convection, which occurs when soil gases containing the VOCs are drawn to the surface by pressure gradients. Pressure gradients can be caused by barometric pressure changes, as well as the reduced pressure that occurs inside many buildings, as discussed below.

After VOCs in soil gas migrate to the area directly beneath a building (e.g., the base rock beneath the floor slab), vapor intrusion into the building can occur. Soil gases containing VOCs may migrate into the building by diffusing through cracks in the floor or through penetrations through the concrete slab (e.g., for utilities). Soil gases may also be swept into the building through cracks in the floor and preferential pathways by convective flow, driven by a lower pressure inside the building. Lower pressures inside of buildings are sometimes referred to as the stack effect. The stack effect can be caused by:

- warmer air inside the building, which tends to rise and draw in air from the lower parts of the building;
- wind, which tends to impart a lower pressure inside the building;
- appliance exhausts, which tend to draw air into the building and lower the interior pressure; and
- active ventilation systems that exhaust outside the building and induce a slight negative pressure inside the building.

Considering the mechanisms of vapor intrusion, vapor intrusion prevention or mitigation tends to be based on (a) eliminating soil gas flow into the building by creating either a

lower pressure (slight vacuum) beneath the floor of the building, or a higher pressure inside the building, (b) preventing VOCs from migrating to the area beneath the building floor, using barriers or source removal, and/or (c) sealing cracks and penetrations in the floor through which vapor intrusion might otherwise occur.

Additional information regarding vapor intrusion is presented in the U.S. EPA's *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (U.S. EPA, 2015a).

5.3.2. Vapor Intrusion Mitigation Engineering Controls

The 2010 VI ROD Amendment developed different response actions (Response Action Tiering System) for existing and future residential and commercial buildings within the MEW Site VI Study Area. In accordance with the 2010 VI ROD Amendment, the MEW Companies prepared its *Revised Site-Wide Vapor Intrusion Sampling and Analysis Work Plan for Response Action Tiering Middlefield-Ellis-Whisman Superfund Area, Mountain View, California and Moffett Field* (Haley & Aldrich, 2013) and the Navy prepared its *Draft Air Sampling and Vapor Intrusion Tier Response Evaluation Report* (Navy, 2012). The MEW Companies 2013 tiering work plan was replaced and superseded by the *Site-Wide Vapor Intrusion Response Action Tiering Work Plan* (2022 Tiering Work Plan; Geosyntec, 2022) that was conditionally approved by U.S. EPA on 12 December 2022.

For existing non-residential buildings where VOCs in indoor air exceed the TCLs, the selected engineering remedy consists of sealing identified direct and leaking conduits that serve as pathways for subsurface vapors to migrate in the building, installing an appropriate sub-slab/sub-membrane ventilation system (an active system or passive system which can be converted to an active system), monitoring, and institutional controls or using an existing sub-slab pressurization system with vapor barrier if the system is operated in a manner consistent with the operations, maintenance, and monitoring plan developed for that building. Where property owners/building owner²⁶ of existing commercial buildings agree to the use, operation, and monitoring of a building's indoor air ventilation system (Positive Pressure Ventilation), the building's indoor air ventilation system may be used as an alternative remedy.

As described in the 2010 VI ROD Amendment and 2022 Tiering Work Plan, existing buildings within the VI Study Area are classified into 5 Tiers based on detected concentrations of COCs in indoor air – that is Tier 1, Tier 2, Tier 3A, Tier 3B, and Tier 4, (Tables 6A and 6B of the 2010 VI ROD Amendment and Table 1 of the 2022 Tiering Work Plan).

²⁶ For the purposes of the EIMP, within the Premises, the Master Lessee is assumed to be the entity to approve the use of HVAC as a remedy within a given building, rather than the property owner.

- Buildings with operational passive or active engineering controls where indoor air concentrations are:
 - above indoor air cleanup levels and outdoor, or background, air concentrations are classified as Tier 1; and,
 - below indoor air cleanup levels are classified as Tier 2.
- Buildings without engineering controls or inactive engineering controls where indoor air concentrations are:
 - above indoor air cleanup levels and outdoor, or background, air concentrations are classified as Tier 1;
 - below cleanup levels but above outdoor, or background, air concentrations are classified as Tier 3A;
 - below cleanup levels and at or within outdoor, or background, air concentrations are classified as Tier 3B; and,
- Buildings without engineering controls or inactive engineering controls where converging lines of evidence demonstrate that there is no potential for vapor intrusion into the building at concentrations exceeding indoor air cleanup levels are classified as Tier 4.

After implementation of additional engineering controls at Tier 1 buildings and monitoring results indicate that indoor air cleanup levels are met, Tier 1 buildings shall be re-categorized as Tier 2 buildings. With the exception of Tier 4 buildings, monitoring and institutional controls are required to ensure that the engineering controls are being operated correctly and demonstrate that indoor air cleanup levels are met.

As described in the 2010 VI ROD Amendment and the 2022 Tiering Work Plan, future buildings within the VI Study Area are classified as Tier A or Tier B (Table 7 of the 2010 VI ROD Amendment and Table 2 of the 2022 Tiering Work Plan). Future buildings are presumed to be Tier A unless multiple lines of evidence sufficiently indicate that there is no potential for vapor intrusion above indoor air cleanup levels in which case, the building is classified as Tier B.

For all Tier A buildings, the selected engineering remedy is a vapor barrier and a passive sub-slab ventilation system that can be converted to an active sub-slab ventilation system. On completion of construction, the Tier A building shall be re-categorized as a Tier 2 building.

For Tier B buildings, after the building has been constructed, indoor air sampling shall be conducted to confirm that there is no potential vapor intrusion risk and that indoor air cleanup levels are met; if sampling confirms that there is no vapor intrusion risk, the Tier B building shall be re-categorized as a Tier 4 building.

Potential VI mitigation engineering controls for new buildings include sub-slab ventilation (SSV), sub-slab depressurization (SSD), vapor intrusion barrier, and sealing cracks and utility penetrations in the floor.

5.3.3. Design of Vapor Intrusion Mitigation Measures

Within the MEW VI Study Area, the U.S. EPA's Statement of Work for the Remedial Design and Remedial Action to Address the Vapor Intrusion Pathway at the MEW Superfund Study Area (U.S. EPA, 2011) describes requirements for the implementation of vapor intrusion remedies and documentation required by the U.S. EPA.

The Project Developer will design and implement adequate measures to mitigate vapor intrusion into buildings and will demonstrate that the system will effectively mitigate the vapor intrusion exposure pathway and meet indoor air cleanup levels;²⁷ costs related to the design and implementation of these mitigation measures should be the responsibility of the Responsible Parties, as shown on Figure 5. The design for the VI mitigation system shall be submitted to NASA and U.S. EPA for review and approval. The proper design, installation, operation and maintenance of an SSV system or SSD system is considered effective mitigation of the vapor intrusion exposure pathway. While vapor intrusion barriers and sealing of cracks in the floor are not sufficient to mitigate the vapor intrusion pathway alone, they should also be used, where appropriate as part of an SSV or SSD remedy in a new building, to further reduce the potential for vapor intrusion to occur.

For vapor intrusion measures other than those described above and in Section 5.3.2, the Project Developer shall submit a design report to NASA for review and approval that describes the design of vapor intrusion mitigation measures that will be implemented and demonstrates how they will be effective in mitigating the potential vapor intrusion pathway. In addition, the report shall also describe any system operation, maintenance, and monitoring activities that will be implemented to demonstrate and maintain the long-term effectiveness of the implemented mitigation measures.

5.3.4. Monitoring Vapor Intrusion Mitigation Effectiveness

VI monitoring programs will ultimately be developed as part of the 2010 VI ROD Amendment, but such programs do not currently exist. The MEW Companies recently

²⁷ It is the intent of the Master Lessee and NASA that the parties that have been named by U.S. EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy and MEW Companies) for contamination at the retain this responsibility and continue to perform their obligations independent of the Master Lessee and/or Project Developer. The design and implementation of the VI mitigation measures by the Master Lessee and/or Project Developer and NASA does not relieve the Responsible Parties of their responsibilities and obligations, and such actions will not result in the Master Lessee/Project Developer becoming a Responsible Party. NASA will facilitate communication between the Master Lessee/Project Developer and the Responsible Party when requested.

submitted the *Site-Wide Long-Term Vapor Intrusion Operation, Maintenance, Monitoring and Management Plan, Middlefield-Ellis-Whisman Area and Moffett Field, California*, prepared by Geosyntec and dated 31 March 2023 (OMMMP); however, the OMMMP has not been approved by U.S. EPA. Until an approved VI monitoring program has been developed, the Master Lessee and the Project Developer will work with the U.S. EPA and the appropriate Responsible Party (NASA, Navy and MEW Companies) to develop an appropriate monitoring program to verify the long-term effectiveness of any implemented VI mitigation measures installed within the Premises.

Effectiveness may be demonstrated by (a) monitoring for VOCs in indoor air, (b) monitoring for VOCs in sub-slab soil gas if a sub-slab ventilation system is designed to prevent VOC accumulation below the slab, or (c) some other means that can reliably demonstrate effectiveness such as sub-slab vacuum measurements in an active system.

The U.S. EPA's Statement of Work for the Remedial Design and Remedial Action to Address the Vapor Intrusion Pathway at the MEW Superfund Study Area (U.S. EPA, 2011) provides additional details on response action activities and deliverables for buildings within the VI Study Area (Figure 5).

5.4. Reducing the Potential for Lateral Migration of VOCs in Utility Corridors

In unsaturated zone soil, VOCs in soil vapor can migrate through permeable utility backfill materials and in saturated zone soil, VOCs in groundwater can migrate through these materials. As discussed in Section 2.1.1, groundwater at the Premises is typically located at approximately 5 to 12 feet below ground surface and contains VOCs. If utilities are located below the groundwater, it is possible that groundwater or soil gas containing VOCs may migrate through utility backfill material. As such, mitigation measures shall be utilized during installation of new utilities to reduce the potential for the lateral migration of VOCs in groundwater or soil gas in utility backfill.

Utilities most likely to be located below the groundwater table are sanitary sewers and storm drains, although other utilities may in some cases also be located below the water table. If possible based on infrastructure needs and design requirements, it is preferable, from an environmental perspective, to place utilities in trenches located above the water table.

In addition to lateral migration through utility corridors, VOCs may migrate into buildings through sewer gas within sanitary sewer lines; additional mitigation measures for VOCs in sewer gas are described below.

5.4.1. Utilities Subject to Mitigation Measures

A utility is subject to the mitigation requirements in this Section 5.4 if it is installed in a trench or horizontal borehole that extends to within two feet of the seasonal high

elevation of the groundwater table. If this condition is met, the mitigation measures described below will be implemented.

5.4.2. Measures to Mitigate Groundwater or Soil Gas Movement in Utility Backfill

For utilities subject to the mitigation requirement, as described in Section 5.4.1, mitigation measures shall include:

- the use of low permeability backfill; and/or
- cutoff features.

Low permeability backfill may include a low strength grout mix known as controlled density fill (CDF) or flowable fill. This material is poured like grout, has low strength and therefore can be excavated by hand, and flows into gaps and around utilities. It can provide a low permeability restriction to water flow when used as utility backfill. Other low permeability fill materials may also be used.

If a granular backfill material is used in a trench, a cutoff feature will be installed a minimum of every 300 feet, and within 50 feet of branches in the distribution system and/or the entrances to building structures. The cutoff feature will be a wall of low permeability material, such as bentonite, concrete, or CDF. The cutoff feature will be at least 2 feet thick and will span the width of the trench from the base of the trench to the ground surface. The sides of the cutoff feature shall be keyed into native soil.

Some utilities subject to the mitigation requirement of this section may be installed in horizontal boreholes with no backfill. If it is determined that the native soil will collapse around the utility (e.g., with horizontal directional drilling), no further mitigation is required. If, however, the borehole may remain open or a granular backfill is installed around the utility line, cutoff features will be installed as described above for trenches. This may require potholing to the borehole to install the cutoff feature, or installing plugs of low permeability material around the utility when it is installed.

5.4.3. Measures to Reduce Groundwater Infiltration into Utility Pipes

In non-pressurized utilities buried below the water table (e.g., sanitary sewer, storm drain), groundwater containing chemicals of concern can infiltrate into the utility line at leaky pipe joints. Such infiltration, should it occur, would cause migration of the VOCs to other areas within the Premises or off-site, and in the case of the storm drain, to the receiving water body. Therefore, utility pipes and their joints must be designed and installed to be watertight. Butt-fused high-density polyethylene pipe shall be used for all utility piping unless other material is approved by the U.S. EPA. Following installation, a four-hour hydrostatic leakage test or other equivalent pressure test shall be performed on each length of utility piping to confirm that the piping is watertight.

If alternate piping or an alternate pressure testing procedure is proposed, information regarding the piping and/or procedures must be presented to NASA, the U.S. EPA, and Water Board for review and approval.

5.4.4. Measures to Protect Drinking Water

All new potable water supply piping within the Premises should be installed at least two feet above the water table, if possible. Since it is still possible that this piping could be submerged in chemical-containing groundwater from time to time, the infiltration of chemicals from groundwater into the drinking water is a potential concern. In addition, concerns about whether chemicals may leach from the piping material into the drinking water have also been raised.

Potential piping materials for potable water distribution were evaluated in the 2005 NRP EIMP Addendum concerning Acceptable Materials for Drinking Water Distribution Piping at NASA Research Park (EKI, 2007). In this addendum, four piping materials (plastic, cement, metal, and fiberglass) were evaluated and in conclusion, the addendum recommended:

- 1) the use of metallic piping material suitable for geotechnical conditions within the Premises and that incorporates appropriate protective coatings or corrosion control techniques to prevent corrosion; and
- 2) welding or soldering pipe joints. If gasketed joints are used instead, the materials and installation methods should be selected to ensure that the joints are watertight and resistant to chemical permeation.

These recommendations continue to be also recommended for the installation of new drinking water piping at the Premises. If alternate piping is proposed, information regarding the piping (e.g., resistance to chemical permeation, etc.) must be presented to NASA, the U.S. EPA, and the Water Board for review and approval.

5.4.5. Design of Utility Lines

If a planned utility line is subject to the mitigation requirements of Section 5.4.1 and the Project Developer does not plan to use low permeability backfill and/or cutoff features (see Section 5.4.2), the Project Developer will prepare a design report describing the mitigation measures that will be implemented to reduce the potential for lateral migration of COPCs in utility corridors and submit it to the U.S. EPA, the Water Board, and the Santa Clara Valley Water District (SCVWD or Valley Water) for review and approval.

5.4.6. Measures to Prevent VOCs Entering Buildings through the Sewer Pathway

In areas with shallow groundwater, VOCs can enter into sanitary sewers and migrate to indoor air through the sewer pathway into buildings. This issue has been documented by U.S. EPA at the MEW Superfund Site south of Highway 101. As part of the Project Developer's utility design report, mitigation measures will be incorporated into the sanitary sewer design, such as installation of trap primers, vapor traps, and incorporation of utility trenches into sub-slab depressurization systems, as appropriate.

5.4.7. Soil and Groundwater Handling During Utility Line Construction

Soil and groundwater handled during construction of utility lines shall be managed as described in Sections 6.3 and 6.10.

5.5. **Reducing the Potential for Creating Conduits to Deeper Groundwater Zones**

It is possible that designs for new construction will include the installation of borings, pile foundations, and/or other deep vertical penetrations. Piles are commonly driven into the ground or placed in drilled boreholes, and extend as deep as 50 to 100 feet bgs, although actual depths of piles or deep foundation systems that may be used for development within the Premises are not currently known. If borings, piles, or deep foundation systems extend greater than approximately 20 feet below ground surface (i.e., potentially penetrating the A1-aquifer zone underlying the Premises are planned in future construction (BB&E, 2023), mitigation measures will be employed to minimize (a) the potential to drive shallow, chemically-impacted soil into deeper soils, (b) the potential to create conduits for the migration of shallow, chemically-impacted groundwater to deeper groundwater, and (c) the potential for more highly contaminated groundwater in the western A2-aquifer (the B1-aquifer under the MEW nomenclature) to migrate upward to the western A1-aquifer from which there would be greater exposure risks.

A permit must be obtained from the SCVWD for the installation of borings greater than 45 feet in depth. The SCVWD currently has no permitting requirements for the driving of piles or installation of deep foundation systems. However, the SCVWD has a general policy regarding driven piles that would require measures to be taken to prevent the creation of potential conduits for contaminant migration via groundwater. Therefore, SCVWD will be involved in the review of any mitigation measures proposed by the Project Developer as described below.

Mitigation measures may include pre-drilling through chemically-impacted soil or groundwater and using conductor casing to prevent downward or upward migration of COPCs. Alternatively, if a geotechnical evaluation indicates that the aquitard sediments will seal around the installed piles to prevent formation of conduits, piles may be installed using a cone-shaped tip on the end of the pile to prevent migration of soil to deeper zones. The Project Developer will prepare a design report for submittal to the SCVWD, U.S. EPA,

and Water Board for review and approval that describes the mitigation measures that will be implemented and demonstrates their effectiveness in preventing downward or upward migration of COPCs. All borings will be abandoned by filling the boring with neat cement to within 12-inches of the ground surface by tremie grouting or pressure grouting.

Other mitigation measures that can effectively reduce the potential for driving impacted soil deeper or creating conduits for groundwater migration may also be used if their effectiveness can be demonstrated to the satisfaction of the SCVWD, U.S. EPA, and Water Board. If alternate mitigation measures are proposed, a design report describing the alternate measures and demonstrating their effectiveness shall be submitted to the SCVWD, U.S. EPA, and Water Board for review and approval prior to implementation.

5.6. Protecting Existing Site Remedies and Groundwater Remediation Systems

In advance of any construction activities in the vicinity of implemented remedies (e.g., groundwater wells, treatment system piping/utilities), the Project Developer will notify the Responsible Party of the planned activities and coordinate with the Responsible Party for the protection of the implemented remedies within the project area. Additional details regarding coordination with the Responsible Party are included in Section 5.6.1 and details regarding the protection of implemented remedies are presented in Section 6.9.

As described in Sections 2.2 and 2.4, the MEW Companies have implemented several remedies within the Premises including networks of groundwater monitoring wells and groundwater extraction and conveyance piping. The Navy also has groundwater monitoring wells on the Premises (some of which are monitored by NASA).

The major features of the existing groundwater treatment systems are shown on Figures 2 and 3. Components of the remediation systems include groundwater extraction wells, single and double-contained pipelines, air relief structures, electrical power and instrumentation conduits, fiber-optic instrument systems, electrical field control panels, leak detection systems, radio frequency communication links, settlement pin monuments, groundwater treatment systems, and a network of groundwater monitoring wells. The locations of existing groundwater monitoring and extraction wells for the WATS are identified in the *2024 Annual Progress Report for NASA's Area of Responsibility and the Site 28 WATS Area* (BB&E, 2025) and the *Final Interim Remedial Action Completion Report* (NAVFAC, 2025). The location of existing groundwater monitoring and extraction wells for the MEW Companies' GWTS are presented in the 2024 MEW Annual Report (Geosyntec, 2025). Figures showing the locations of the groundwater monitoring and extraction wells and tables identifying the well owners are provided in Appendix A. The Project Developer should consult NASA's and the MEW Companies' most recent annual groundwater monitoring reports for the locations of existing extraction and monitoring wells.

5.6.1. Coordination of Development with Implemented Site Remedies and Groundwater Remediation Systems

The following section describes coordination activities that must occur during design and pre-construction planning. Measures to protect implemented Site remedies and remediation system components during construction are described in Section 6.9, and procedures for managing soil, groundwater, and impacted building materials produced during construction activities are described in Section 6.10.

5.6.1.1. Pre-Construction Coordination

Based on the proposed Masterplan, it is expected that wells and pipelines of the existing remediation systems will conflict with the planned development (Figure 3). The Project Developer has started identifying affected wells and pipelines and determining alternative locations for reinstallation of these features. As part of this process, the Project Developer will work with NASA, U.S. EPA, the MEW Companies, and the Water Board to determine which of the MEW Companies' and Navy's monitoring wells will need to be replaced following development of the Premises and if any can be permanently removed.

Relocation or removal of any remediation system components may only occur with the prior approval of the U.S. EPA and Water Board. In addition, U.S. EPA and Water Board must also approve in advance any planned shutdown of the remediation system for more than 24 hours.

In identifying potential conflicts between existing remediation system components and planned development, the following criteria will be used:

- All wells located within 5 feet of the outer wall of a new building are considered in conflict with planned development and must be properly abandoned and relocated, if required, because they will be too difficult to access once the building is constructed. Wells located more than 5 feet from building walls may also be considered in conflict with planned development subject to a site-specific evaluation.
- All pipelines located within five feet of the outer edge of the footing or foundation of a new building are considered in conflict with planned development and must be removed and relocated.
- Wells, pipelines, or other remediation system components that do not meet either criteria above, but are identified as potentially in conflict with the layout of the planned development or planned construction activities by the Project Developer, for example, a monitoring well in the center of a planned roadway.

Modifications to existing Site remedies or modifications to or planned shutdowns of the remediation systems will be coordinated with the Responsible Party for such system (e.g., the MEW Companies, NASA, or Navy). In addition, it is contemplated that the design and construction of any modifications to the remediation systems so approved will be performed by the Responsible Party's contractor(s), as applicable, at the Project Developer's expense. A flow chart describing the preconstruction planning process for coordination with existing Site remedies and operation of existing remediation systems is shown on Figure 9.

To effectively coordinate the development within the Premises with implemented Site remedies and the operation and modification of the remediation systems, the Project Developer and its contractors, NASA representatives, and contractors for the Navy and MEW Companies will need to be communicating frequently. The Project Developer and NASA shall each designate to one another in writing a primary and alternate single point of contact for communication and shall specify the methods for communication among the designated contacts (e.g., telephone numbers, email addresses, and facsimile numbers). Project Developer and NASA will continue to communicate with the Navy's BRAC Environmental Coordinator and the environmental coordinator for the MEW Companies. It is contemplated that an initial meeting among the involved parties be scheduled as early as possible during project planning and that the Project Developer be provided with detailed drawings showing the location of remedial system components in computer-aided design (CAD) form so they can be integrated into the Project Developer's design plans. In addition, as the Project Developer's design and construction plans are developed, the Navy and the MEW Companies, as applicable, will be updated with the Project Developer's planned construction schedule and plans. Material updates to the project schedule, and plans and specifications will be provided to the Navy, the MEW Companies, and NASA, as applicable, and the U.S. EPA and Water Board as they become available.

5.7. Sea Level Rise

Sea level rise has the potential to impact groundwater levels, including at the Premises, located at the edge of San Francisco Bay. The Premises is not expected to flood, based on modeling performed for the Masterplan. Depending on the magnitude of effect of sea level rise, rising groundwater may cause changes in the shape, distribution, and partitioning of contaminants in groundwater, including the MEW Superfund Site plume. These changes may affect lateral migration of VOCs in groundwater, along utility conduits, and in sewer gas – these conditions are addressed in the mitigation measures described in Section 5.4.

Rising groundwater tables are not likely to impact the design or efficacy of vapor intrusion mitigation for buildings at the Premises.

5.8. Prepare Project Information and Summary of Environmental Conditions

For each phase of the development project, a Project Information and Summary of Environmental Conditions (PISEC) will be prepared by the Project Developer in advance of any development activities and provided to NASA, the MEW Companies, the U.S. EPA, and the Water Board. Based on the current Masterplan, it is anticipated that project phasing will occur in clusters of two to four buildings per phase. The PISEC will include the following:

- Project Description, including a description of the planned development activities for the phase of the project, and key health and safety information, as appropriate;
- Identification of Project Roles, including contact information for the Project Developer, contractors, consultants, and oversight agency;
- Project schedule, including start date, phasing, and anticipated durations;
- Deviations from the EIMP, if any;
- Summary of Environmental Conditions, including:
 - Chemicals of potential concern and lateral and vertical extents of subsurface work;
 - Detailed map of work locations overlain with locations of known contamination and existing infrastructure, including monitoring wells, extraction wells, and pipelines;
 - Potential impacts to site remedies;
 - Potential impacts to tenants, lessees, and others;
 - Deep foundation elements approach;
 - Vapor intrusion mitigation system;
 - Groundwater management plan;
 - Additional characterization data, if available;
- Applicable Land Use Restrictions and Institutional Controls; and
- References.

The PISEC for each area must be approved by the appropriate regulatory agencies (U.S. EPA and Water Board) prior to the start of construction activities.

6. RISK MANAGEMENT DURING CONSTRUCTION

During development activities within the Premises, construction risk management addresses precautions that will be taken to mitigate risks to human health and the environment from COPCs at the Site.

Section 6.1 describes the general approach to conducting environmental sampling and treatment or disposal of impacted soil and groundwater and other materials relating to chemical impacts (e.g., USTs or chemical containers encountered during construction) during development activities within the Premises. The respective roles of the Project Developer and NASA are described in this section.

Precautions to be taken during construction will include the following:

- review of available information (e.g., LUCs, Table 1 and Figure 6) to identify COPCs and potential development restrictions, including the PISEC prepared for the construction phase in accordance with Section 5.8;
- establishment of health and safety training and worker protection objectives for construction workers who may directly contact soil or groundwater containing COPCs (e.g., during site preparation, grading, foundation construction, or landscape installation) (Section 6.2);
- implementation of construction impact mitigation measures, including control of dust generation within the Premises, decontamination of equipment, prevention of sediment from leaving the Premises in storm water runoff, and management of groundwater extracted from excavations for dewatering (Section 6.3);
- implementation of procedures for managing asbestos-containing materials (Section 6.4), lead-based paint, PCB-containing paint, and debris and/or building materials affected by lead or PCBs (Section 6.5);
- implementation of procedures for removing PCB-containing materials, such as caulking, and/or equipment (Section 6.6) and building materials containing other chemicals (Section 6.7);
- implementation of procedures for managing abandoned underground storage tanks, sumps, abandoned pipes, or buried drums and containers (Section 6.8);
- implementation of procedures to protect existing Site remedies, groundwater monitoring wells and other remediation system components, such as pipelines (Section 6.9); and

- establishment of procedures to characterize and manage soil during construction excavation and trenching activities within the Premises, including procedures to follow if visibly contaminated or odorous soil is encountered during development (Section 6.10).

To ensure implementation of the EIMP during construction, the Project Developer shall incorporate the appropriate provisions of the EIMP into the technical specifications of construction contracts.

6.1. General Approach for Conducting Environmental Sampling and Treatment/Disposal of Impacted Material during Development

Many of the risk management measures described in Section 6 of this EIMP involve collection and analyses of soil or groundwater samples to determine appropriate measures for handling potentially impacted soil or groundwater encountered during construction activities. In addition, the EIMP describes actions involving removal and onsite treatment or off-site disposal of impacted soil, groundwater, or other materials, such as underground storage tanks or sumps encountered during construction.

This section describes the general approach to addressing these issues and the respective roles of NASA and the Project Developer in the event of non-performance or delayed performance of the Responsible Party.²⁸

6.1.1. Environmental Sampling

The EIMP describes environmental sampling of soil and groundwater that is handled during construction activities to determine how these materials must be managed (see Sections 6.3.4 and 6.10). This sampling will be conducted in close coordination with construction activities. Additional environmental sampling may be necessary in conjunction with the removal of tanks, sumps, containers, abandoned pipes or other subsurface structures associated with potential impacts to soil or groundwater within the Premises (see Section 6.8), or in the event that previously unknown soil contamination is encountered during construction.

²⁸ It is the intent of the Master Lessee and NASA that the parties that have been named by U. S. EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy and MEW Companies) for contamination at the Premises retain this responsibility and continue to perform their obligations independent of the Master Lessee. The implementation of the sampling, treatment, and disposal measures discussed in Section 6.1 by the Master Lessee and NASA does not relieve the Responsible Parties of their responsibilities and obligations; rather, Section 6.1 allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party, but such actions will not result in Master Lessee becoming a Responsible Party. NASA will facilitate communication between the Master Lessee/Project Developer and the Responsible Party when requested.

In general, the Project Developer will conduct the environmental sampling described in the EIMP, unless the responsibility has been allocated to another party. The Project Developer will be responsible for using a qualified environmental contractor, appropriately staffed with licensed, certified, or registered environmental professionals. For each development project, the Project Developer will agree to conduct the necessary environmental sampling activities during development activities within the Premises.

6.1.2. Excavation and Reconsolidation or Removal of Impacted Soil or Groundwater and Other Materials Relating to Potential Chemical Impacts

The Project Developer will be responsible for excavation or removal of impacted soil and groundwater that must be removed as part of development activities within the Premises. Excavated impacted soil can be reconsolidated under buildings or hardscape if approved by the appropriate regulatory agency. In addition, the Project Developer will also be responsible for the removal of other materials or subsurface structures associated with potential chemical impacts, such as USTs, sumps, or abandoned pipes, encountered during development.

In situations where the removal of structures, such as USTs, are subject to regulatory agency oversight, NASA will facilitate coordination with the appropriate regulatory agencies.

6.1.3. Treatment or Disposal of Impacted Soil and Groundwater, Tanks, Sumps, Abandoned Pipes or Chemical Containers

As described in this EIMP, environmental sampling will be conducted to determine if potentially impacted soil or groundwater that is handled during development activities within the Premises must be treated or disposed off-site at a licensed disposal facility. NASA will facilitate communication between the Master Developer and/or Project Developer and the Navy or MEW Companies, as applicable. In the absence of a cooperation agreement addressing construction coordination with the Navy or MEW Companies, the procedures below shall apply.

Based on the appropriate discharge requirements, groundwater produced during dewatering of excavated areas during development activities within the Premises will either be used for dust suppression if concentrations are below TCLs, discharged to the storm drain system, discharged to the sanitary sewer system, or, if approved by the Responsible Party for any existing groundwater treatment system operating at the time,²⁹

²⁹ NASA has indicated that the WATS may have capacity limitations that can impact the use of the system for dewatering water treatment and discharge. In addition, a means to compensate NASA for the incremental cost for carbon treatment from the VOCs in groundwater would have to be developed and agreed upon.

transported by the Project Developer to the permitted groundwater treatment system (see Section 6.3.4). Once the Project Developer has transported extracted groundwater to tanks next to the groundwater treatment system, the Responsible Party for such system who approved the discharge through the system will be responsible for ensuring that it is appropriately treated and disposed of.

If groundwater cannot be managed by one of the above management/disposal options, the Project Developer will transport the extracted groundwater to a permitted off-site facility for treatment and/or disposal. NASA shall be designated as the generator of the wastewater and shall sign all waste manifests.

If soil excavated during development activities within the Premises is determined to require treatment or off-site disposal, the Project Developer will arrange for the off-site disposal of these materials at a permitted off-site facility that is in compliance with the CERCLA Off-Site Rule.³⁰ NASA shall be designated as the generator of the impacted soil and shall sign all waste manifests. Section 6.10 describes soil management protocols for determining when excavated soil requires treatment or off-site disposal.

This EIMP also provides procedures to be used in the event that tanks, sumps, abandoned pipes, or chemical containers (e.g., drums) are encountered during development activities within the Premises. In general, while the Project Developer will be responsible for excavating or removing the structure or container, as required for development, and disposing of these materials, NASA shall be designated as the generator of these wastes and shall sign all waste manifests

6.2. Site-Specific Health And Safety Worker Planning Requirements

The Project Developer has the responsibility to manage its operations in a safe manner and in compliance with all State and Federal occupational safety and health requirements. The Project Developer shall notify NASA of any operation that endangers or has the potential to endanger NASA employees or the public. NASA reserves the right to conduct oversight of the Project Developer's activities to assure effective coordination of health and safety issues and adequate protection of NASA employees and the public.

6.2.1. Planning Requirements for Contractors

Each construction contractor with workers who may directly contact soil or groundwater (e.g., during preparation, grading, and foundation construction) or potentially impacted

³⁰ The CERCLA Off-Site Rule, CERCLA 121(d)(3) indicates that CERCLA wastes may only be placed in facilities that are operating in compliance with the Resource Conservation and Recovery Act or other applicable Federal or State Requirements and prohibits the transfer to CERCLA wastes to a land disposal facility that is releasing contaminants into the environment and requires that any releases from other waste management units must be controlled.

building materials will prepare its own site-specific health and safety plan (H&SP), consistent with State and Federal Occupational Safety and Health Administration (OSHA) standards for hazardous waste operations (California Code of Regulations, Title 8, Section 5192 and 29 Code of Federal Regulations 1910.120, respectively) and any other applicable health and safety standards. Each contractor will provide copies of its H&SP for review by Master Lessee. However, the contractor maintains overall responsibility for ensuring the health and safety of its workers. Among other things, the H&SPs will include a description of health and safety training requirements for on-site personnel, a description of the level of personal protective equipment to be used and any other applicable precautions to be undertaken to minimize direct contact with soil and groundwater.

Consistent with the OSHA standards, a H&SP would not be required for contractors engaged in work such as carpentry, painting or other such work that will not disrupt the subsurface or existing CERCLA remedies in such a manner that the contractor's employees would encounter COPCs in groundwater, soil, soil vapor, or building materials. When constructed, buildings and cover materials such as roadways and walk-ways will prevent exposure to COPC-containing soil. It remains the responsibility of the Project Developer to determine if an H&SP is required for compliance with other federal, state, or local requirements.

It is the responsibility of the contractor preparing the site-specific H&SP to verify that the components of the H&SP are consistent with applicable OSHA standards and currently available toxicological information. Each contractor must require its employees who may directly contact COPCs in groundwater or soils to perform all activities in accordance with the contractor's H&SP. Each construction contractor will assure that its on-site construction workers will have the appropriate level of health and safety training and will use the appropriate level of personal protective equipment, as determined in the relevant H&SP based upon the evaluated job hazards and monitoring results.

6.2.2. Worker Training

Workers who may directly contact soil or groundwater at the Premises will have the appropriate level of health and safety training and will use the appropriate level of personal protective equipment, as determined in the relevant H&SP. In general, due to the presence of COPCs in soil and groundwater within the Premises, it is expected that construction activities involving excavation of soil may constitute "clean-up operations" or "hazardous substance removal work" as defined in the OSHA standards for Hazardous Waste Operations and Emergency Response (HAZWOPER), 29 Code of Federal Regulations 1910.120. Therefore, each construction contractor will ensure that its on-site personnel conducting such activities, who may contact COPCs in subsurface soil or groundwater, is conducting work in accordance with OSHA standards.

In general, workers involved in soil or groundwater removal operations or other construction activities that involve soil handling must have completed 40 hours of

HAZWOPER training, with annual 8-hour refresher training, as required under 29 Code of Federal Regulations 1910.120. Exceptions can be made for certain types of work and conditions at the Premises with limited exposure levels in accordance with 29 CFR 1910.120. For example, if landscape workers are only disturbing soil within the upper two feet outside of known source areas and outside of the drip-line of buildings containing lead-based paint, such workers do not have to have 40-hour HAZWOPER training.

6.2.3. Components of the Health and Safety Plan

The minimum content required for all H&SPs is outlined below. However, each H&SP shall be tailored to current conditions within the Premises, current occupational safety and health standards, and task-specific activities then known to the preparer of the H&SP. It is the responsibility of the contractor preparing the site-specific H&SP to verify that the components of the H&SP are consistent with applicable OSHA standards and currently available toxicological information.

General Information

This section of the H&SP will contain general information about the site, including the location of the site, the objectives of the work that the H&SP is intended to cover, and the name of the individual(s) who prepared the H&SP. This section will also contain a brief summary of the possible hazards associated with the soil and groundwater conditions at the site. Based on the known conditions at the site, the principal hazards posed by the soils and groundwater that construction workers may encounter will be direct contact with the COPCs potentially present in soil and groundwater and inhalation of vapors from volatile COPCs or dust containing lead.

Key Personnel/Health and Safety Responsibilities

This section of the H&SP will identify the contractor's key personnel by name and will include identification of the Project Manager, the site Supervisor, site Safety Officer, and the subcontractors that will be working at the site. The contractor will provide its employees who will potentially contact groundwater or previously unidentified soil contamination a copy of the H&SP and brief its employees as to its contents. The health and safety responsibilities of each individual worker will be described in this section of the H&SP.

Facility/Site Background

This section of the H&SP provides background information concerning past operations at the project location, the types of contaminants that may be encountered, and a brief description of the types of construction activities that the contractor will perform within the Premises. The description of the construction activities will focus on those activities that will result in the

movement of soil or activities that may involve potentially contaminated structures, soil, or groundwater. This section will provide a general map showing the portion of the project location where construction will occur, highlighting those particular areas where soil movement activities or direct contact with groundwater may occur. The types of contaminants that may be encountered during the construction activities will be identified in the H&SP and should consider the COPCs discussed in Section 2 as appropriate to the construction site.

Job Hazard Analysis/Hazard Mitigation

A description of the hazards associated with the specific construction activities planned will be provided in this section of the H&SP. The description of job hazards will include potential physical hazards (e.g., hazards associated with work around heavy equipment, trenches, electrical equipment, etc.) as well as construction activities that may give rise to contact or potential contact with COPCs on existing structures, in soil or groundwater, or previously unidentified contamination. The hazards that will be discussed include, at a minimum, chemical, temperature, and explosion hazards, if applicable. As part of the job hazard analysis, the H&SP will identify the chemicals likely to be encountered during the construction activities and will present a table indicating the symptoms of exposure and the relevant regulatory exposure limits for each compound (i.e., the OSHA Permissible Exposure Limit (PEL)). The procedures to mitigate the hazards identified in the job hazard analysis will also be presented in this section of the H&SP. The use of appropriate engineering controls and personal protective equipment (PPE) will likely be the principal mitigation procedures.

Air Monitoring Procedures

Air monitoring procedures will be detailed in the H&SP. Depending on the areas of planned construction, air monitoring may include monitoring for volatile constituents, lead, and/or respirable dust. The objectives for each are described below.

Air Monitoring for Volatile Organic Compounds

Air monitoring for volatile constituents will be conducted within the Premises because it is entirely within the MEW VI Study Area. The purpose of the air monitoring will be to verify that the workers are not exposed to levels of volatiles that exceed the OSHA PELs, the relevant occupational standards for airborne exposures. The presence of those constituents with the lowest OSHA PELs will dictate the level of PPE that will be required.

During soil handling and excavation activities deeper than 3 feet or in known source areas (Figure 6), the Project Developer should:

- Monitor total VOC concentrations in ambient air within and outside of the excavation using a direct-read instrument (e.g., an Organic Vapor Analyzer (OVA)) capable of measuring down to at least 0.1 parts-per-million by volume (ppmv).

If OVA readings exceed 1 ppmv for 1 minute or longer, the Project Developer will implement engineering controls within the work area (e.g., covering exposed stockpiles and/or sidewalls of the excavation with visqueen, adding air ventilation). If after the implementation of engineering controls, OVA readings continue to exceed the 1 ppmv for 1 minute or longer, the Project Developer should stop work, notify the Master Lessee, and implement procedures outlined on Figures 14 and 16, as appropriate.

Air Monitoring for TCE

In light of the U.S. EPA's 9 July 2014 Guidance regarding TCE (U.S. EPA, 2014b), and the presence of TCE in groundwater, the entire Premises is identified for screening or sampling for TCE. Additional details regarding the air sampling or air screening and respiratory protection requirements presented below. A flow chart of worker respiratory protection and TCE sampling requirements is presented on Figure 17.

The Project Developer should also sample or screen the excavation for TCE during excavation entry activities.³¹ The use of respiratory protection during excavation entry activities is required during excavation entry anywhere in the Premises. The sampling or screening for TCE may be conducted by either (1) sampling air in the excavation or collecting personal air samples using TCE sampling badges (e.g., Radiello 130 or Radiello 145 samplers) or (2) screening air in the excavation using a portable gas chromatograph coupled to a mass spectrometer (GC-MS) (e.g., Hapsite GC-MS or equivalent). Sampling or screening for TCE should be conducted for a minimum period of one full work day. Air samples should be analyzed and reported on a 24-hour turnaround time and screening with a portable GC-MS should be conducted, at a minimum, on an hourly basis.

If sampling or screening data collected over a minimum period of one full work day demonstrates that TCE is either (1) below a reporting limit of 5 ug/m³ in the excavation or (2) is present in the excavation at concentrations less than the U.S. EPA's Accelerated Response Action Level (7 ug/m³) (U.S. EPA, 2014b), the use of respiratory protection during excavation entry may be discontinued and the

³¹ Excavation entry is defined as entry for a period of 15-minutes or greater (over the course of a single day) into an excavation that is greater than 3 feet deep.

Project Developer may terminate sampling or screening for TCE.³² Personnel entering the excavation will resume using respiratory protection and the Project Developer will resume sampling or screening for TCE if any of the following conditions occur:

- groundwater begins to enter the excavation;
- the excavation is enlarged by a distance of 20 feet or greater; or
- excavation activities commence in a new excavation that is greater than 3 feet bgs and personnel are entering the excavation.

If sampling or screening data, with a reporting limit of 5 ug/m³ or lower, demonstrates that TCE is present at concentrations greater than 7 ug/m³, the use of respiratory protection during all excavation entry will continue and the Project Developer will notify the Master Lessee immediately. Master Lessee will notify the applicable regulatory agencies within 24-hours of being notified by the Project Developer.

If sampling or screening data demonstrates that TCE is present at concentrations less than 50 ug/m³, the Project developer may terminate sampling or screening for TCE while workers continue to wear respiratory protection. If sampling or screening data demonstrates that TCE is present at concentrations greater than 50 ug/m³, the Project Developer should implement additional engineering controls within the excavation, re-evaluate respiratory protection and upgrade as necessary, and continue sampling or screening until sampling or screening data demonstrates that TCE is present at concentrations less than 50 ug/m³. The Certified Industrial Hygienist should consider performance of TCE air sampling or screening outside of the excavation if TCE concentrations within the excavation cannot be reduced to levels below 50 ug/m³.

Air Monitoring for Particulates

In general, air at the work area perimeter will be visually monitored for the presence of airborne particulates. In the event that visual observations indicate that dust may be leaving the work area, real-time particulate air monitoring at the work area perimeter will be conducted to demonstrate that the fugitive dust generated during the development/construction activities is not affecting the health and safety of off-site populations. Personal air monitoring for worker exposures to dust, and potentially for lead, where appropriate, will be conducted within work zones where soil is disturbed or contacted.

³² The Certified Industrial Hygienist for a given project in a known or suspected TCE area may elect to continue air monitoring for TCE even if concentrations are documented to be less than 7 ug/m³.

Personal Protective Equipment

This section of the H&SP will identify the PPE that will be used to protect workers from the identified COPCs present in groundwater or soil. Personal protective equipment will be selected based on the known contaminants present at the work site, and the known potential route(s) of entry into the human body. The primary exposure routes include direct contact with contaminated structures, groundwater, or soil and the inhalation of vapors.

Certain construction activities, such as the installation of deep utility trenches or foundations, could result in workers coming into direct contact with COPCs in groundwater. This contact is expected to be minimal, because OSHA regulations prohibit accumulation of water in open excavations. However, limited direct contact with COPCs in groundwater could occur. In the event that excavations are conducted in areas with shallow groundwater, the H&SP will identify any additional PPE required to minimize direct contact with COPCs in water, including water repellant gloves and boots, Tyvek coveralls, etc.

For construction activities conducted on or around contaminated building materials (e.g., asbestos containing materials, PCB-containing materials), the H&SP will identify PPE required to minimize direct contact with and/or inhalation of COPCs (e.g., Tyvek coveralls, gloves, respirators, etc.).

Work Zones and Site Security Measures

This section of the H&SP will identify the specific work zones of the construction site and describe the site security measures, such as the placement of barricades, fencing, access control, and access logs. The work zones will be defined as the areas of the construction site where construction workers may come into contact with COPCs in contaminated soil or groundwater; that is work in known release areas and when work is deeper than 4 feet bgs. All workers within the work zone, who will have direct contact with groundwater or soil, will perform the work in compliance with relevant aspects of the H&SP. The support zone will be located outside of the work zone, but within the boundaries of the construction site. All end-of-the day cleanup operations, such as cleaning of truck wheels (for vehicles exiting the construction site that could be tracking contaminated soils off-site), and the removal of any PPE, will occur in the support zone. If possible, the support zone will be located in close proximity to the entry and exit point of the construction site. The entire construction site will be fenced to control pedestrian and vehicular entry, except at controlled (gated) points. The fences will remain locked during non-construction hours.

Decontamination Measures

This section of the H&SP will describe the specific procedures that will be used to decontaminate both equipment and personnel that have been performing work in direct contact with soil, groundwater, and/or contaminated building materials or debris. Decontamination measures will include cleaning the wheels of all vehicles that have been in contact with soil and/or groundwater in the support zone prior to their exiting the site and may include the cleaning of potentially impacted surfaces, if applicable. Procedures to collect and sample decontamination water will be described. Additionally, workers will be required to remove any contaminated PPE and place it in a designated area in the support zone prior to leaving the site.

General Safe Work Practices

This section of the H&SP will discuss the general safe work practices to be followed at the construction site, including entry restrictions, tailgate safety meetings, use of PPE, personal hygiene, hand washing facilities, eating and smoking restrictions, the use of warning signs and barricades, precautions near heavy equipment, confined space entry, and any special precautions that may be specific to the construction site and construction worker.

Contingency Plans/Emergency Information

This section of the H&SP will provide information regarding the procedures to be followed in the event of an emergency. The location of specific emergency equipment, such as eyewash, first aid kit, and a fire extinguisher, and emergency telephone numbers and contacts will be identified. A map indicating the route to the nearest hospital will also be provided in this section of the H&SP.

Medical Surveillance

This section of the H&SP will describe medical surveillance that would be required for certain workers. In general, due to the presence of COPCs in soil and groundwater within the Premises, it is expected that construction activities involving excavation of soil may constitute “clean-up operations” or “hazardous substance removal work” as defined in the OSHA standards for HAZWOPER. Therefore, each construction contractor will evaluate the OSHA requirements and ensure that its on-site personnel conducting such activities, who may contact COPCs in subsurface soil or groundwater, are in compliance with OSHA standards.

6.3. Construction Impact Mitigation Measures

This section outlines measures that will be implemented to mitigate potential impacts to human health and the environment during earthwork construction or construction

involving potentially impacted building materials. Measures will be implemented to mitigate the potential impacts of the following activities:

- dust generation associated with soil excavation, loading activities, construction or transportation equipment traveling over on-site soil, and wind traversing COPC-containing soil stockpiles or particulate generation associated with activities such as the scraping or sanding of building materials;
- tracking soil or potentially impacted particulate debris (e.g., paint chips) off the site with construction or transportation equipment;
- transporting sediments or potentially impacted particulate debris (e.g., paint chips) from the site in surface water run-off; and
- managing groundwater extracted while performing below-grade construction activities.

The mitigation measures for these potential activities will include, but are not limited to, the following:

- implementing dust, particulate generation, and odor control measures (Section 6.3.1);
- decontaminating construction and transportation equipment or potentially impacted surfaces (Section 6.3.2);
- implementing storm water pollution prevention plans, best management practices, and applicable controls (Section 6.3.3); and
- sampling and analyzing extracted groundwater to determine appropriate storage and disposal practices (e.g., evaluation before its use for dust control within the Premises or disposal to the storm drain, to the sanitary sewer, to nearby groundwater treatment systems or at an appropriate off-site facility that is operating in compliance with the CERCLA Off-Site Rule) (Section 6.3.4).

These mitigation measures are discussed in more detail below.

The Project Developer shall prepare a plan or plans describing construction mitigation measures that will be implemented during development activities within the Premises. The plan will, at a minimum, include the mitigation measures described in Sections 6.3.1 through 6.3.4 and will describe management procedures to ensure that the mitigation measures are properly implemented during construction. Mitigation measures associated with working on and around contaminated structures follow applicable rules and regulations for work removing or remediating asbestos, lead, and PCBs in or on structures.

6.3.1. Dust and Particulate Control Measures

Dust and particulate control measures will be implemented during construction activities at the project area to minimize the generation of dust and/or particulates. It is particularly important to minimize the exposure of on-site construction workers to dust and/or particulates containing COPCs and to prevent nuisance dust and dust and/or particulates containing COPCs from migrating off-site.

Dust generation may be associated with excavation activities, truck traffic, ambient wind traversing soil stockpiles, loading of transportation vehicles, and other earthwork. Dust control measures are drawn from the Bay Area Air Quality Management District's (BAAQMD's) 2023 CEQA Guidelines, Table 5-2, and may include the following:

- exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered two times per day;
- cover all trucks transporting soil, sand, or loose impacted materials off-site;
- visible mud or dirt trackout onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day; the use of dry power sweeping is prohibited;
- limit vehicle speeds on unpaved roads on the property to 15 miles per hour (mph);
- roadways, driveways, and sidewalks to be paved will be completed as soon as possible; building pads will be laid as soon as possible after grading unless seeding or soil binders are used;
- suspend excavation, grading, and/or demolition activities when average wind speeds exceed 20 mph;
- trucks and equipment, including their tires, will be washed off prior to leaving the Premises;
- unpaved roads providing access to sites located 100 feet or further from a paved road will be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel; and
- publicly visible signs will be posted with the telephone number and name of the person to contact regarding dust complaints; the person shall respond and take corrective action within 48 hours; the Bay Area Air Quality Management District's General Air Pollution Complaints number will also be visible.

The above dust control measures must be implemented, as necessary, especially if windy conditions persist. Other potential mitigation measures for dust control are presented in

the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement (NADP EIS; DCE, 2002).

In order to further control dust as well as storm water pollution, any soil stockpiles generated as a result of excavating soil potentially impacted by COPCs (e.g., visibly contaminated or odorous soil or soil from areas known to contain lead-based paint) must be covered with plastic sheeting or tarps. Inactive soil stockpiles potentially impacted by COPCs should be kept covered at all times.

Particulate generation activities may include activities such as scraping or sanding impacted materials in preparation for painting and/or coating. Particulate control measures may include, but are not limited to, the following:

- misting water in active construction areas;
- the use of enclosures or encapsulation; and
- the use of vacuum filtration systems to entrain particulates.

6.3.2. Decontamination

Construction equipment and transportation vehicles that contact soil or impacted particulates containing COPCs within the construction site (i.e., in areas where chemically-impacted soil is potentially located) will be decontaminated prior to leaving the construction site in order to minimize the potential for this equipment to track COPC-containing soil onto roadways. Areas of potentially impacted soils are shown on Figure 6; other soil should also be considered potentially impacted if there is evidence of unnaturally stained, discolored, or odorous soil. At the Premises all soil excavated from deeper than 4 feet is also considered potentially impacted.

Decontamination methods may include scraping, brushing, rumble strips, and/or vacuuming to remove dirt on vehicle exteriors and wheels or from potentially impacted surfaces. The above dry decontamination procedures are illustrative and the Project Developer may propose alternate techniques. In the event that the dry decontamination methods are not adequate, methods such as steam cleaning, high-pressure washing, and cleaning solutions will be used, as necessary, to thoroughly remove accumulated dirt and other materials. Wash water resulting from decontamination activities will be collected and managed in accordance with all applicable laws and regulations. Collected wash water (containing no soap or detergent) may be filtered and managed along with construction dewatering water as described in Section 6.3.4 and shown on Figure 10.

6.3.3. Storm Water Pollution Controls

The Premises is subject to storm water regulations enforced by the SWRCB. The Project Developer shall be responsible for obtaining necessary storm water permits and filing a

Notice of Intent consistent with SWRCB Order 2022-0057 DWQ, effective 1 September 2023 (Construction General Permit or any amended or revised applicable permit as of the date construction work commences) to the SWRCB and other regulatory agencies concerning the Project Developer's construction project. As required by Construction General Permit, the Project Developer shall submit the following permit registration documents (PRDs) prior to the start of field activities: (1) Notice of Intent) (2) risk assessment, (3) site map, (4) a Construction Storm Water Pollution Prevention Plan (SWPPP), (5) annual fee, and (6) certification. The PRDs shall be prepared and certified by a Qualified SWPPP Developer, in accordance with the Construction General Permit requirements for the project risk level determined for the site.

The SWPPP will include a risk level determination and will identify potential pollutant sources. The SWPPP will also identify, among other things, the storm water best management practices (BMPs) to be implemented as part of the Project Developer's construction activities. The primary objectives of the BMPs are to minimize soil erosion from the construction site(s) and to prevent contact of storm water with chemicals that may be used during construction. BMPs may include, but are not limited to the following:

- constructing berms or erecting silt fences at entrances to the site, perimeters of work areas, or as needed to divert runoff from contacting exposed soil;
- placing straw bale barriers around entrances to storm drains and catch basins;
- during significant rainfall events, covering all soil stockpiles with plastic sheeting or tarps;
- protecting and/or closing storm drains located at the site during construction activities; and
- storing chemical products inside buildings, sheds, or beneath water repellant tarps, and refraining from applying or dispensing chemicals (e.g., paints, lacquers, solvents, diesel fuels) outside during inclement weather.

The above BMPs are illustrative. It is anticipated that the Project Developer will propose specific BMPs appropriate to the construction plans and specifications. Additional BMPs may also be required to protect water quality post-construction and to ensure that the quantity, rate, and duration of storm water runoff does not increase.

6.3.4. Dewatering

Within the Premises, the depth to groundwater varies between 5 and 12 feet bgs. If dewatering is to be performed as part of construction activities, then the groundwater will be sampled in planned work areas and analyzed to determine appropriate management and disposal practices. Dewatering water shall initially be collected and

analyzed for VOCs by U.S. EPA Method 8260, TPH (gasoline, diesel, and motor oil) by U.S. EPA Method 8015m, and PFAS by U.S. EPA Method 537 or other appropriate method.

Depending on the analytical results, and with appropriate governmental agency approvals, extracted groundwater may be:

- used for dust control within the Premises with NASA approval;
- discharged to the storm drain in accordance with a National Pollutant Discharge Elimination System (NPDES) permit;
- discharged to an existing groundwater treatment system with approval of the Responsible Party for such system;
- discharged to the sanitary sewer (with pre-treatment, if needed); or
- transported off-site for disposal at an authorized facility.

A flow chart illustrating dewatering water management options is shown on Figure 10.

If analytical results indicate chemical concentrations are below TCLs, dewatering water from construction activities may be used for dust control within the Premises (with NASA approval).

If the dewatering water cannot be used for dust control, the water can be transported to one of the nearby groundwater treatment systems with approval of the Responsible Party for such system (the WATS or the MEW GWTS) for treatment and disposal;³³ Figure 4 identifies the Responsible Party for groundwater contamination within the Premises. The Project Developer and NASA shall inform the treatment system owner of the location where the dewatering water was generated and coordinate with the treatment system's owner or owner's contractor for the treatment and disposal of this groundwater. The Project Developer will deliver the extracted groundwater to clean storage tanks that it provides at a location selected by the treatment system owner. Prior to initial use, the storage tanks are to be inspected and the contents sampled by the Project Developer for analytical parameters specified by the treatment system owner. Sample results will be provided to the treatment system owner. In addition, the treatment system owner shall have the right to inspect the storage tanks prior to their use. The dewatering water must be filtered before it is pumped into the clean storage tanks. All solids removed from the groundwater shall be managed and disposed of in accordance with the procedures for

³³ NASA has indicated that the WATS may have capacity limitations that can impact the use of the system for dewatering water treatment and discharge. In addition, a means to compensate NASA for the incremental cost for carbon treatment from the VOCs in groundwater would have to be developed and agreed upon.

managing potentially contaminated soil described in Section 6.10. The Project Developer shall arrange for the off-site disposal of these materials at a permitted off-site facility and NASA shall be designated the generator for any solids or filter wastes shipped for off-site disposal. The treatment system owner or its contractor will manage the treatment and disposal of filtered groundwater through the groundwater treatment system within a reasonable time-frame.

To the extent that the NASA and/or the MEW Companies do not accept dewatering groundwater, the Master Lessee shall obtain any necessary permits for the discharge of extracted groundwater to the sanitary sewer or storm drain and copies of such permits will be provided to NASA.

If dewatering water cannot be discharged to the storm drain, used for dust control, or treated at the WATS or MEW Companies (as applicable) groundwater treatment systems, it may be possible to discharge dewatering water to the Sunnyvale Waste Water Treatment Plant or City of Palo Alto Treatment Plant through the NASA sanitary sewer system. Both Publicly-Owned Treatment Works (POTW) limit the concentration of Total Toxic Organics (TTO) in any discharge to a maximum of 1.0 mg/L. The POTWs also have requirements regarding the discharge of water containing PFAS compounds that would have to be assessed and approved of prior to discharge. If the Project Developer's contractor plans on discharging to the sanitary sewer, the contractor shall submit an Incidental Sewer Discharge (ISD) Permit application to NASA for review and approval.³⁴ In addition, if COPC concentrations in the dewatering water exceed the TTO discharge limit, the dewatering water will require treatment prior to discharge to the sanitary sewer.

If anticipated dewatering period is long and/or volumes are high enough, the Project Developer's contractor may opt to work with NASA and the POTW to obtain an industrial Wastewater Discharge Permit instead of discharging the water via NASA's ISD permit process. No discharge of extracted groundwater to the sanitary sewer can occur unless a Wastewater Discharge Permit is first obtained. It is expected that all groundwater that cannot be discharged to the storm drain or treated at one of the nearby groundwater treatment systems will be eligible for discharge to the sanitary sewer.

Dewatering water may also be transported off-site for treatment at a permitted wastewater treatment facility, in accordance with applicable laws and regulations.³⁵ The

³⁴ Analytical data for the dewatering water must accompany the permit application and processing of the application may take up to 10 business days.

³⁵ It is the intent of the Master Lessee and NASA that the parties that have been named by U. S. EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy and MEW Companies) for

Project Developer shall transport this groundwater to a permitted off-site facility for treatment and/or disposal. NASA shall be designated as the generator of the wastewater and shall sign all waste manifests.

6.4. Management of Asbestos Containing Debris

Asbestos-containing material (ACM) may be present in existing buildings at the Site. In the event an existing building is to be demolished, the developer and its contractor shall abide by the requirements in the NASA-ARC *Asbestos Management Plan* (Chapter 30 of the NASA-ARC Health and Safety Manual). Among other things, the *Asbestos Management Plan* requires a pre-demolition survey for the presence of ACM, and the removal and management of ACM in accordance with all applicable government regulations and with oversight by the NASA-ARC Safety, Health & Medical Services Office. As described in Section 2.6.1, NASA has completed ACM surveys for all pre-1998 buildings within the NRP area. The project developer shall contact the NASA-ARC Safety, Health & Medical Services Office to obtain copies of the ACM surveys conducted for the buildings it intends to demolish or renovate.

All persons who manage construction or maintenance projects, disturb, handle, store or dispose of ACM located on NASA property shall conduct operations in compliance with the *Asbestos Management Plan* and all applicable governing regulatory agency regulations and guidelines pertaining to ACM. A copy of the NASA-ARC *Asbestos Management Plan* may be obtained from the NASA-ARC Safety, Health & Medical Services Office.

6.5. Management of Debris Containing Lead-Based Paint and PCB-Containing Paint

As described in Section 2.6.2, lead-based paint has been used in existing buildings within the Premises, and residues from lead-based paint occur in surface soil adjacent to buildings where lead-based paint was used (CWMI, 1993; Weston, 1998). In addition, PCBs are known to be present in paint and building materials from buildings constructed between 1950 and 1979 (U.S. EPA, 2015b). PCBs have been detected in the paint at nearby Hangar 1. As such, lead-containing materials (LCM) and PCB-containing materials (PCM) may be encountered during redevelopment. In the event an existing building is to be demolished, or when painted debris is encountered during development, the Project

contamination at the Premises retain this responsibility and continue to perform their obligations independent of the Master Lessee. The dewatering management options discussed in Section 6.3.4 are does not relieve the Responsible Parties of their responsibilities and obligations. Rather, these management options allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party, but such actions will not result in Master Lessee becoming a Responsible Party. NASA will facilitate communication between the Master Lessee/Project Developer and the Responsible Party when requested.

Developer and its contractor shall conduct a pre-demolition survey for the presence of LCM and PCBs and will manage and dispose of LCM and debris in a manner consistent with state laws and the CERCLA Off-Site Rule. Disposal of PCB-containing materials will be in accordance with TSCA requirements. NASA shall be designated as the generator of the wastes and shall sign all waste manifests.

Procedures for managing soil impacted by lead- and/or PCB-based paint are discussed further in Section 6.10.1.

6.6. Management of PCB-Containing Electrical Equipment

Electrical equipment containing PCBs may be located within the Premises in areas or buildings subject to redevelopment. In the event that the removal of PCB-containing electrical equipment is to be performed during redevelopment, the Project Developer shall manage and dispose of the PCB-containing electrical equipment in a manner consistent with applicable government regulations (such as TSCA) and the CERCLA Off-Site Rule. NASA shall be designated as the generator of the wastes and shall sign all waste manifests.

6.7. Management of Building Materials Containing Other Chemicals Including PCBs

Prior to building demolition, the Project Developer will perform an evaluation of the building as described in the *PCBs in Priority Building Materials: Model Screening Assessment Package* prepared by the Bay Area Stormwater Management Agencies Association (BASMAA, 2023). In the event that PCB-containing materials are discovered and the removal of building materials containing PCBs or other chemicals is required for redevelopment (e.g., PCBs in caulking or paint) or wood timbers that contain elevated levels of chromium), the Project Developer shall assess, manage, and implement appropriate measures for the management and disposal of these materials consistent with applicable government regulations (such as TSCA) and the CERCLA Off-Site Rule. NASA shall be designated as the generator of the wastes and shall sign all waste manifests.

6.8. Management and Disposal of Abandoned Underground Storage Tanks, Sumps, Abandoned Pipes, or Buried Drums and Containers

It is the intent of the Master Lessee and NASA that the parties that have been named by U. S. EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy or MEW Companies) for contamination at the Premises retain this responsibility and continue to perform their obligations independent of the Master Lessee. The implementation of the management and disposal measures discussed in Section 6.8 by the Master Lessee and NASA is not intended to relieve the Responsible Parties of their responsibilities and obligations.

6.8.1. Underground Storage Tanks and Sumps

As described in Section 2.4, numerous USTs and sumps were known to exist within the Premises (Table 1 and Figure 6). All known USTs and sumps within the Premises have been removed; the Water Board has classified the removed USTs and sumps as requiring no further action. Implementation of this EIMP will address the notification and soil management requirements imposed by the Water Board as part of the closure of IR Site 15.

In the event an unknown UST or sump is discovered during construction activities, NASA and the Navy will be contacted promptly. NASA will facilitate communication between the Master Lessee and/or Project Developer and the Navy. In the absence of a Construction Coordination Agreement with the Navy, the procedures below shall apply.

As indicated on Figure 11, the UST or sump will be removed by the Project Developer in accordance with Santa Clara County regulations and guidance.

Soil and groundwater samples will be collected by Project Developer from the UST or sump excavation in accordance with Section 6.10 and analyzed as required by the regulatory guidance and under the supervision of Santa Clara County inspectors. If COPC concentrations exceed soil TCLs, the soil management protocols described in Section 6.10 will be followed.

The tank, sump, associated piping, and any impacted materials generated during removal of the tank or sump will be disposed of by the Project Developer in accordance with applicable laws and regulations and the CERCLA Off-Site Rule; NASA shall sign all manifests as generator of the wastes. The Project Developer will prepare a report that describes the field activities conducted, the findings, actions taken, photographs, and analytical results for the samples collected by the Project Developer. The report will also include a figure depicting the location where the action was taken, chain-of-custody forms, and photographs as well as information regarding the disposal of the impacted materials. Documentation of actions relating to removal of abandoned USTs or sumps will be in accordance with Santa Clara County's regulation and guidance for closure of USTs and sumps. This report will be submitted to the applicable regulatory agencies (e.g., U.S. EPA, the Water Board, and Santa Clara County Department of Environmental Health), NASA, and the Navy as documentation of the completion of the remedial action within 60 days of completion of the field activities. The Project Developer will revise the report as necessary to adequately document the actions taken.

6.8.2. Buried Drums or Containers

In the event buried drums or containers that contain unknown materials are discovered during construction activities within the Premises, the NASA and the Navy will be contacted promptly, and the procedures shown on Figure 11 will be followed. NASA will

facilitate communication between the Master Lessee and/or Project Developer and the Navy. In the absence of a Construction Coordination Agreement with the Navy, the procedures below shall apply.

The term “containers” in this EIMP is intended to include containers that may contain or may have contained hazardous substances. In the absence of labels or other knowledge of the container’s contents, the Project Developer in consultation with NASA will use professional judgment, including evaluating any observed odors or soil staining, to assess whether the procedures summarized in Figure 11 should be triggered.

As indicated in Figure 11, if drums and containers discovered within the limits of construction are not accessible to allow sampling and inspection, the Project Developer will notify NASA, the Navy, and the applicable regulatory agencies. If the drums or containers are empty, the Project Developer will remove them from the excavation. If the drums or containers contain liquid wastes and the drums can be removed such that a spill during removal is unlikely, the Project Developer may remove them from the excavation and subsequently characterized their contents for disposal. If the drums or containers cannot be removed from the excavation such that a spill is unlikely, the Project Developer will sample each container of like material³⁶; the Project Developer will subsequently remove the contents from the drums and place it in appropriate containers.

The Project Developer will dispose of the drums, containers, and other impacted materials discovered within the limits of construction at a permitted off-site facility in accordance with applicable laws and regulations and the CERCLA Off-Site Rule; NASA shall be designated as the generator of the waste and shall sign all waste. After removal of the drum or container, a discrete confirmation sample will be collected by the Project Developer at the former location of the drum or container. Determination of the specific laboratory analyses to be performed will be based on field observation and professional judgment of a licensed or certified hazardous material manager or registered environmental professional and on characterization of the contents of the drum or container. If COPC concentrations exceed soil TCLs, the soil management protocols described in Section 6.10 will be followed.

The implementation of the protocol for managing buried drums or containers shall be documented through the use of field notes and photographs. After completion of the removal of the drums or containers and the subsequent management of any potentially impacted soil located within the limits of construction (conducted in accordance with the procedures described in Section 6.10) or groundwater (Section 6.3.4), the Project Developer will prepare a report that describes the field activities conducted, the findings, actions taken, photographs, and analytical results for the samples collected by the Project

³⁶ Determination of the specific laboratory analyses to be performed will be based on field observation and professional judgment of a licensed or certified hazardous material manager.

Developer. The report will also include a figure depicting the location where the action was taken, chain-of-custody forms, and photographs as well as information regarding the disposal of the impacted materials. This report will be submitted to the applicable regulatory agencies (e.g., U.S. EPA and/or the Water Board), NASA, and the Navy as documentation of the completion of the remedial action within 60 days of the completion of field activities. The Project Developer will revise the report as necessary to adequately document the actions taken.

6.8.3. Abandoned Pipes

If an abandoned pipe that may have been used to transmit hazardous materials or COPCs (e.g., fuel lines, industrial wastewater sewers, sanitary sewers in areas of past chemical use, etc.) is encountered within the limits of construction, the procedures presented in decision diagram shown on Figure 12 will be followed. The objectives of this protocol for abandoned pipe management are (a) to remove potential sources of contamination, including impacted soil and (b) to prevent the abandoned piping from acting as a future conduit for contaminant migration.

Upon encountering an abandoned pipe, NASA, the Navy, the U.S. EPA, and the Water Board will be notified. The Project Developer will review available historic information, Table 1 and Figure 6 of the EIMP for the construction area to assess whether the hazardous materials could have formerly been contained in the pipe (e.g., the sanitary sewer line that runs from Building 88 to the traffic island area). If this review indicates that the pipe may have historically contained hazardous materials, NASA, the Navy, and the applicable regulatory agencies will be notified and confirmation sampling beneath the pipe (which could include grab groundwater beneath the pipe) may be conducted if the applicable regulatory agencies determine that additional sampling is warranted.

If the pipe is associated with a tank and the tank needs to be removed due to construction activities, then the pipe will be removed with the tank in accordance with Santa Clara County requirements for UST removal as described in Section 6.8.1. Otherwise, the pipe will be managed as outlined below and summarized in the decision diagram shown on Figure 12.

If the pipe contains liquid or sludge, the following actions will be taken:

- the liquid or sludge will be removed from the pipe, if feasible, and placed in an appropriate container prior to removal of the pipe;
- the liquid or sludge will be tested for hazardous constituents. In the event that the analytical results indicate that hazardous constituents are present in the liquid or sludge, NASA, the Navy, and the applicable regulatory agencies will be notified, and confirmation sampling beneath the pipe shall be conducted to determine whether additional characterization and/or soil removal may be necessary within

the limits of construction. In addition, at the direction of the applicable regulatory agencies, grab groundwater samples beneath the pipe may also be collected;

- the pipe and the liquid or sludge will be disposed at an appropriate off-site facility; and,
- stained, discolored or odorous soil located within the limits of construction will be sampled in accordance with the procedures described in Section 6.10.3.

If not all of the pipe is removed for purposes of the planned construction activities, the ends of the pipe that remain in place will be capped. The Project Developer shall characterize and dispose of the abandoned piping and any impacted materials in accordance with applicable laws and regulations and the CERCLA Off-Site Rule; NASA shall be designated as the generator of the wastes and shall sign all waste manifests.

The implementation of the protocol for abandoned pipes shall be documented through the use of field notes and photographs. After completion of the removal of abandoned pipes and any subsequent actions managing potentially impacted soil located within the limits of construction in accordance with the soil management protocols in Section 6.10, the Project Developer will prepare a report that describes the field activities, findings, actions taken, and analytical results for activities conducted by the Project Developer. The report will also include a figure depicting the location where the action was taken, chain-of-custody forms, and photographs as well as information regarding the disposal of the impacted materials. This report will be submitted to the applicable regulatory agencies (e.g., U.S. EPA and/or the Water Board), NASA, and the Navy as documentation of the completion of the remedial action within 60 days of the completion of field activities. The Project Developer will revise the report as necessary to adequately document the actions taken.

The procedures presented in Figure 12 do not apply to active or abandoned utilities, such as sanitary sewer, water, gas, or steam lines because they are not anticipated to have contained potentially hazardous materials. An exception, however, is the case of steam lines that are insulated with asbestos-containing materials, in which case the provisions of Section 6.4 apply.

6.9. Protection of Existing Site Remedies and Removal/Relocation of Monitoring Wells and Remediation System Components

As described in Section 2.2 and Section 2.4, the Navy and MEW Companies have implemented several remedies within the Premises; the MEW Companies and NASA currently operates groundwater remediation systems located near the Premises and

MEW Companies and Navy³⁷ monitoring wells are present within the Premises. The locations of the treatment system piping, extractions wells, and monitoring wells are shown on Figures 2 and 3 and additional information about the existing extraction and monitoring wells are presented in the 2024 NASA Annual Progress Report (BB&E, 2025), the *Final Interim Remedial Action Completion Report, Remedial Action at the Traffic Island Area* (NAVFAC, 2025), and the 2024 MEW Annual Report (Geosyntec, 2025); sections of the 2024 NASA Annual Progress Report and the 2024 MEW Annual Report are reproduced in Appendix A.

As discussed in Section 5.6, measures must be taken to protect the integrity of the implemented Site remedies, the MEW Companies groundwater remediation system, and the MEW, Navy, and NASA monitoring wells during development within the Premises. In addition, no changes can be made to existing Site remedies without concurrence from the Responsible Party, the U.S. EPA, and the Water Board. Any regulatory agency-approved modifications or disturbances³⁸ to implemented Site remedies will be appropriately repaired.

A flow chart describing the process for protecting existing Site remedies and the groundwater remediation system and monitoring wells and coordinating construction activities with the MEW Companies' or Navy's contractors is shown on Figure 13; a pre-construction planning flowchart is shown on Figure 9. NASA will facilitate communication between the Master Lessee and/or Project Developer and the Navy or the MEW Companies. In the absence of a Construction Coordination Agreement with the Navy or the MEW Companies, the procedures below shall apply.

While the MEW GWTS and WATS are not located within the Premises, several of the MEW Companies and Navy/NASA's monitoring wells are located on the Premises. Measures must be taken to protect the integrity of these monitoring wells during development within the Premises. A flow chart describing the process for protecting the MEW Companies' and Navy/NASA's existing groundwater monitoring wells and coordinating construction activities with the MEW Companies' and/or Navy's contractors is shown on Figure 13; a pre-construction planning flowchart is shown on Figure 9. In the absence of a cooperation agreement addressing construction coordination with the MEW Companies, the Navy, and NASA, the procedures below shall apply.

6.9.1. Removal, Relocation, or Modifications to Existing Site Remedies

Potential conflicts between the Project Developer's planned project and the location of existing Site remedies or remediation system components and/or groundwater

³⁷ Some of the Navy monitoring wells within the Premises are being monitored by NASA as part of NASA's operation of the WATS system.

³⁸ Any disturbances to the implemented Site remedies must be timely reported to the Responsible Party, NASA, the U.S. EPA, and Water Board.

monitoring wells should be identified and resolved during the design stage and, as described in Section 5.6.1.1. It is contemplated that the contractor(s) for the Responsible Party for the treatment system will complete (at the Project Developer's expense) the design and implementation of any changes to the remediation system, such as properly sealing groundwater wells designated to be closed, installing and developing any replacement groundwater wells, and installing and connecting any rerouted pipelines or other system components that need to be relocated. The Project Developer should use reasonable efforts to work with such contractor(s) and coordinate the schedule for completion of any regulatory agency-approved modifications to the remediation system and/or groundwater monitoring wells with the Project Developer's construction schedule. NASA will facilitate communication between the Master Lessee and/or Project Developer and the Navy and the Project Developer and the MEW Companies, as applicable.

It is contemplated that following completion of final grade by the Project Developer's contractor, contractor(s) for the Responsible Party for the treatment system will make final changes (at the Project Developer's expense) to the impacted wells, well vaults, and pull boxes, based on the final grade established by the Project Developer's contractor.

On completion of the modifications, final as-built drawings will be provided to the U.S. EPA, Water Board, NASA, and the Responsible Party.

6.9.2. Protection of Groundwater Wells and Remediation System Components

It is contemplated that prior to the start of construction, contractors for the Responsible Parties will show the Project Developer the locations of all of the groundwater extraction and monitoring wells in the field. Before initiating building demolition or other construction work, the Project Developer's contractors shall install water filled K-rails or brightly painted steel bollards around each groundwater monitoring or extraction well. The painted bollard shall extend above ground not less than four feet, so as to be highly visible, and shall be buried sufficiently below the ground surface to protect the wellhead. Alternative equivalent well protection measures may be used by the Project Developer provided the alternative is approved in writing by the contractor(s) responsible for the system. The Project Developer's contractor shall provide and place steel plate or equivalent protective measures over the existing MEW Companies' pipelines and power and control conduits that are within the project development area.

Additionally, all construction work within two feet of all groundwater wells shall be performed manually with hand tools. Fine grading work performed in areas more than two feet from the wells but within close proximity shall be performed by light grading equipment.

6.9.3. Shutdown of Remediation Systems

The WATS and MEW GWTS are required to be operated on a continuous basis; any planned shutdown of the systems for more than 24 hours in duration must be approved by the U.S. EPA Water Board, and NASA or the MEW Companies.³⁹ In the event that planned construction activities would require a planned shutdown of any portion of the WATS or MEW GWTS, the Project Developer shall provide NASA or the MEW Companies, as appropriate, with written notice at least ten working days in advance of the proposed shutdown. In the event the Project Developer's activities results in an unplanned shutdown of any components of the remediation system, immediate verbal notification must be given to NASA or the MEW Companies, as appropriate, the U.S. EPA, and the Water Board. Within 72 hours of an unplanned shutdown of the remediation system, the Master Lessee will provide written notification to NASA and the MEW Companies, as appropriate, the U.S. EPA and the Water Board describing the reason for the shutdown, the duration of the shutdown, the nature of the potential release, response actions taken, potential impacts, and proposed next steps.

6.9.4. Access to Existing Site Remedies

Development within the Premises must be performed in such a way that all existing Site remedies, groundwater wells, pull boxes and the groundwater treatment system and associated components are made accessible to the Navy's, MEW Companies', and/or NASA's contractors, as applicable, and their equipment for sampling, operation, maintenance, removal and replacement of pumps, and well sealing during and after development. If access to a well or other remediation system component is restricted during construction, the Master Lessee will provide written notice to and coordinate activities with the Navy or MEW Companies, as appropriate, in advance of creating the restriction, with an explanation of the reason for and the expected duration of the proposed restricted access and request a planned schedule for well sampling and other remedial activities from such Responsible Party.

6.9.5. Accidental Releases of Untreated Groundwater

Prior to the initiation of construction activities, the Project Developer shall prepare a contingency plan to outline actions that would be taken in the event that the Project Developer's contractors damage any remediation system component in a manner that causes the release of untreated groundwater. During planning meetings with NASA or the MEW Companies, as appropriate, emergency contacts and procedures to initiate emergency shutdown of system components, if necessary, shall be reviewed. The plan shall identify any emergency equipment the Project Developer may need to retain on-site during construction activities to control or contain potential releases of untreated

³⁹ As neither the MEW Companies' nor WATS are located within the Premises, development activities on the Premises should not require the shutdown of either of these treatment systems.

groundwater. The plan shall be submitted to NASA and the MEW Companies, as appropriate, for review and approval prior to the start of construction activities in areas where remediation system components are located.

In the event that construction activities result in the release of untreated groundwater, the Project Developer shall immediately notify NASA and the MEW Companies, as appropriate. NASA shall promptly notify the U.S. EPA and the Water Board following receipt of any such notice. If the remediation system is shut down due to damage to the system or to control the release of untreated groundwater, the Project Developer will provide a written explanation for the shutdown to NASA or the MEW Companies, as appropriate, and to the U.S. EPA and Water Board as described in Section 6.9.3.

The Project Developer will take immediate action to control the source of the spill and contain untreated groundwater that has been released in accordance with its approved contingency plan. Effort shall be made to avoid release of untreated groundwater into storm sewers.

After any continued release has been stopped or controlled, any areas where the release may have come in contact with or infiltrated subsurface soils shall be identified. Potentially impacted soil will be screened using the soil management protocols for excavated soils described in Section 6.10. Soils found to contain COPCs above the TCLs will be excavated and disposed of off-site at a licensed disposal facility at the Project Developer's expense. NASA will sign manifests as generator for any impacted soil that must be sent for off-site disposal.

6.10. Soil Management Protocols

Soil will be imported, excavated, or relocated at construction sites within the Premises during demolition work, grading, foundation excavation, utility installation, and other construction-related activities.

Whenever soil is being excavated or exposed, the contractor performing the work shall monitor the soil to determine if the soil is contaminated. Figure 4 identifies the Responsible Party for soil contamination within the Premises,⁴⁰ and Figure 6 shows the approximate locations of potentially contaminated soils (e.g., locations of existing and/or former oil-filled transformers, aboveground storage tanks, and former underground

⁴⁰ It is the intent of the Master Lessee and NASA that the parties that have been named by U. S. EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy) for contamination at the Premises retain this responsibility and continue to perform its obligations independent of the Master Lessee. The implementation of the soil management protocols discussed in Section 6.10 by the Master Lessee and NASA does not relieve the Responsible Parties of their responsibilities and obligations and will not result in Master Lessee becoming a Responsible Party. NASA will facilitate communication between Master Lessee/Project Developer and the Responsible Party when requested.

storage tanks). The Project Developer need only excavate to the extent required for construction. In addition, additional soil management procedures are applicable when surface soils that may potentially be impacted by lead from the historical use of lead-based paints area or PCBs from historical use of paints with PCBs are planned to be excavated during development. Procedures for monitoring excavated soil, and for managing soil that is found to be contaminated, are shown on the decision diagram on Figure 14. Procedures for managing soil potentially impacted by lead from historical use of lead-based paints and PCBs from PCB-containing paint are shown on the decision diagram on Figure 15. The following sections describe:

- requirements for managing potential lead- and PCB-impacted soil surrounding buildings (Section 6.10.1);
- procedures for screening soil excavated during construction activity for VOCs and petroleum hydrocarbons, and/or evidence of staining, discoloration, or odors⁴¹ (Section 6.10.2);
- procedures for testing and managing soil that potentially contains VOCs, petroleum hydrocarbons, and other COPCs at concentrations above levels of concern (Section 6.10.3);
- reusing soil within the Premises (Section 6.10.4);
- contingency actions for the observation, investigation, and removal of additional impacted soil (Section 6.10.5); and
- import fill requirements (Section 6.10.6).

6.10.1. Lead-Impacted Soil and PCB-Impacted Soil from Paint

As discussed in Section 2.4.8, lead has been found to occur in surface soil near existing buildings where lead-based paint was used historically at Moffett Field (CWMI, 1993; Weston, 1998). Lead-impacted soils that exceeds the Water Board ESLs for commercial/industrial land use (500 mg/kg) or residential land use (80 mg/kg), as applicable, or currently applicable criteria, shall be disposed at an off-site facility prior to or during development activities within the Premises. As described in Section 2.4.8, the criteria for classifying lead-impacted excavated soil for disposal purposes in California can be summarized as follows:

⁴¹ While chemicals other than VOCs and petroleum hydrocarbons have been detected (e.g., PAHs) in Site soils, detections of these compounds are typically limited to small areas. Prior to conducting development activities, the Project Developer should review Table 1 and Figure 6 to identify any potential contaminants of concern and, if any are identified, an environmental professional should screen the soil for visible impacts and the excavated materials should be analyzed for the potential contaminants of concern before the on-site reuse or off-site disposal of the excavated materials.

- If the total lead concentration of excavated soil is greater than 1,000 mg/kg (or currently applicable criteria), it is classified as California (non-RCRA) hazardous waste for disposal purposes;
- If the soluble lead concentration (using the WET) of excavated soil is greater than 5 mg/L (or currently applicable criteria), it is classified as California (non-RCRA) hazardous waste for disposal purposes;⁴² and
- If the total lead concentration of excavated soil is between 500 (or 80 mg/kg in residential areas) and 1,000 mg/kg, but the soluble lead concentration based on the WET is less than 5 mg/L and the TCLP is less than 5 mg/L (or currently applicable criteria) the soil could be classified as non-hazardous and disposed at an off-site non-hazardous waste landfill in accordance with the disposal facility's permit.

This section describes a general approach for identifying and managing lead- and/or PCB-impacted soil encountered during redevelopment within the Premises. This approach is based on the assumption that excavation and off-site disposal is NASA's preferred method for handling lead- and/or PCB-impacted soil encountered during redevelopment and the general approach to managing potentially lead- and/or PCB-impacted soils is shown schematically on Figure 15. For buildings that are to be demolished as part of redevelopment, lead- and/or PCB-impacted soil shall be removed prior to building demolition.

For PCB-impacts to soil from PCB-containing paint, sampling, remediation, and disposal will be performed in accordance with the requirements of TSCA 761.61. For PCB impacts, the high occupancy cleanup level of 1 mg/kg is the TCL for both commercial and residential land use.

6.10.1.1. Lead- and PCB-Based Paint Survey

Previous investigations conducted at Moffett Field indicate that lead-impacted soil surrounding buildings is likely due to the historical use of lead-based paints. The 1998 investigation conducted on behalf of U.S. EPA (Weston, 1998) concluded that elevated levels of lead in soil were not found near buildings that did not have lead-based paints. The lead survey conducted by Benchmark in 2001 found lead-based paint at the exteriors of several Premises buildings, but did not detect lead in soil at concentrations above the residential U.S. EPA PRG (AECOM, 2019). If no evidence of the presence of lead-containing

⁴² If lead concentrations in soil are greater than 100 mg/kg (or currently applicable criteria), the sample will also have to be subjected to the Toxicity Characteristic Leaching Procedure (TCLP). If lead concentrations in the TCLP extract exceed 5 mg/L (or currently applicable criteria), such soil is classified as a RCRA hazardous waste if excavated.

material is found and lead-impacted soil has not been identified during any previous soil sampling, no further action is required regarding lead. However, any soil excavated during construction activities shall be screened for VOCs and petroleum hydrocarbons according to the procedures in Section 6.10.2.

Except for Hangar 1, EKI is not aware of any sampling for PCBs in paint at other buildings at former Moffett Field. Thus, it is not known if any of the buildings within the Premises have PCB-containing paint. Such a survey will be performed prior to demolition as described in Section 6.7.

6.10.1.2. Initial Soil Lead and PCB Assessment

If a building survey has confirmed the presence of lead- and/or PCB-based paints, an initial assessment of lead and/or PCBs in soil shall be conducted in the planned construction area to determine if soils surrounding the building perimeter are impacted by elevated concentrations of lead. The sampling procedure described below for lead will be applied to PCBs if the exterior building paint contains PCBs at levels consistent with PCB bulk product as defined in TSCA (i.e., PCB concentrations greater than 50 mg/kg).

The initial soil assessment at buildings where lead-based paints (i.e., paint containing greater than 0.5% by weight lead or 5,000 mg/kg) are confirmed to be present involves collecting multi-increment composite samples from around the periphery of the building. By collecting multiple-increment composite samples rather than discrete soil samples, a more representative sample of bulk soil around the building will be obtained. For sampling purposes, a soil sampling (and potential excavation) cell or decision unit is assumed to be approximately 30-feet long by 5-feet wide by approximately 6 inches deep; the exact geometry of the decision unit may be modified as appropriate based on Site conditions. This geometry assumes that elevated levels of lead will generally not extend farther than 5 feet from the building nor more than 6 inches deep into the soil column; however, if lead-impacts within the decision unit are confirmed, additional confirmation sampling will be conducted during excavation activities to identify areas where lead-impacted soils may extend further from building walls or at greater depth (see Section 6.10.1.3) and whether additional excavation is required. Within each decision unit, soil from between approximately 0 to 6 inches below ground surface will be collected from a minimum of 30 locations. In total, the multi-increment sample from each decision unit should consist of a minimum of approximately 2 kilograms of soil. The multi-increment samples should be sent to an analytical laboratory for homogenization and systematic subsampling (with a minimum of 30 increments) and, at a minimum, 10-grams of the subsampled material should be extracted and analyzed for lead. For additional details regarding the collection and analysis multi-increment samples, refer to the ITRC's ISM guidance document (ITRC, 2020) or an updated version of this document.

If any of the multi-increment samples contain lead at a concentration greater than 50 mg/kg then a WET extract should be prepared from 10 grams of the systematically subsampled material and the WET extract should be analyzed for lead.

If any of the initial soil assessment sample results for lead exceed 80 mg/kg or 500 mg/kg,⁴³ as applicable, then significant lead-related contamination is deemed to be present around the building and excavation and disposal of lead-impacted soil located within the limits of construction will be conducted prior to or as part of development activities within the Premises. Using these criteria, soil in areas where lead has been detected at concentrations exceeding the Water Board ESLs for commercial/industrial or residential soil (500 mg/kg and 80 mg/kg, respectively) will be excavated and properly disposed of. If the impacted materials contain between 80 mg/kg and 1,000 mg/kg and WET extract contains less than 5 mg/L of soluble lead (or currently applicable criterion) the soil may be classified as non-hazardous and disposed at a non-hazardous waste landfill in accordance with the disposal facility's permit. Any soil containing total lead in excess of the TTL of 1,000 mg/kg (or currently applicable criteria) and/or containing WET-soluble lead in excess of the STLC of 5.0 mg/L (or currently applicable criterion) and TCLP-soluble lead less than the Regulatory Criterion of 5.0 mg/L (or currently applicable criterion) will be managed as a non-RCRA hazardous waste. Lastly, any soil containing TCLP-soluble lead in excess of the RCRA regulatory criterion of 5.0 mg/L (or currently applicable criterion) will be managed as a RCRA hazardous waste.

If none of the initial soil assessment results exceed the 80 mg/kg or 500 mg/kg total lead concentrations, as applicable, and WET-soluble lead less than 5.0 mg/L (or currently applicable criterion), no further action is required regarding lead for protection of human health. However, if soil that contains total lead less than 500 mg/kg (or 80 mg/kg in residential areas) and WET-soluble lead in excess of the STLC of 5.0 mg/L (or currently applicable criterion) needs to be excavated and moved from its current location, the excavated material shall be properly disposed in a Class I landfill. Soil excavated during construction activities will be screened according to the procedures described in Section 6.10.2.

6.10.1.3. Excavation and Disposal of Lead- and/or PCB-Impacted Soil

Prior to construction activities around buildings where lead- and/or PCB-impacted soil is encountered, an initial excavation will be conducted to remove shallow (e.g., approximately 6 inches in depth) soil surrounding the building in areas identified for remediation to a set distance from the building (e.g., approximately 5 feet or as otherwise determined from the initial soil assessment sampling).

⁴³ If the results of any of the multi-increment samples exceed either 10X the Soluble Limit Threshold Concentration and/or 20X the Toxicity Characteristic Leaching Procedure Regulatory Level, WET and TCLP extracts will need to be prepared and analyzed for lead. The WET and TCLP extractions should be performed on a minimum of 10 grams of the homogenized and systematically subsampled material.

Multi-increment confirmation samples will then be collected from the floor and the excavation sidewalls for each excavation cell to determine whether additional excavation is required. As with the initial soil assessment sampling, the floor and sidewall samples shall be 30-point multi-increment composite samples, properly homogenized and subsampled in accordance with ITRC ISM guidance. Samples shall be analyzed for total lead and soluble lead (WET and TCLP) if the total lead concentration exceeds 50 mg/kg and 100 mg/kg, respectively (or currently applicable criteria). These results will be used to confirm that lead-impacted soils have been successfully excavated. Additional excavation may be necessary if confirmation sample analytical results indicate additional lead-impacted soils remain.

After lead- and/or PCB-impacted soils have been excavated and removed, soil excavation for site development can continue using the soil screening procedures described in Section 6.10.2.

The Project Developer will arrange for off-site disposal of lead-impacted soil at a facility that is in compliance with the CERCLA Off-Site Rule and NASA will be designated as the generator of the waste and will sign all manifests. Treatment, if necessary, and disposal of lead-impacted soil excavated prior to or during development within the Premises will be performed in accordance with applicable laws and regulations at permitted off-site treatment facilities. Disposal characterization samples can be collected *in situ* from disposal cells established from previous sampling data or from bins or stockpiles in accordance with the needs of the disposal/treatment facility. Similarly, the Project Developer will arrange for off-site disposal of PCB-impacted soil at a facility that is compliant with the CERCLA Off-Site Rule and TSCA, and NASA will be designated as the generator of the waste and will sign all manifests.

On completion of lead- and/or PCB-impacted soil excavation and disposal activities, the Project Developer will prepare a report that describes the field activities, findings, actions taken, and analytical results for activities conducted by the Project Developer. The report will include a figure depicting the location where the action was taken, chain-of-custody forms, and photographs as well as information regarding the disposal of the impacted materials. This report will be submitted to the applicable regulatory agencies (e.g., U.S. EPA and/or the Water Board), NASA, and the Navy to document compliance with the soil management protocol for lead-impacted soils (Section 6.10.1) within 60 days of the completion of field activities. The Project Developer will revise the report as necessary to adequately document the actions taken.

6.10.2. Excavated Soil Screening Procedures

As described in Section 2.4, there are a number of areas within the Premises where soil containing COPCs may be encountered during construction activities. Areas of potentially impacted soils are identified in Table 1 (see the EIMP Approach column) and the

approximate locations of these areas are shown on Figure 6. This section describes the soil screening procedures that will be implemented in these areas.

Alternatively, the Project Developer may perform pre-characterization of soil to be excavated to assess potential impacts. If implemented, soil screening will only be performed if visual screening reveals potential impacted soil that was not found during pre-characterization activities.

6.10.2.1. General Screening Procedures for all Excavated Soil

During all redevelopment activities, the Project Developer's contractor will monitor soil that is excavated during construction activities. Figure 14 summarizes the general soil screening procedures and presents a decision diagram for the management of excavated materials.

In areas of no known environmental impacts for soil between the ground surface and 4 feet bgs, the Project Developer's contractor will visually screen the soil during soil handling activities for evidence of potential impacts. If, during any earthwork or building demolition activities within the Premises, soil is encountered that is visibly stained, discolored, shiny, or oily or has a noticeable solvent-like or hydrocarbon odor, the Project Developer's contractor will implement the contingency procedures described in Section 6.10.2.7.

In areas of known potential environmental impacts (see Table 1 and Figure 6) and deeper than 4 feet bgs, visual screening and/or screening for VOCs by an environmental professional may be required. Additional information regarding the screening procedures for VOCs is described in Section 6.10.2.2.

6.10.2.2. Additional Screening Procedures for VOCs in Excavated Soil

If soil is not pre-characterized for reuse prior to the start of excavation, then screening for VOCs should be conducted in the following areas:

- below 4 feet bgs because the Premises is nearly entirely within the MEW Site VI Study Area and within potential halogenated volatile organic compound (HVOC) source areas, using the field headspace soil screening criteria described in Section 6.10.2.3 and the field headspace soil screening method described in Section 6.10.2.5;
- additional areas as identified in the EIMP Approach column of Table 1 by the statement: "An environmental professional should perform soil screening during subsurface work in accordance with EIMP" using the field headspace soil screening criteria described in Section 6.10.2.4 and the field headspace soil screening method described in Section 6.10.2.5;

- additional locations as may be identified by the Project Developer’s environmental professional in locations where the Project Developer’s contractor has observed evidence of unnaturally stained, discolored, or odorous soil, and using the field headspace soil screening criteria described in Section 6.10.2.4 and the field headspace soil screening method described in Section 6.10.2.5.

The VOC screening procedures do not apply to shallow (i.e., shallower than 4 feet bgs) soil that is moved around the project site during rough or final grading, during the demolition or removal of hardscape or landscaping materials or to material that will not be reused on-Site.⁴⁴

6.10.2.3. Field Headspace Soil Screening Criteria for Soil Deeper than 4 Feet bgs and within and HVOC Source Area

As indicated above, if soil is not pre-characterized for reuse prior to the start of construction, during redevelopment activities at depths greater than 4 feet bgs and at all depths within any HVOC source area, the Project Developer’s environmental consultant shall field-screen the soil for the presence of VOCs using a ppbv OVA (Figure 14). If a continuous reading of 500 ppbv or greater is observed in a representative Field Headspace Soil sample for 10 seconds or more, the soil will be considered as “potentially contaminated with volatile chemicals” and will be segregated from the other excavated materials. If the OVA screening criterion is exceeded, the Project Developer will notify the Master Lessee, NASA, the Navy, the U.S. EPA, and the Water Board.

Excavated soil not exceeding 500 ppbv in the headspace for 10 seconds or more during soil screening can be reused within the project area for backfill or cover without any further soil sampling or analyses.

6.10.2.4. Field Headspace Soil Screening Criteria in Potential Petroleum Areas and Non-HVOC Potential Shallow Subsurface Contamination

As indicated above, if soil is not pre-characterized for reuse prior to the start of construction, during redevelopment activities that require screening for petroleum hydrocarbons or non-halogenated VOCs at depths less than 4 feet bgs (as identified in Table 1) or in areas where soil that is unnaturally stained, discolored, or odorous is observed, the Project Developer’s environmental consultant shall field-screen the soil for the presence of VOCs using an OVA capable of measuring down to the 0.1 ppmv range (ppmv OVA) (Figure 14). If a continuous reading of 5.0 ppmv or greater is observed in a representative Field Headspace Soil sample for 10 seconds or more, the soil will be considered as “potentially contaminated with volatile chemicals” and will be segregated

⁴⁴ Material that will be disposed of at a permitted disposal facility operated in accordance with the CERCLA Off-Site Rule does not need to be screened for VOCs during excavation activities and only needs to be characterized for the constituents required by the disposal facility.

from the other excavated materials. If the OVA screening criterion is exceeded, the Project Developer will notify the Master Lessee, NASA, the Navy, the U.S. EPA, and the Water Board.

Excavated soil not exceeding 5 ppmv in the headspace for 10 seconds or more during soil screening can be reused within the project area for backfill or cover without any further soil sampling or analyses.

6.10.2.5. Field Headspace Soil Screening Method

Soil samples will be screened in the field for the presence of VOCs using the following screening method:

- at a minimum, a representative soil sample will be collected from every 15 cubic yards of excavated soil or 20 linear feet for trenches and placed into an unused re-sealable plastic bag with a minimum volume of one quart, until the container is approximately one-half full;
- the plastic bag will be sealed and the soil within it will be crumbled by hand, if possible, to expose fresh surfaces;
- after at least 2 minutes, the plastic bag will be opened just enough to allow the probe of the OVA to be inserted into the headspace of the plastic bag;
- if the OVA reading exceeds the applicable screening limit⁴⁵ continuously for 10 seconds or more, the soil will be considered “potentially contaminated with volatile chemicals.”

In general, VOC screening should be conducted during excavation activities. However, VOC screening may also be conducted on excavated soil that has been stockpiled for a period of less than 48-hours. If material from stockpiled soil is used for field headspace screening, it should be collected from a minimum of 1 foot into the soil stockpile.

The OVA used in the above analysis will utilize a photo-ionization detector (PID) that shall be field-calibrated in accordance with the manufacturer’s requirements. Both the ppbv OVA and ppmv OVA will be calibrated, as necessary, in accordance with the manufacturer’s recommendations. Calibration documentation for the OVA should be documented in field notes or field logs.

⁴⁵ 500 ppbv for soil deeper than 4 feet bgs and in HVOC source areas (Section 6.10.2.3) and 5 ppmv in soil shallower than 4 feet bgs in areas with potential petroleum or non-HVOC impacted soil (Section 6.10.2.4).

6.10.2.6. Additional Testing of Potentially Contaminated Soil

Excavated materials that are considered to be potentially contaminated will be segregated from soil with no indications of contamination and transferred to a stockpile at a location in the construction area. The Project Developer's contractor will place a plastic liner underneath the stockpile(s) of potentially contaminated soil and will cover the stockpile(s) with a plastic liner at all times except when material is being handled. The top covering will be adequately secured so that all surface areas are covered. Berms will be constructed by the Project Developer's contractor around the stockpile area to control precipitation run-on and run-off. All handling of contaminated soil must comply with BAAQMD Regulation 8, Rule 40. Soils from the saturated and unsaturated zones will be stockpiled separately.

In the event that the potentially contaminated material will be reused on-Site, the Project Developer's environmental professional will collect composite samples from potentially contaminated soil stockpiles to characterize the material for potential reuse.⁴⁶

- Two four-point composite samples, representative of the stockpiled material, will be collected for every 50 cubic yards of stockpiled soil.
- The samples should be collected in accordance with U.S. EPA Method 5035 from freshly exposed soil surfaces using 5-gram EnCore Samplers™; a total of five 5-gram EnCore Samplers™ (or equivalent) and one 16-ounce glass jar will be collected for each composite sample. The capped samplers and glass jar should be placed into plastic bags for storage and transported to a state-certified analytical laboratory, on ice, under chain-of-custody protocols.
- Soil from EnCore Samplers™ should be composited in methanol at the analytical laboratory and analyzed for (a) VOCs, using U.S. EPA Method 8260, and (b) total purgeable petroleum hydrocarbons, TPHg using U.S. EPA Method 8015m; the sample collected in the 16-ounce glass jar should be analyzed for TPHd and TPHmo using U.S. EPA Method 8015m,⁴⁷ Title 22 metals using U.S. EPA Method 6020, and percent moisture, and any additional analyses, if appropriate. Analytical results for the samples should be compared to soil TCLs presented in Table 2 for residential or commercial-industrial land use, as applicable.

The sample collected in the 16-ounce glass jar will also be used for additional analyses if there is evidence that chemicals other than volatile chemicals may be present.

⁴⁶ For material that will not be reused on-Site, the Project Developer's contractor should contact the permitted off-site disposal facility to determine what analyses will be required and the number of samples that need to be collected.

⁴⁷ Silica gel cleanup should not be used for the analysis of total petroleum hydrocarbons in the diesel and motor oil ranges.

Determination of whether additional sample analyses should be conducted will be based on the location of the excavation in relation to known past COPC release or use and on the field observation and judgment of the Project Developer's environmental professional.

Additional analyses may include the following:

- SVOCs (or PAHs) by U.S. EPA Method 8270;
- PCBs by U.S. EPA Method 8082; or
- Pesticides by U.S. EPA Method 8081.

If chemical concentrations (on a dry weight basis) in the soil samples do not exceed the soil TCLs for residential or commercial/industrial land use as applicable (Table 2), the soil can be reused within the Premises for backfill. If chemical concentrations in the soil samples exceed the soil TCLs, the Project Developer will notify NASA, the Navy, and the MEW Companies (as applicable per Figure 5) and the appropriate regulatory agencies as described in Section 6.10.2.8 and the Project Developer will manage the soil as described in Section 6.10.3.

For in place soil that is visibly stained, discolored, shiny, or oily or has a noticeable solvent-like or hydrocarbon odor, the environmental professional should collect a discrete sample of the potentially impacted material within the excavation (i.e., an "evaluation sample").

6.10.2.7. Notification of Soil Containing Chemicals and Impacted Soil

NASA, the Navy and the MEW Companies, as applicable, the U.S. EPA, and the Water Board must be notified when the results of chemical screening indicates excavated soil contains or possibly contains chemicals of concern.

- If the OVA screening criterion is exceeded, the Project Developer will notify NASA, the Navy and the MEW Companies, as applicable, the U.S. EPA, and the Water Board promptly.
- If analytical data are obtained that indicate excavated soil containing COPCs would require treatment or disposal (as described in Section 6.10.3), NASA, the Navy and the MEW Companies, as applicable, and the applicable regulatory agencies will be notified and provided with copies of analytical reports for review.

The notification provided to NASA, the Navy and the MEW Companies, as applicable, and the applicable regulatory agencies shall include relevant information such as:

- the approximate location and depth of the excavated soil;

- whether the soil was visibly stained, discolored, shiny, or oily or had a noticeable solvent-like or hydrocarbon odor;
- OVA screening results; and
- the number of samples collected for laboratory analysis and any analytical results already obtained.

The notification documentation will be made part of the final report documenting implementation of the excavated soil screening procedures and will be submitted to the applicable regulatory agencies within 60 days of completing field activities.

In accordance with BAAQMD Rule 8-40-402, the BAAQMD will be notified at least 5 days before the excavation of known contaminated soil. If previously unknown soil contamination is discovered, the BAAQMD shall be notified as soon as possible per Rule 8-40-405 with written verification shall follow not later than 30 working days after excavation is completed.

6.10.2.8. Documentation of Soil Screening

The Project Developer shall document the implementation of the excavated soil screening procedures. The documentation shall include, as a minimum, the following information:

- a summary of field headspace soil screening results, an estimate of the volume of excavated soil which exceeded the headspace soil screening criterion, and identification of the approximate location of excavated soil which exceeded the headspace soil screening criterion;
- a summary of laboratory analytical results of soil stockpile sampling and a compilation of laboratory analytical data reports; and
- documentation regarding the off-site disposal or treatment of the impacted materials and estimates of the volume or mass of the impacted materials. NASA shall sign all manifests as generator of the wastes to the extent not timely signed by the Navy or MEW Companies.

The documentation shall be submitted to NASA, the Navy and the MEW Companies, as applicable, and the applicable lead regulatory agency within 60 days of the completion of field activities, unless it is included as an appendix or attachment to a report submitted to the lead regulatory agency by the Project Developer documenting the treatment or disposal of the excavated soil. The Project Developer will revise the documentation as necessary to adequately document the actions taken.

6.10.3. Management of Impacted Excavated Soils

Excavated soil that is determined to contain COPCs at concentrations above soil TCLs for residential or commercial/industrial land use as applicable (Table 2) by the procedures described in Section 6.10.2 (“impacted soil”) is required to be treated or removed from the Site.⁴⁸ Prior to disposing the impacted soil at a permitted off-site facility, the Project Developer will notify NASA and the Navy and the MEW Companies, as applicable, and will provide NASA and the Navy and the MEW Companies, as applicable, with copies of analytical data for review. The Project Developer will dispose of the soil at a permitted off-site disposal facility in accordance with the soil characteristics and applicable laws and regulations and the CERCLA Off-Site Rule. NASA will sign all manifests as generator of the waste.

6.10.4. Soil Re-Use Within the Premises

Soil with COPC concentrations that do not exceed the applicable soil TCLs may be reused as backfill within the Premises provided that the analytical data for this material meets applicable soil TCLs for the area in which it will be placed. At a minimum, the number of samples collected and analyzed must conform with the sampling frequency described in the DTSC’s fill guidance (Cal-EPA, 2001; Cal-EPA, 2006).

6.10.5. Management of Impacted Soils after Construction Excavation is Complete

The Project Developer need only excavate to the extent required for construction. If the concentrations of COPCs in excavated soil samples exceed soil TCLs (Table 2) as applicable, discrete confirmation samples⁴⁹ will be collected from in-place soil at the limits of the excavation as follows:

- for each approximately 50 linear feet of exposed excavation sidewalls, a discrete confirmation sidewall sample will be collected from freshly exposed soils between the ground surface and the total excavation depth.
- for each approximately 2,500 square feet of exposed excavation bottom, a confirmation sample will be collected from the excavation floor if the excavation does not extend to the groundwater table or if soils were impacted by COPCs other than VOCs or TPH.
- a minimum of one bottom sample and one sidewall sample per excavation sidewall face will be collected from each excavation.

⁴⁸ As applicable, the material should be managed in accordance with BAAQMD Regulation 8, Rule 40.

⁴⁹ The sample should be collected from a freshly exposed soil surface. Five 5-gram EnCore™ Samplers and one 16-ounce glass jar should be collected and transported to a state-certified analytical laboratory, on ice, under chain-of-custody protocols.

If the results of the confirmation sample analyses indicate that COPCs remain in unexcavated soils at concentrations that exceed soil TCLs, NASA, the Navy and the MEW Companies, as applicable, and the applicable regulatory agencies shall be notified and the Project Developer will manage the unexcavated soil according to one of the three general approaches summarized below and shown on Figure 16. The procedures below allow for over-excavation of identified contamination, if desired, and the subsequent collection and analysis of soil samples to determine chemical impacts, if any, in the remaining unexcavated soil.

Selection of which of the three approaches, or “tracks,” will be followed will depend on the apparent extent of contamination, the construction schedule, and physical constraints. Track 1 described below is designed to be implemented relatively quickly by the Project Developer in coordination with NASA and to completely address relatively limited source areas in locations that potentially impact the construction project. Track 2 is also designed to be implemented relatively quickly by the Project Developer in coordination with NASA and to completely address relatively limited source areas. The third track is potentially appropriate for larger source areas, not associated with the MEW Companies impacted groundwater, for which excavation may not be practicable or if the source area extends into areas that do not affect the construction project schedule; in this track, the Project Developer defers additional actions to the Responsible Party who will be responsible for agency coordination and for the implementation of any remedial actions, if required.

- *Track 1 – Excavate and Remove, Collect Confirmation Samples:* Track 1 is considered a “Fast Track” remedial approach, and is designed to allow development work to proceed with minimal delay. Unsaturated zone soils that appear to contain chemicals above applicable TCLs are excavated from within the limits of construction, screened, stockpiled, and managed as described in the previous sections. Impacted soil not associated with an HVOC or TPH release on the Premises (i.e., soil associated with MEW Companies impacted groundwater) needs to be excavated only to the extent needed for development purposes.

Confirmation soil samples are then collected from remaining soil in the excavation sidewalls and floor (if the excavation did not extend to the groundwater table) to assess whether impacted soils have been removed or document soil impacts associated with the MEW Companies impacted groundwater. Confirmation samples shall be collected at the same frequency as described above. Excavation is considered complete if confirmation soil sample results are below TCLs, the top of the groundwater table is encountered, or the boundary of the construction area have been reached. After soil excavation is considered complete, the excavation may be backfilled with clean soil and development work may continue.

- *Track 2 - Characterize In-Situ:* Track 2 is considered the “Middle Track” remedial approach because in-situ characterization requires significantly more time than

the direct excavation approach. Track 2 may be more appropriate (a) if the construction schedule allows for *in-situ* characterization, or (b) if the potentially impacted construction area is suspected to be large. Under Track 2, the extent of impacted soils is characterized *in-situ* by installing soil borings in advance of the soil removal action (i.e., extent characterized in advance with borings, rather than confirmation sampling). Based on the nature and extent of contamination, the Project Developer can decide whether to proceed with the removal and disposal of impacted soils, or to defer any action to the Responsible Party for coordination with the regulatory agencies if excavation does not appear to be practicable at that time.

- *Track 3 – Standard Agency Oversight:* Track 3, involving direct regulatory agency involvement in decision making, may be more appropriate (a) if excavation is not practicable at the time of construction (e.g., the potentially impacted area is particularly large in size or there are physical constraints like a building), (b) if the Project Developer's construction schedule is not adversely affected by the impacted area, (c) if no further action is believed to be necessary due to the nature of the source (e.g., not mobile, low toxicity), or (d) because an existing approved remedy adequately addresses the issue (e.g., operation of the regional groundwater remediation system adequately addresses any potential impact due to the identified impacted soil). Any further assessment will be conducted by the Responsible Party in coordination with the regulatory agencies. NASA will facilitate communication between the Master Lessee and/or Project Developer and the Responsible Party when requested.

The implementation of actions to manage impacted soil in construction areas that remains in-place shall be documented through the use of field notes and photographs. After completion of a contingency action, the Project Developer will prepare a report that describes the field activities, findings, actions taken, and analytical results for activities conducted by the Project Developer. The report will also include a figure depicting the location where the action was taken, chain-of-custody forms, and photographs as well as information regarding the disposal of the impacted materials. This report will be submitted to the applicable regulatory agencies (e.g., U.S. EPA and/or the Water Board), NASA, and the Navy and the MEW Companies, as appropriate, within 60 days of the completion of field activities as documentation of the contingency actions taken. The Project Developer will revise the report as necessary to adequately document the actions taken.

6.10.6. Import Fill

All imported soils will be certified clean with supporting documentation per DTSC fill guidance (Cal-EPA, 2001; Cal-EPA, 2006). Provided that the Project Developer can demonstrate that virgin import fill from the source quarry does not contain naturally occurring asbestos and associated chromium and nickel (e.g., serpentine), the Project

Developer need only characterize the material for TPH extractable compounds by U.S. EPA Method 8015. The Project Developer's contractor will provide certification documents to the Project Developer prior to the placement of imported soil within the Premises.

If soil or other fill (e.g., aggregate base) is recycled, the DTSC fill guidance will be used to determine the chemicals that must be analyzed. Concentrations of those chemicals must meet the appropriate TCLs for the intended area of use for the fill (e.g., commercial/industrial or residential). Fill to be placed beneath roads must meet commercial/industrial TCLs.

6.11. Recordkeeping

All documentation regarding soil screening, including field screening, stockpile and excavation sampling, and disposal or treatment information, will be maintained for a period of 10 years after the completion of fieldwork and made available to NASA and U.S. EPA upon request.

7. POST-CONSTRUCTION AND LONG-TERM RISK MANAGEMENT

This section of the EIMP addresses precautions that shall be implemented to mitigate long-term risks to human health and the environment related to exposure to COPCs during periods of normal non-construction activity. Any construction that will disturb the soil, building foundations, or pavement shall be completed in a manner that is consistent with the EIMP, particularly Sections 5 and 6, and all then-applicable environmental policies, laws, and regulations.

Components of the EIMP for long-term risk management activities are as follows:

- Providing required notification to future property managers and tenants of the known environmental conditions within the Premises (e.g., the applicable closure plans), lead, PCB, and asbestos surveys, results of available air monitoring data, and the requirements of the EIMP (Section 7.1);
- Ensuring that future land uses are consistent with the planned land use assumed in this EIMP in terms of exposure risk assumptions (Section 7.2);
- Prohibiting the use of untreated groundwater within the Premises (Section 7.3);
- Establishing a notification procedure and protocols for future subsurface activity to ensure long-term compliance with this EIMP (Section 7.4);
- Vapor intrusion monitoring by the Navy and the MEW Companies (Section 7.5);
- Ensuring compliance with LUCs and Navy remedies within the Premises (Section 7.6); and
- Periodically reviewing and modifying this EIMP, as necessary, to address any new COPCs encountered within the Premises, any newly-developed toxicological data relating to COPCs, and any significant changes in exposure assumptions because of an intended land use that is different from the planned land use upon which this EIMP is based (Section 7.7).

7.1. Rights and Notifications

Subject to the terms and conditions of the Lease, NASA, the U.S. EPA, the Water Board, the State of California, the Navy, the MEW Companies, and other entities and governmental agencies that are involved in the remediation of, or that are responsible to remediate, existing or future contamination on or about the Property, shall have the right to reasonable access to known or suspected areas of contamination or other areas upon which any containment system, treatment system, monitoring system, or other environmental response action is installed or implemented, or to be installed or

implemented, for the purposes of complying with environmental law and requirements provided, however, that any such installation and implementation shall be undertaken so as to cause as little interference to Master Lessee as reasonably practicable. NASA shall cooperate with Master Lessee in locating such required equipment in locations and installing and implementing such systems in a manner that are compatible with the Master Lessee's development plans.

The Master Lessee and NASA shall both be responsible for providing notification of the known environmental conditions within the Premises and of the requirements of this EIMP to the property manager, and tenants and other entities leasing or otherwise exercising control over space within the Premises. The Master Lessee shall provide written documentation of any required notification it makes to tenants or other parties to NASA's development office, which will maintain overall records documenting that required notifications have been made to all appropriate parties.

Project Developers, property managers, tenants, or others exercising control over space within the Premises shall be responsible for informing construction contractors and maintenance workers about the EIMP, as necessary, to ensure compliance with the procedures laid out herein.

7.2. Maintaining Planned Land Use

Development on the Premises is subject to the NASA Ames Development Plan (NASA, 2002), the NASA Ames Development Plan Final Programmatic Environmental Impact Statement (DCE, 2002), and Ames Procedural Requirements 8500.1. The planned land use for the Premises, as permitted by the Lease includes short-term and academic year housing, laboratories, research and development space, offices, and a conference center. The proposed development is undergoing an environmental review process under NEPA and CEQA. Once that process is completed, the land use plan should generally allow for unrestricted or residential land use within the Premises. If any significant change in the land use is proposed in the future, the Master Lessee shall conduct a risk analysis to support any proposed changes to this EIMP. Changes in the planned land use must be approved by NASA and applicable environmental regulatory agencies.

7.3. Prohibiting Use of Groundwater within the Premises

Because chlorinated solvents are known to be present in groundwater at concentrations that exceed U.S. and California MCLs for drinking water, NASA, the Master Lessee, Project Developers, and tenants are responsible for ensuring that groundwater beneath the Premises will not be used for drinking water or for any other purpose until such time that a risk assessment is performed that demonstrates the proposed use of groundwater does not represent a significant risk and the use of groundwater within the Premises is approved by NASA, the U.S. EPA, the Water Board, and the SCVWD. Notwithstanding the

foregoing sentence, treated groundwater that meets TCLs may be used for irrigation, industrial heating or cooling, toilet water or other processes.

7.4. Protocols for Future Subsurface Activities

Prior to the initiation of future subsurface activities, the Project Developer should review available historic information, Table 1 and Figure 6 of the EIMP for the planned construction area to identify potential COPCs and LUCs and prepare a PISEC in accordance with Section 5.8. Should the area be located in a known area of contamination, the Project Developer will notify the applicable regulatory agencies of the proposed subsurface activities and will comply with existing LUCs.

Health and safety procedures, as described in Section 6.2, will be followed for all individuals engaged in activities that disturb subsurface soil (e.g., utility repairs, work on building foundations, changes to paved areas, and changes to landscaping and unpaved recreational areas) within the Premises. Such work will follow the soil handling and other protocols discussed in Section 6.10 unless a future evaluation results in regulatory agency approval of alternate procedures. Utility clearances will be conducted prior to any subsurface drilling.

NASA, Master Lessee, and tenants within the Premises will require each contractor with workers that may contact Site groundwater or disturb Site soil to prepare its own site-specific H&SP, as described in Section 6.2. The requirement for preparation of a site-specific H&SP also applies to activities involving work in utility vaults or other subgrade areas (e.g., utility maintenance or modifications in subfloor areas of buildings) where potential exposure to accumulated VOC vapors may occur. Each H&SP will be consistent with State, Federal, and any other applicable health and safety standards and regulations. Among other things, a contractor's H&SP will include a description of health and safety training requirements for on-site personnel, a description of the level of personal protective equipment to be used, air monitoring requirements, confined space entry procedures, if applicable (e.g., work in utility vaults), and any other applicable precautions to be undertaken to minimize direct contact with soil and groundwater or exposure to COPC vapors. Workers will have the appropriate level of health and safety training and will use the appropriate level of personal protective equipment, as determined in the relevant H&SP.

7.5. Vapor Intrusion Monitoring

Periodic monitoring and verification of the adequacy of vapor intrusion mitigation measures may be necessary depending on the specific measures implemented, as described in Section 5.3.4. In addition, regular inspections of system components, such as blowers in SSD systems, shall be conducted to ensure their proper operation. Master Lessee shall review all vapor intrusion monitoring reports prepared by the Navy and the MEW Companies.

If work on utility lines or subfloor areas will occur in buildings that have implemented vapor mitigation measures as described in Section 5.3.2, cracks in the concrete floor and around utility penetrations shall be sealed. In addition, if a vapor intrusion barrier has been installed, work shall be completed in a manner that does not tear, penetrate, or otherwise compromise the vapor intrusion barrier. If penetration of the vapor barrier is unavoidable or occurs inadvertently, measures shall be taken to reseal the vapor barrier.

7.6. Compliance with LUCs and Implemented Remedies

Master Lessee shall ensure future development is conducted in compliance with LUCs within the Premises. Master Lessee shall participate in future discussions between the applicable regulatory agencies and the Responsible Parties regarding future LUCs within the Premises.

Specific sites with LUCs located within the Premises area include the following LUCs, as identified in the Water Board closure documents.

The LUCs for portions of the NEX Service Station:

- No residential land use;
- No grading excavation, or subsurface activities without a soil management plan;
- Notify Water Board in writing of proposed changes in future land or groundwater use; and
- Monitoring wells no longer in use must be destroyed.

The LUCs for the West-Side Aquifers Treatment System Area (IR Site 28) include:

- Semi-annual or annual groundwater monitoring, depending on the well (NASA responsibility); and
- Operation and maintenance of installed VI mitigation measures and indoor air monitoring within the Navy allocation area (Navy responsibility).

The implemented remedy at MEW Superfund Site within the Premises include:

- Operation and maintenance of the groundwater extraction system and associated conveyance piping (MEW Companies Responsibility);
- Semi-annual or annual groundwater monitoring, depending on the well (MEW Companies responsibility); and

- Operation and maintenance of installed VI mitigation measures and indoor air monitoring within the MEW Companies allocation area (MEW Companies responsibility).

Master Lessee will work with the U.S. EPA, Water Board, NASA, and the Responsible Party to develop LUCs for future Site remedies or implemented remedies for which LUCs have not yet been developed.

7.7. Long-Term Compliance: Periodic Review and Update of EIMP

Management measures will be implemented to ensure long-term compliance with this EIMP. The Master Lessee and NASA shall maintain documentation of notification of the known environmental conditions within the Premises and of the requirements of this EIMP to the property manager, and tenants and other entities leasing or otherwise exercising control over space within the Premises as described in Section 7. Property managers, tenants, or others exercising control over space within the Premises will inform their construction contractors and maintenance workers about the EIMP, as needed, to ensure compliance.

To the extent that subsurface work is conducted, documentation shall be maintained to show that the protocols for the subsurface activities described in Section 7.4 were followed as required by the EIMP.

The Master Lessee will review and evaluate ongoing environmental monitoring data to determine if there are any relevant changes in environmental conditions within the Premises that may require modification of the EIMP.

This EIMP, and any addenda, will be periodically reviewed by the Master Lessee as necessary to address new COPCs encountered within the Premises and not addressed in the existing EIMP, any newly available toxicological data and/or screening levels relating to COPCs, or any relevant changes in land use from the planned land use on which this EIMP is based. Updates to the EIMP and any addenda will be reviewed by NASA and submitted to the U.S. EPA and Water Board for approval. If necessary, updates to the EIMP may be communicated with the Responsible Parties.

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Table 1
Summary of Environmental Conditions
Berkeley Space Center, Former NAS Moffett Field, Mountain View, California

Area (a)	ID (b)	COCs (c)	Regulatory Status	LUCs (d)(e)	OM&M (e)	Potential Environmental Concerns	EIMP Approach (e)
Parcel 3	Tank 86A (gasoline)	Petroleum hydrocarbons BTEX compounds	NFA	None	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP.
Parcel 3	Tank 86B (diesel)	Petroleum hydrocarbons	NFA	None	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP.
Parcel 3	Tank 110 (diesel)	Petroleum hydrocarbons	NFA	None	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP.
Parcel 5A/5B	Tanks 108 & 109 and Sump 41B (lubricating oil, transmission fluid, floor drain waste)	Petroleum hydrocarbons BTEX compounds Metals	NFA	1. Notify Water Board of proposed changes in future land or groundwater use.	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work implement procedures in the EIMP.
Parcel 5A/5B	Tanks 33 through 40 at Building 503--Former NEX Station	Petroleum hydrocarbons BTEX compounds	NFA	1. Notify Water Board of proposed changes in future land or groundwater use.	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. An environmental professional should perform soil screening during subsurface work in accordance with EIMP. 2. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP. 3. Manage dewatering water in accordance with EIMP.
Parcel 5A/5B	Former Hydraulic Lift Systems, Waste Oil Drainage Line, and Clarifier at Building 503--Former NEX Station	Petroleum hydrocarbons BTEX compounds	NFA	1. No residential land use. 2. No grading excavation, or subsurface activities without a soil management plan approved by Water Board. 3. Notify Water Board in writing of proposed changes in future land or groundwater use. 4. Monitoring wells no longer in use must be destroyed.	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. An environmental professional should perform soil screening during subsurface work in accordance with EIMP. 2. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP. 3. Manage dewatering water in accordance with EIMP.
Parcel 5A/5B	Tank 67 (IR Site 14-North) (fuel oil)	Petroleum hydrocarbons BTEX compounds	NFA	None	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP.
Parcel 5A/5B	Tank 68 and Sump 91 (IR Site 14-North)--Former dry cleaner (solvents)	VOCs (solvents)	Open, considered part of IR Site 28	None	None	1. Unknown contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work implement procedures in EIMP.
Parcel 5A/5B	Sump 25 (IR Site 15) (wash rack sump)	Petroleum hydrocarbons BTEX compounds	NFA	1. Notify Water Board of proposed changes in future land or groundwater use.	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP.
Parcel 5A/5B	Sump 42 (IR Site 15) (vapor condensation sump)	Petroleum hydrocarbons BTEX compounds	NFA	1. Notify Water Board of proposed changes in future land or groundwater use.	None	1. Petroleum hydrocarbon contamination in soil could be encountered during subsurface work.	1. An environmental professional should perform soil screening during subsurface work in accordance with EIMP. 2. If stained or odorous soil is encountered during subsurface work, follow procedures in EIMP. 3. Manage dewatering water in accordance with EIMP.
Parcel 5A/5B	Tank 66 (IR Site 18)	VOCs (solvents)	Open, considered part of IR Site 28	None	None	1. Because of known solvent impacts, soil with COCs could be encountered during subsurface work. 2. Vapor intrusion if VOCs are present beneath building. 3. Because of known solvent impacts to groundwater, dewatering water will have to be managed appropriately.	1. An environmental professional should perform soil screening during subsurface work in accordance with EIMP. 2. If stained or odorous soil is encountered during subsurface work implement procedures in the EIMP. 3. If development is proposed over the known groundwater plume, sample soil gas and assess if VI mitigation is needed. 4. Manage dewatering water in accordance with EIMP. 5. Allow access to the Navy, NASA, regulatory agencies, and other entities responsible for the remediation and monitoring of contamination in this area.
All UCB Parcels	MEW Plume	Chlorinated organics	Open	1. Potential development subject to the MEW ROD Amendment for the Vapor Intrusion Pathway. 2. Potential development subject to NASA Ames Development Plan, the Environmental Impact Statement, and Ames Procedural Requirements 8500.1.	1. Semi-annual, annual, and/or biennial groundwater monitoring depending on the well. 2. Operations and maintenance of the MEW GWTS. 3. Operations and maintenance of installed VI mitigation within the MEW Companies allocation area.	1. Because of known solvent impacts, soil with COCs could be encountered during subsurface work. 2. Vapor intrusion if VOCs are present beneath building. 3. Because of known solvent impacts to groundwater, dewatering water will have to be managed appropriately.	1. An environmental professional should perform soil screening during subsurface work in accordance with EIMP. 2. If stained or odorous soil is encountered during subsurface work implement procedures in the EIMP. 3. Incorporate mitigation system into new buildings in accordance with the MEW ROD Amendment for the Vapor Intrusion Pathway. 4. Manage dewatering water in accordance with EIMP. 5. Allow access to the Navy, NASA, regulatory agencies, and other entities responsible for the remediation and monitoring of contamination in this area.

Table 1
Summary of Environmental Conditions
Berkeley Space Center, Former NAS Moffett Field, Mountain View, California

Area (a)	ID (b)	COCs (c)	Regulatory Status	LUCs (d)(e)	OM&M (e)	Potential Environmental Concerns	EIMP Approach (e)
All UCB Parcels	PFAS Plume	PFAS	Open	None	None	1. Because of known PFAS impacts to groundwater, dewatering water will have to be managed appropriately.	1. Manage dewatering water in accordance with EIMP. 2. Allow access to the Navy, NASA, regulatory agencies, and other entities responsible for the remediation and monitoring of contamination in this area.
Parcel 5A/5B	IR Site 28 (WATS Area including traffic island and Building 88)	Petroleum Hydrocarbons, BTEX comounds, Chlorinated organics	Open	1. Potential development subject to the MEW ROD Amendment for the Vapor Intrusion Pathway. 2. Potential development subject to NASA Ames Development Plan, the Environmental Impact Statement, and Ames Procedural Requirements 8500.1.	1. Semi-annual, annual, and/or biennial groundwater monitoring depending on the well. 2. Operations and maintenance of the WATS. 3. Sampling of the WATS effluent in accordance with the NPDES permit. 4. Operations and maintenance of installed VI mitigation measures and quarterly indoor air monitoring within the Navy allocation area.	1. Because of known solvent impacts, soil with COCs could be encountered during subsurface work. 2. Vapor intrusion if VOCs are present beneath building. 3. Because of known solvent impacts to groundwater, dewatering water will have to be managed appropriately.	1. An environmental professional should perform soil screening during subsurface work in accordance with EIMP. 2. If stained or odorous soil is encountered during subsurface work implement procedures in the EIMP. 3. Incorporate mitigation system into new buildings in accordance with the MEW ROD Amendment for the Vapor Intrusion Pathway. 4. Manage dewatering water in accordance with EIMP. 5. Allow access to the Navy, NASA, regulatory agencies, and other entities responsible for the remediation and monitoring of contamination in this area.

Abbreviations:

AST = aboveground storage tank
BTEX - benzene, toluene, ethylbenzene, and xylenes
COC = chemical of concern
EIMP = Environmental Issues Management Plan
IR = Installation Restoration
LUC = land use restrictions and institutional controls
MEW = Middlefield-Ellis-Whisman

MOA = Memorandum of Agreement
NASA = National Aeronautics and Space Administration
NFA = no further action
NPDES = National Pollutant Discharge Elimination System
OM&M = operation, maintenance, and monitoring
PAHs = polycyclic aromatic hydrocarbons
PFAS = per- and polyfluoroalkyl substances

ROD = Record of Decision
Water Board = Regional Water Quality Control Board, San Francisco Bay Region
UST = underground storage tank
VI = vapor intrusion
VOCs = volatile organic compounds (includes BTEX compounds, chlorinated organics, and other solvents such as acetone)
WATS = West-side Aquifers Treatment System

Notes:

- (a) Area refers to the approximate location at the Berkeley Space Center based. Figure 6 depicts the identified Areas.
- (b) See Section 2 of the EIMP for additional information regarding each of the sites identified in this table.
- (c) Where analytical data were available, COCs are listed. In the absence of analytical data, potential COCs were identified based on site use history.
- (d) This Table 1 summarizes site-specific LUCs which are in addition to the LUCs imposed by the NASA Ames Development Plan, Final Programmatic Environmental Impact Statement, NASA Ames Research Center, by Design, Community, and Environment, July 2002.
- (e) NASA, Master Lessee, Project Developers, contractors, tenants, and other entities engaged in activities that disturb subsurface soil or impacted groundwater within the Berkeley Space Center should not rely on the information in this column. Prior to engaging, parties should review the EIMP as well as site-specific regulatory documents, and other available information, to identify LUCs that must be complied with, OMM activities, and other procedures and requirements (e.g., Health and Safety) that should be implemented.

Table 2
Soil Target Concentration Levels for Soil Reuse

Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Soil (mg/kg)						
	RWQCB ESLs Residential (b)	RWQCB ESLs Commercial/Industrial (b)	U.S. EPA RSLs Residential (c)	U.S. EPA RSLs Commercial/Industrial (c)	Background Concentration (d)	Residential TCL (e)	Commercial/Industrial TCL (e)
Chlorinated Volatile Organic Compounds							
Chloroform	0.32	1.4	0.32	1.4	--	0.32	1.4
1,2-Dichloroethane	0.46	2	0.46	2	--	0.46	2
1,1-Dichloroethene	4.8	20	83	350	--	4.8	20
cis-1,2-Dichloroethene	63	360	18	84	--	18	84
trans-1,2-Dichloroethene	70	300	130	600	--	70	300
Methylene chloride	2.2	26	2.2	26	--	2.2	26
Tetrachloroethene (PCE)	0.59	2.6	0.59	2.7	--	0.59	2.6
Trichloroethene (TCE)	0.94	5.9	0.94	6	--	0.94	5.9
Vinyl chloride	0.0082	0.14	0.0082	0.15	--	0.0082	0.14
Methyl tertiary butyl ether (MTBE)	47	200	47	210	--	47	200
Petroleum Hydrocarbons and BTEX							
TPH purgeable as gasoline	460	2,100	--	--	--	460	2100
TPH extractable as diesel	200	920	--	--	--	200	920
TPH extractable as motor oil	12,000	180,000	--	--	--	12,000	180,000
TPH extractable as jet fuel	250	1,300	--	--	--	250	1300
Benzene	0.33	1.4	0.33	1.4	--	0.33	1.4
Toluene	1,400	7,100	1,100 (f)	5,300 (f)	--	1,100 (f)	5,300 (f)
Ethylbenzene	5.8	25	5.8	25	--	5.8	25
Xylenes	580	2,400	580	2,500	--	580	2400
Polynuclear Aromatic Hydrocarbons							
Benzo[a]anthracene	1.1	20	1.1	12	--	1.1	12
Benzo[a]pyrene	0.11	2.1	0.11	1.3	--	0.11	1.3
Benzo[b]fluoranthene	1.1	21	1.1	13	--	1.1	13
Benzo[k]fluoranthene	11	210	11	130	--	11	130
Chrysene	110	2,100	110	1,300	--	110	1,300
Naphthalene	2	8.5	2	8.6	--	2	8.5

Table 2
Soil Target Concentration Levels for Soil Reuse

Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Soil (mg/kg)						
	RWQCB ESLs Residential (b)	RWQCB ESLs Commercial/Industrial (b)	U.S. EPA RSLs Residential (c)	U.S. EPA RSLs Commercial/Industrial (c)	Background Concentration (d)	Residential TCL (e)	Commercial/Industrial TCL (e)
Per- and Polyfluoroalkyl Substances							
Perfluorobutanesulfonic acid (PFBS)	19	250	19	250	--	19	250
Perfluorobutanoic acid (PFBA)	78	1,200	78	1,200	--	78	1,200
Perfluorohexanesulfonic acid (PFHxS)	1.3	16	1.3	16	--	1.3	16
Perfluorooctanesulfonic acid (PFOS)	0.0063	0.058	0.0063	0.058	--	0.00630	0.05800
Perfluorooctanoic acid (PFOA)	0.000019	0.000078	0.000019	0.000078	--	0.000019	0.000078
Semivolatile Organic Compounds							
Pentachlorophenol	1	4	1	2	--	1	2
bis(2-Ethylhexyl)phthalate	39	160	39	110	--	39	110
PCBs							
Polychlorinated Biphenyls	0.23	0.94	0.23 (g)	0.58 (g)	--	1.0 (h)	1.0 (h)
Metals							
Antimony (i)	31	470	31	470	--	31	470
Arsenic	0.032	0.14	0.11	0.36	20	20	20
Barium (i)	150,000	220,000	150,000	220,000	--	150,000	220,000
Beryllium (i)	16	230	1,600	6,900	3.2	16	230
Cadmium and compounds	7.1	100	7.1	79	14	14	79
Chromium VI	0.30	6.2	0.30	6.2	--	0.30	6.2
Total Chromium	160 (j)	160 (j)	--	--	170	170	170
Cobalt (i)	23	350	23	350	--	23	350
Copper (i)	3,100	47,000	3,100	47,000	67	3,100	47,000
Lead	80	500	80	500	54	80	500
Mercury	0.67	2.9	1	4.4 (f)	1.3	1.3	2.9
Molybdenum (i)	390	5,800	390	5,800	--	390	5,800
Nickel (i)	820	11,000	820	11,000	145	820	11,000
Selenium (i)	390	5,800	390	5,800	4	390	5,800
Silver (i)	390	5,800	390	5,800	4.8	390	5,800

Table 2
Soil Target Concentration Levels for Soil Reuse

Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Soil (mg/kg)						
	RWQCB ESLs Residential (b)	RWQCB ESLs Commercial/Industrial (b)	U.S. EPA RSLs Residential (c)	U.S. EPA RSLs Commercial/Industrial (c)	Background Concentration (d)	Residential TCL (e)	Commercial/Industrial TCL (e)
Thallium	0.78	12	0.78	12	3.8	3.8	12
Vanadium (i)	390	5,800	390	5,800	--	390	5,800
Zinc (i)	23,000	350,000	23,000	350,000	120	23,000	350,000

Notes

- (a) List of chemicals of potential concern is provided in the NRP EIMP (EKI, 2005) except for MTBE and naphthalene, which were detected in soil after publication of the 2005 NRP EIMP.
- (b) Soil screening levels from the Summary of Soil ESLs table (RWQCB, 2025). The lowest value was selected from the following columns: Direct Exposure Human Health Risk Levels and Odor Nuisance Levels; Leaching to Groundwater where Groundwater is a Potential Drinking Water Resource; and Gross Contamination Levels.
- (c) RSLs from U.S. EPA's Regional Screening Level (RSL) Soil Tables (TR=1E-6, HQ=1) (November 2024) for residents and commercial workers as modified by Cal-EPA Human and Ecological Risk Office (HERO) Note 3, May 2022 (Cal-EPA, 2022).
- (d) Background metal concentrations are the maximum concentrations presented in Scott (1995).
- (e) With the exception of the TCL for PCBs, the selected TCL is the lower of the ESL and RSL. For metals, if the lowest of the ESL and RSL is less than background levels, the background level was selected as the TCL.
- (f) The indicated values are in excess of the soil saturation concentration (Cal-EPA, 2022).
- (g) The values listed are for the HERO Note 3 values for total PCBs.
- (h) Value is from TSCA (USC Title 15, Section 2601 et. seq. and 40 CFR 761.1 et. seq.).
- (i) The indicated metal is not a chemical of concern for the Berkeley Space Center.
- (j) The value presented is the Terrestrial Habitat Level ESL as there are no other ESLs for total chromium.

Table 2
Soil Target Concentration Levels for Soil Reuse

Berkeley Space Center
Former NAS Moffett Field, California

Abbreviations

-- = not applicable or not available

BTEX = benzene, toluene, ethylbenzene, xylene

CFR = Code of Federal Regulations

EIMP = Environmental Issues Management Plan

ESL = environmental screening level

HERO = Human and Ecological Risk Office

mg/kg = milligrams per kilogram of soil

MTBE = methyl tertiary butyl ether

NASA = National Aeronautics and Space Administration

NRP = NASA Research Park

PCBs = polychlorinated biphenyls

PCE = tetrachloroethene

RSL = regional screening level

RWQCB = Regional Water Quality Control Board, San Francisco Bay Region

TCE = trichloroethene

TCL = target concentration level

TPH = total petroleum hydrocarbons

TSCA = Toxic Substances Control Act

USC = United States Code

U.S. EPA = United States Environmental Protection Agency

References

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EKI, 2005. *Environmental Issues Management Plan, NASA Research Park, Santa Clara County, California*. Erler & Kaliniowski, Inc. 1 March 2005.

RWQCB, 2025. *Environmental Screening Levels (Revision 3)*, September 2025. California Regional Water Quality Control Board, San Francisco Bay Region.

Scott, C.M. 1995. *Background Metal Concentrations in Soils in Northern Santa Clara County, California* in: Recent Geological Studies in the San Francisco Bay Area, Pacific Section of the Society of Economic Paleontologists and Mineralogists, Volume 76.

U.S. EPA, 2024. *Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1)*. November 2024.

Table 3
Groundwater Target Concentration Levels

Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Groundwater (ug/L)							
	MEW ROD (b)	California MCL (c)	RWQCB GW VI ESLs (d)	RWQCB GW VI ESLs (d)	RWQCB GW ESLs (e)	U.S. EPA RSLs Tap Water	Residential TCL (f)	Commercial/ Industrial TCL (f)
			Residential	Commercial				
Chlorinated Volatile Organic Compounds								
Chloroethane	--	--	9,200	39,000	16	8,300	16	16
Chloroform	100	80 (g)	0.81	3.6	80	0.22	100	100
1,1-Dichloroethane	--	5	7.6	33	5	2.8	5	5
1,2-Dichloroethane	--	0.5	2.2	9.8	0.5	0.17	0.5	0.5
1,1-Dichloroethene	6	6	3.9	16	6	8.2	6	6
cis-1,2-Dichloroethene	--	6	250	1,100	6	25	6	6
trans-1,2-Dichloroethene	--	10	110	460	10	68	10	10
1,4-Dioxane	--	--	2,900	12,000	2,900	0.46	0.46	0.46
Trichlorotrifluoroethane (Freon 113)	--	1,200	--	--	--	--	1,200	1,200
Methylene chloride	--	5	7.6	92	5	11	5	5
Tetrachloroethene (PCE)	--	5	0.64	2.8	5	11	5	5
1,1,1-Trichloroethane	200	200	1,500	6,200	200	8,000	200	200
Trichloroethene (TCE)	5	5	1.2	7.4	5	0.49	5	5
Vinyl chloride	0.5	0.5	0.0083	0.14	0.5	0.019	0.5	0.5
Methyl tertiary butyl ether (MTBE)	--	13	450	2,000	5	14	13	13
Petroleum Hydrocarbons and BTEX								
TPH purgeable as gasoline	--	--	--	--	100	--	100	100
TPH extractable as diesel	--	--	--	--	100	--	100	100
TPH extractable as motor oil	--	--	--	--	(h)	--	(h)	(h)
TPH extractable as jet fuel	--	--	--	--	100	--	100	100
Benzene	--	1	0.43	1.9	1	0.46	1	1
Toluene	--	150	1,600	6,800	150	1,100	150	150
Ethylbenzene	--	300	3.5	15	300	1.5	300	300
Xylenes	--	1,750	380	1,600	1,800	190	1,750	1,750

Table 3
Groundwater Target Concentration Levels

Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Groundwater (ug/L)							
	MEW ROD (b)	California MCL (c)	RWQCB GW VI ESLs (d)	RWQCB GW VI ESLs (d)	RWQCB GW ESLs (e)	U.S. EPA RSLs Tap Water	Residential TCL (f)	Commercial/ Industrial TCL (f)
			Residential	Commercial				
Polynuclear Aromatic Hydrocarbons								
Naphthalene	--	--	4.6	20	21	0.12	0.12	0.12
Per- and Polyfluoroalkyl Substances								
Hexafluoropropylene oxide dimer acid (HFPO-DA)	--	0.01 (i)	--	--	(i)	0.015	0.01 (i)	0.01 (i)
Perfluorobutanesulfonic acid (PFBS)	--	(i)	--	--	(i)	6.0	6.0	6.0
Perfluorobutanoic acid (PFBA)	--	--	--	--	50,000	18	18	18
Perfluorodecanoic acid (PFDA)	--	--	--	--	50,000	0.000040	0.000040	0.000040
Perfluorododecanoic acid (PFDoDA)	--	--	--	--	41,000	1.0	1.0	1.0
Perfluoroheptanoic acid (PFHpA)	--	--	--	--	50,000	--	50,000	50,000
Perfluorohexanesulfonic acid (PFHxS)	--	0.01 (i)	--	--	(i)	0.39	0.01 (i)	0.01
Perfluorohexanoic acid (PFHxA)	--	--	--	--	50,000	9.9	9.9	9.9
Perfluorononanoic acid (PFNA)	--	0.01 (i)	--	--	(i)	0.059	0.01 (i)	0.01 (i)
Perfluorooctadecanoic acid (PFODA)	--	--	--	--	2.4	800	2.4	2.4
Perfluorooctanesulfonic acid (PFOS)	--	0.004 (i)	--	--	0.004	0.0020	0.004	0.004
Perfluorooctanoic acid (PFOA)	--	0.004 (i)	--	--	0.004	0.0000027	0.004	0.004
Perfluoropentanoic acid (PFPeA)	--	--	--	--	50,000	--	50,000	50,000
Perfluoropropanoic acid (PFPrA)	--	--	--	--	50,000	9.8	9.8	9.8
Perfluorotetradecanoic acid (PFTeDA)	--	--	--	--	150	20	20	20
Perfluoroundecanoic acid (PFUDA)	--	--	--	--	46,000	6.0	6.0	6.0

Table 3
Groundwater Target Concentration Levels

Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Groundwater (ug/L)						
	MEW ROD (b)	California MCL (c)	RWQCB GW VI ESLs (d)	RWQCB GW VI ESLs (d)	RWQCB GW ESLs (e)	U.S. EPA RSLs Tap Water	Residential TCL (f)
			Residential	Commercial			Commercial/ Industrial TCL (f)

Notes

- (a) List of chemicals of potential concern is provided in the 2005 NRP EIMP (EKI, 2005) except for MTBE and naphthalene, which were detected in soil after publication of the 2005 NRP EIMP, and TPH compounds, which are chemicals of concern for the former Naval Exchange Gasoline Service Station.
- (b) MEW ROD Cleanup Levels are from the Record of Decision for the MEW Study Area (EPA, 1989) and represent the lower of Federal or California MCLs at the time the ROD was adopted.
- (c) California MCLs are from Title 22 California Code of Regulations Sections 64431, 64672.3, and 64444 (SWRCB, 2024).
- (d) Groundwater Vapor Intrusion Human Health Risk Levels from the Summary of Groundwater ESLs table (RWQCB, 2025).
- (e) Groundwater screening levels from the Summary of Groundwater ESLs table (RWQCB, 2025). The lowest of the MCL, Gross Contamination, or Odor Nuisance Levels under a Drinking Water scenario was chosen. In the absence of a MCL, the lowest of the Direct Exposure Human Health Risk Levels Human Health Risk Levels was compared to the Gross Contamination and Odor Nuisance Levels. Because the purpose of the groundwater TCLs are to determine the appropriate management option for dewatering water generated during Site development activities, the screening of dewatering water against Aquatic Habitat Goals was not considered appropriate.
- (f) The selected TCL is the MEW ROD Cleanup Level, where available. Where MEW ROD Cleanup Levels are not available, the selected TCL is the California MCL or the lower of the RWQCB ESLs or U.S. EPA RSLs where a California MCL is not available.
- (g) The value presented is for total trihalomethanes.
- (h) According to a footnote in the Summary of Groundwater ESLs table (RWQCB, 2025), motor oil range petroleum hydrocarbons have negligible solubility and detections in this range are typically from petroleum hydrocarbon oxidation products, nonaqueous phase liquids, contaminated sediments entrained in the water sample, or naturally occurring compounds. When TPH in the motor oil range is detected in groundwater, the RWQCB recommends reviewing the chromatograms to help determine the nature of the compounds being detected.
- (i) Federal MCLs (U.S. EPA, 2024a) are shown for per- and polyfluoroalkyl substances since California MCLs are not available. For PFBS and PFHxS, a Hazard Index of 1 is set as the Federal MCL. The Hazard Index is calculated using the equation below; for non-detect values, a value of 0 ng/L is used in the Hazard Index equation. The Hazard Index equation is also used for RWQCB groundwater ESLs.

$$\text{Hazard Index (HI)} = \frac{[\text{GenX}](\frac{\text{ng}}{\text{L}})}{10} + \frac{[\text{PFBS}](\frac{\text{ng}}{\text{L}})}{2000} + \frac{[\text{PFNA}](\frac{\text{ng}}{\text{L}})}{10} + \frac{[\text{PFHxS}](\frac{\text{ng}}{\text{L}})}{10} \quad (\text{U.S. EPA, 2024a})$$

Table 3
Groundwater Target Concentration Levels

Berkeley Space Center
Former NAS Moffett Field, California

Abbreviations

-- = not applicable or not available

BTEX = benzene, toluene, ethylbenzene, xylene

EIMP = Environmental Issues Management Plan

ESL = environmental screening level

GW = groundwater

MCL = maximum contaminant level

MEW = Middlefield-Ellis-Whisman

MTBE = methyl tertiary butyl ether

NASA = National Aeronautics and Space Administration

NRP = NASA Research Park

RSL = regional screening level

RWQCB = Regional Water Quality Control Board, San Francisco Bay Region

SWRCB = California State Water Resources Control Board

TCL = target concentration level

TPH = total petroleum hydrocarbons

ug/L = micrograms per liter

U.S. EPA = United States Environmental Protection Agency

VI = vapor intrusion

References

RWQCB, 2025. *Environmental Screening Levels (Revision 3)*. California Regional Water Quality Control Board, San Francisco Bay Region, September 2025.

SWRCB, 2024. *MCLs, DLRs, and PHGs for Regulated Drinking Water Contaminants*. California State Water Resources Control Board, November 2024

U.S. EPA, 2024a. *PFAS National Primary Drinking Water Regulation*. April 2024.

U.S. EPA, 2024b. *Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1)*. November 2024.

Table 4
Soil Vapor and Indoor Air Target Concentration Levels
Berkeley Space Center
Former NAS Moffett Field, California

Chemical of Potential Concern (a)	Concentration in Indoor Air or Soil Gas/Sub-Slab Vapor (ug/m ³)															
	Indoor Air						Soil Gas/Sub-Slab Vapor						Indoor Air TCLs (g)		Soil Gas/Sub-Slab Vapor TCLs (h)	
	MEW 2010 VI ROD (b)	MEW 2010 VI ROD (b)	U.S. EPA RSLs (c)	U.S. EPA RSLs (c)	RWQCB ESLs (d)	RWQCB ESLs (d)	MEW 2010 VI ROD (b)	MEW 2010 VI ROD (b)	U.S. EPA RSLs (e)	U.S. EPA RSLs (e)	RWQCB ESLs (f)	RWQCB ESLs (f)				
	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial
Chlorinated Volatile Organic Compounds (VOCs)																
Chloroethane	--	--	4,200	18,000	4,200	18,000	--	--	140,000	600,000	140,000	580,000	4,200	18,000	140,000	580,000
Chloroform	0.1	0.4	0.12	0.53	0.12	0.53	3.3	13	4.0	18	4.1	18	0.1	0.4	3.3	13
1,1-Dichloroethane	2	6	1.8	7.7	1.8	7.7	67	200	60	260	58	260	2	6	67	200
1,2-Dichloroethane	--	--	0.11	0.47	0.11	0.47	--	--	3.7	16	3.6	16	0.11	0.47	3.6	16
1,1-Dichloroethene	210	700	73	310	4.1	17	7,000	23,000	2,400	10,000	140	580	210	700	7,000	23,000
cis-1,2-Dichloroethene	60	210	8.3	35	42	180	2,000	7,000	280	1,200	1,400	5,800	60	210	2,000	7,000
trans-1,2-Dichloroethene	60	210	83	350	42	180	2,000	7,000	2,800	12,000	1,400	5,800	60	210	2,000	7,000
1,4-Dioxane	--	--	0.56	2.5	0.56	2.5	--	--	19	83	19	82	0.56	2.5	19	82
Trichlorotrifluoroethane (Freon 113)	31,000	100,000	--	--	--	--	1,000,000	3,300,000	--	--	--	--	31,000	100,000	1,000,000	3,300,000
Methylene chloride	--	--	1.0	12	1.0	12	--	--	33	400	34	410	1.0	12	33	400
1,1,1-Trichloroethane	5,200	18,000	1,000	4,400	1,000	4,400	170,000	600,000	33,333	150,000	35,000	150,000	5,200	18,000	170,000	600,000
Tetrachloroethene (PCE)	0.4	2	0.46	2.0	0.46	2.0	13	67	15	67	15	67	0.4	2	13	67
Trichloroethene (TCE)	1	5	0.48	3.0	0.48	3.0	33	170	16	100	16	100	1 (i)	5 (i)	33	170
Vinyl chloride	0.2	2	0.0095	0.16	0.0095	0.16	6.7	67	0.32	5.3	0.32	5.2	0.2	2	6.7	67
Methyl tertiary butyl ether (MTBE)	--	--	11	47	11	47	--	--	370	1,600	360	1,600	11	47	360	1,600
Petroleum Hydrocarbons and BTEX																
TPH purgeable as gasoline	--	--	--	--	100	100	--	--	--	--	3,300	3,300	100	100	3,300	3,300
TPH extractable as diesel	--	--	--	--	200	850	--	--	--	--	6,800	28,000	200	850	6,800	28,000
TPH extractable as motor oil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TPH extractable as jet fuel	--	--	--	--	310	1,000	--	--	--	--	10,000	33,000	310	1,000	10,000	33,000
Benzene	--	--	0.097	0.42	0.097	0.42	--	--	3.2	14	3.2	14	0.097	0.42	3.2	14
Toluene	--	--	310	1,300	440	1,800	--	--	10,000	43,000	15,000	61,000	310	1,300	10,000	43,000
Ethylbenzene	--	--	1.1	4.9	1.1	4.9	--	--	37	160	37	160	1.1	4.9	37	160
Xylenes	--	--	100	440	100	440	--	--	3,300	15,000	3,500	15,000	100	440	3,300	15,000
Polynuclear Aromatic Hydrocarbons																
Naphthalene	--	--	0.083	0.36	0.083	0.36	--	--	2.8	12	2.8	12	0.083	0.36	2.8	12
Metals																
Mercury	--	--	0.031	1.3	0.031	0.13	--	--	1	43	1.0	4.4	0.031	0.13	1.0	4.4

Table 4
Soil Vapor and Indoor Air Target Concentration Levels
Berkeley Space Center
Former NAS Moffett Field, California

Notes

- (a) List of chemicals of potential concern is based on the MEW 2010 VI ROD Amendment and the volatile chemicals in soil and groundwater detected at the Site.
- (b) The MEW 2010 VI ROD Amendment (U.S. EPA, 2010) indoor air cleanup levels for residential and commercial buildings.
- (c) RSLs are from U.S. EPA's Regional Screening Level (RSL) Ambient Air Tables (TR=1E-6, HQ=1) for residents and composite workers (May 2025) as modified by Cal-EPA Human and Ecological Risk Office (HERO) Note 3, May 2022 (Cal-EPA, 2022).
- (d) Indoor air screening levels are from RWQCB (2025), Summary of Vapor ESLs. The lower value was chosen from the Direct Exposure Human Health Risk Levels and the Odor Nuisance Levels.
- (e) Sub-slab vapor screening levels calculated using the U.S. EPA's generic attenuation factor of approximately 33 (i.e., 1/0.03) between indoor air and sub-slab soil vapor (U.S. EPA, 2015).
- (f) Sub-slab vapor screening levels are from the Summary of Vapor ESLs table (RWQCB, 2025). The lower value was chosen from the Subslab/Soil Gas Vapor Intrusion Human Health Risk Levels and the Subslab/Soil Gas Vapor Intrusion Odor Nuisance Levels.
- (g) The selected TCL is the MEW 2010 VI ROD Level or the lower of the U.S EPA RSLs and the RWQCB ESLs where MEW 2010 VI ROD Level is not available.
- (h) Where MEW 2010 VI ROD Levels are available for indoor air, the sub-slab vapor TCL was calculated using the U.S. EPA's generic attenuation factor between indoor air and sub-slab soil vapor. For analytes without MEW 2010 VI ROD Levels, the lower of the EPA RSLs and RWQCB ESLs for Soil Gas/Sub-Slab Vapor was selected as the TCL.
- (i) On 9 July 2014, the U.S. EPA Region 9 issued interim indoor air response action levels for short-term exposures to trichloroethene. Under a Commercial/Industrial exposure scenario, the Accelerated Response Action Levels (HQ = 1) are 8 ug/m 7 ug/m³ and the Urgent Response Action Levels (HQ = 3) are 24 ug/m³ and 21 ug/m³ for 8-hour and 10-hour workdays, respectively. Under a Residential exposure scenario, the Accelerated Response and Urgent Response Action Levels are 2 ug/m³ and 6 ug/m³, respectively (U.S. EPA, 2014).

Abbreviations

-- = not applicable or not available	RSL = regional screening level
BTEX = benzene, toluene, ethylbenzene, xylene	RWQCB = Regional Water Quality Control Board, San Francisco Bay Region
ESL = environmental screening level	TCE = trichloroethene
HERO = Human and Ecological Risk Office	TCL = target concentration level
MEW = Middlefield-Ellis-Whisman	TPH = total petroleum hydrocarbons
MTBE = methyl tertiary butyl ether	ug/m ³ = micrograms per cubic meter of air
PCE = tetrachloroethene	U.S. EPA = United States Environmental Protection Agency
ROD = Record of Decision	VI = vapor intrusion

References

Cal-EPA, 2022. *HERO HHRA Note Number: 3, DTSC-modified Screening Levels (DTSC-SLs)*, California Department of Toxic Substances Control. May 2022.

RWQCB, 2025. *Environmental Screening Levels (Revision 3)*, September 2025. California Regional Water Quality Control Board, San Francisco Bay Region.

U.S. EPA, 2010. *Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW)* Superfund Study Area, Mountain View and Moffett Field, California, 16 August 2010.

U.S. EPA, 2014. *EPA Region 9 Response Action Levels and Recommendations to Address Near-Term Inhalation Exposures to TCE in Air from Subsurface Vapor Intrusion*. Memorandum from Enrique Manzanilla to Region 9 Superfund Division Staff and Management, U.S. EPA Region 9, dated 9 July 2014.

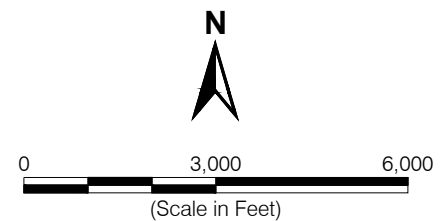
U.S. EPA, 2015. *OWSER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, 9200.2-154, June 2015.

U.S. EPA, 2024. *Regional Screening Level (RSL) Resident Composite Worker Ambient Air Tables (TR=1E-6, HQ=1)*. November 2024.



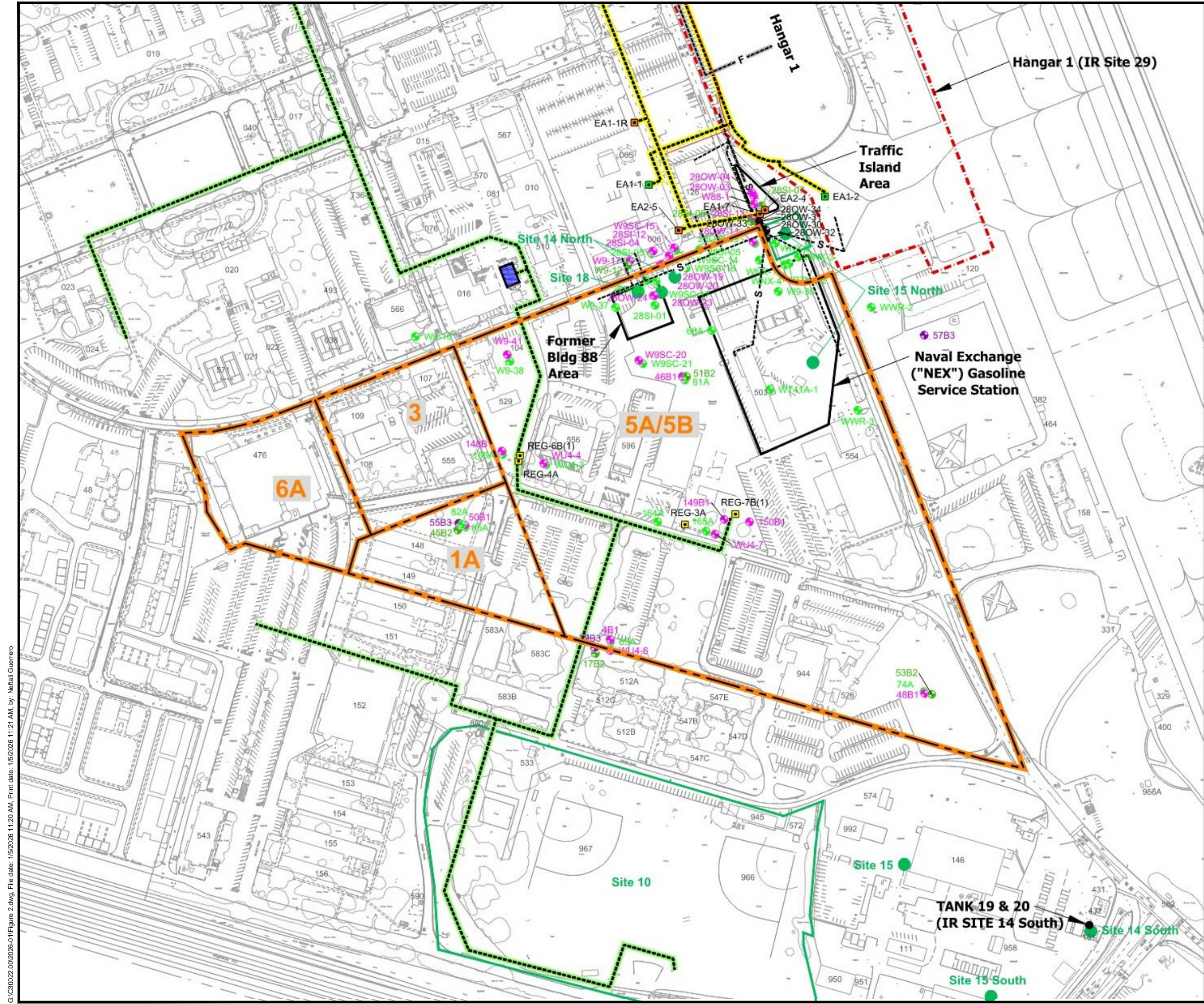
Notes:

1. All locations are approximate.
2. Basemap source: Google Earth Pro, date of imagery 2 August 2023.



Berkeley Space Center Location

\\C30022\00\2026-01\Figure 2.dwg, File date: 1/5/2026 11:20 AM, Print date: 1/5/2026 11:21 AM, by: Neil Guerrero



Legend:

- Parcels 1A, 3, 5A/5B, and 6A (UCB Leasehold)
- CERCLA Site
- 104 Building Number
- A1 Aquifer Monitoring Well
- A2/B1 Aquifer Monitoring Well
- B2 Aquifer Monitoring Well
- B3 Aquifer Monitoring Well
- MEW Recovery Well
- Navy Recovery Well
- New Navy Extraction Well (2023)
- New Navy Monitoring Well (2023)
- Treatment Facility Piping
- Navy WATS Treatment Facility Piping
- MEW GWTS Treatment Facility Piping
- Treatment Facility
- Underground Fuel Line
- Sanitary Sewer Line
- Section of the Sanitary Sewer Line that Reportedly Collapsed (PRC, 1995)

Abbreviations:

MEW = Middlefield-Ellis-Whisman

References:

PRC, 1995. *Final Operable Unit 2 – West (Building 88) Project Summary Report*, Moffett Federal Airfield, California, PRC Environmental Management, 9 October 1995.

Notes:

1. All locations are approximate.

0 250 500
(Scale in Feet)

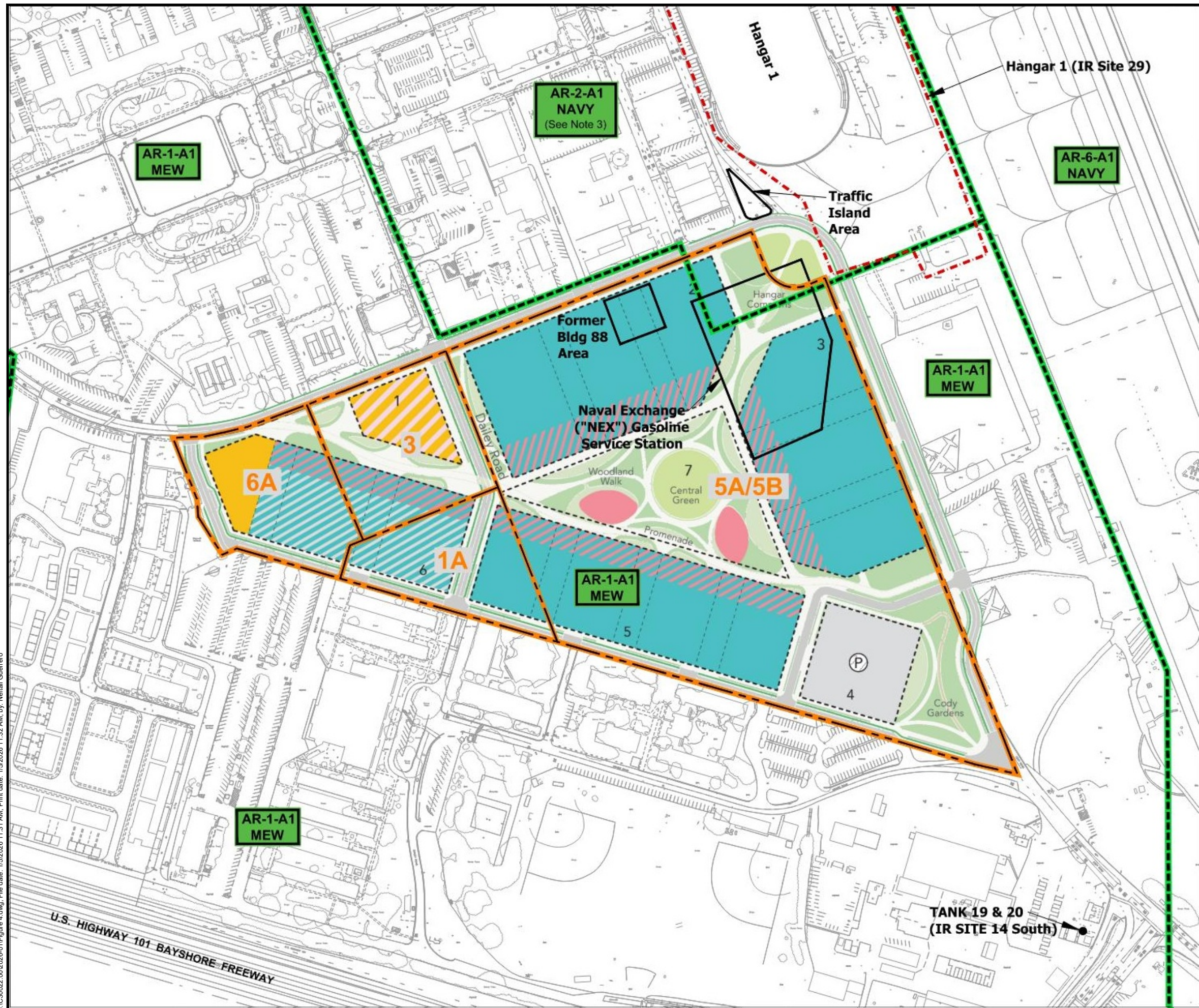
N

Locations of MEW and NAVY Monitoring Wells, Recovery Wells, and Treatment System Piping, Existing Site Layout

Berkeley Space Center
Mountain View, CA
Spring 2026
EKI C30022.00

Figure 2

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Legend:

- Parcels 1A, 3, 5A/5B, and 6A (UCB Leasehold)
- Area of Responsibility Boundary

**Allocation and Settlement Agreement
NASA/NAVY/MEW Companies**

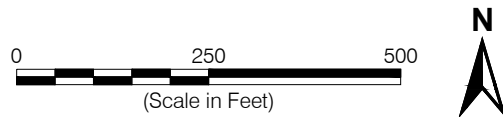
Location	Responsible Party/Contamination Type
AR-1-A1	MEW Companies: Chlorinated Solvents in Saturated Soil and Groundwater NAVY: TPH in Saturated Soil and Groundwater and all Vadose Zone Soil
AR-2-A1	NAVY: All Soil and Groundwater (See Note 3)
AR-6-A1	NAVY: All Soil and Groundwater

Abbreviations:

- MEW = Middlefield-Ellis-Whisman
- NASA = National Aeronautical and Space Administration
- TPH = Total petroleum Hydrocarbons

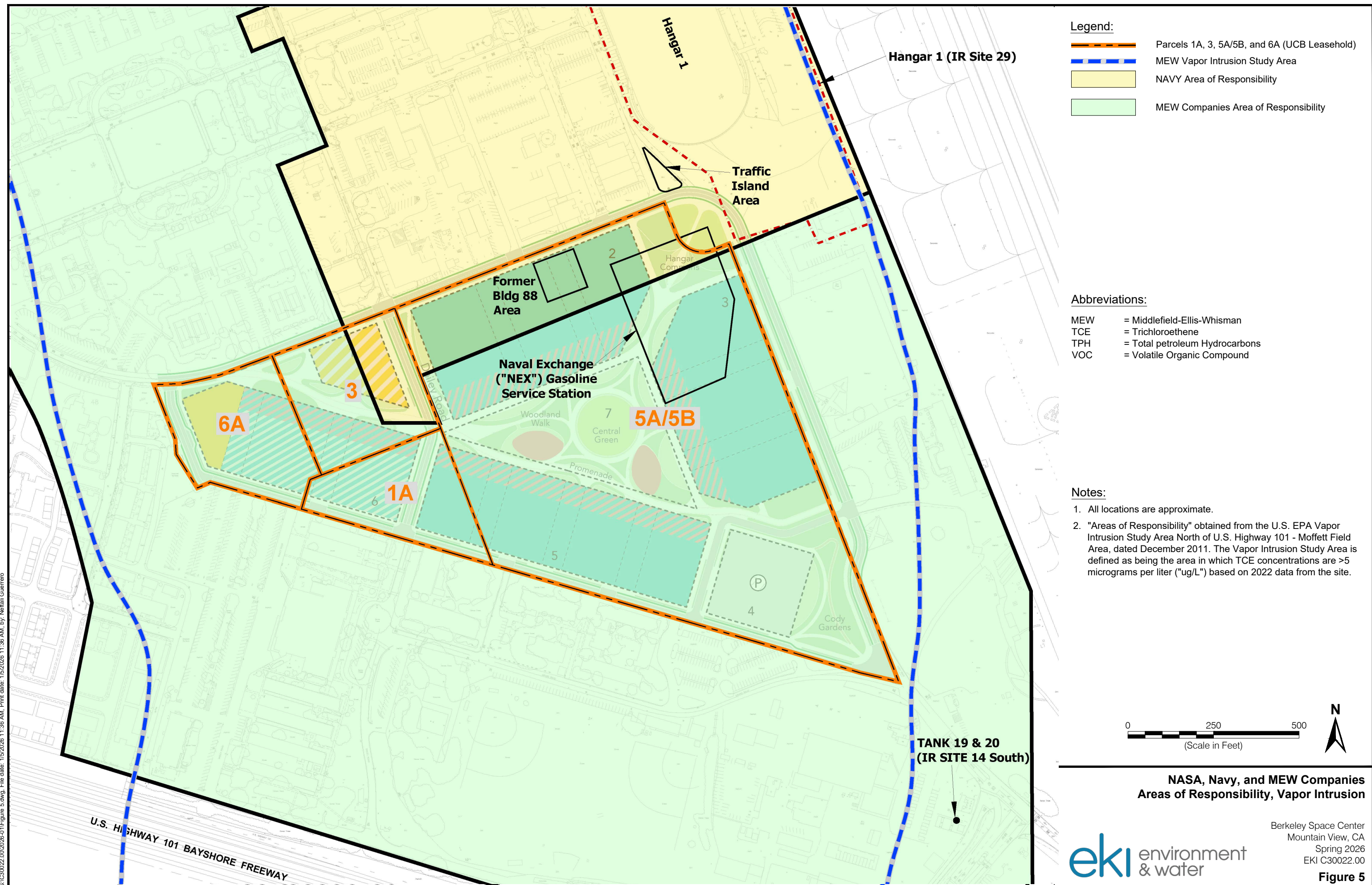
Notes:

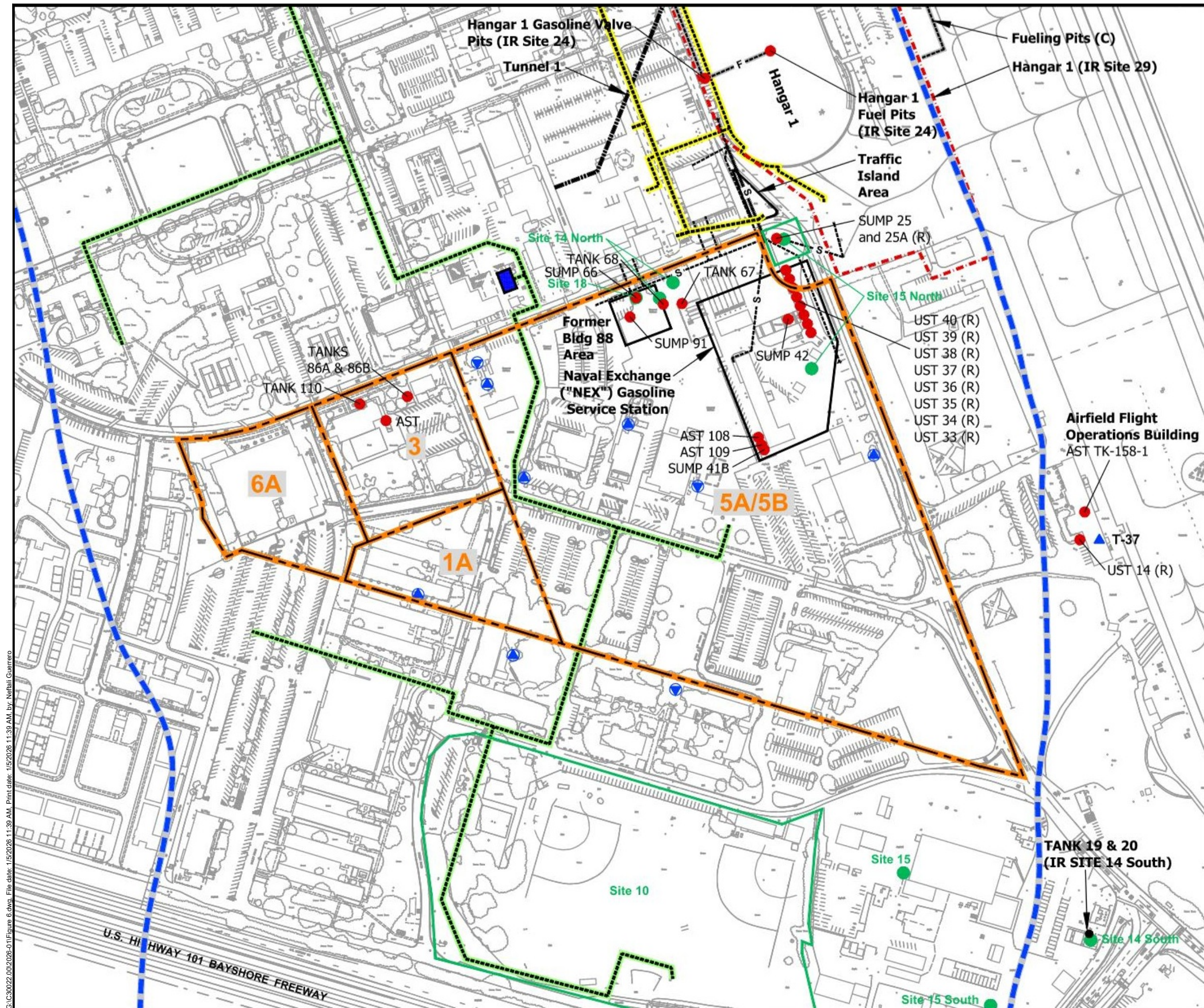
- All locations are approximate.
- Areas of Responsibility from Exhibit B1 of the Allocation and Settlement for MEW Remedial Program Management Between the National Administration and Fairchild Semiconductor Corporation, Raytheon Company, and Intel Corporation, dated 16 March 1998.
- In 2016 NASA assumed operations, maintenance, and monitoring responsibilities at IR Site 28 including the WATS and associated extraction and monitoring wells.



**Navy and MEW Companies
Allocation Areas, Soil and Groundwater**

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Legend:

- Parcels 1A, 3, 5A/5B, and 6A (UCB Leasehold)
- MEW Vapor Intrusion Area
- CERCLA Site
- Treatment Facility Piping
- Navy WATS Treatment Facility Piping
- MEW GWTS Treatment Facility Piping
- Treatment Facility
- Underground Fuel Line
- Sanitary Sewer Line
- Section of the Sanitary Sewer Line that Reportedly Collapsed (PRC, 1995)
- Tank, UST, AST, Sump and Pits
- Transformers
- Oil-Filled Transformers
- Transformers with PCBs

Abbreviations:

- (A) = Active
- (C) = Closed in Place
- (E) = Empty
- (R) = Removed
- AST = Aboveground Storage Tank
- GWTS = Ground Water Treatment System
- MEW = Middlefield-Ellis-Whisman
- PCBs = polychlorinated biphenyls
- WATS = West-Side Aquifer Treatment System

References:

PRC, 1995. *Final Operable Unit 2 – West (Building 88) Project Summary Report, Moffett Federal Airfield, California*, PRC Environmental Management, 9 October 1995.

U.S. EPA, 2024. *Fifth Five-Year Review Report for Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, Santa Clara County, California*, United States Environmental Protection Agency, 30 September 2024.

Notes:

- All locations are approximate.
- The TCE contour is based on the 2022 data used by the U.S. EPA to delineate the MEW Vapor Intrusion Study Area (U.S. EPA, 2024). More recent groundwater data in this area is available in the annual groundwater monitoring reports at the U.S. EPA's website for the MEW Superfund Study Area.



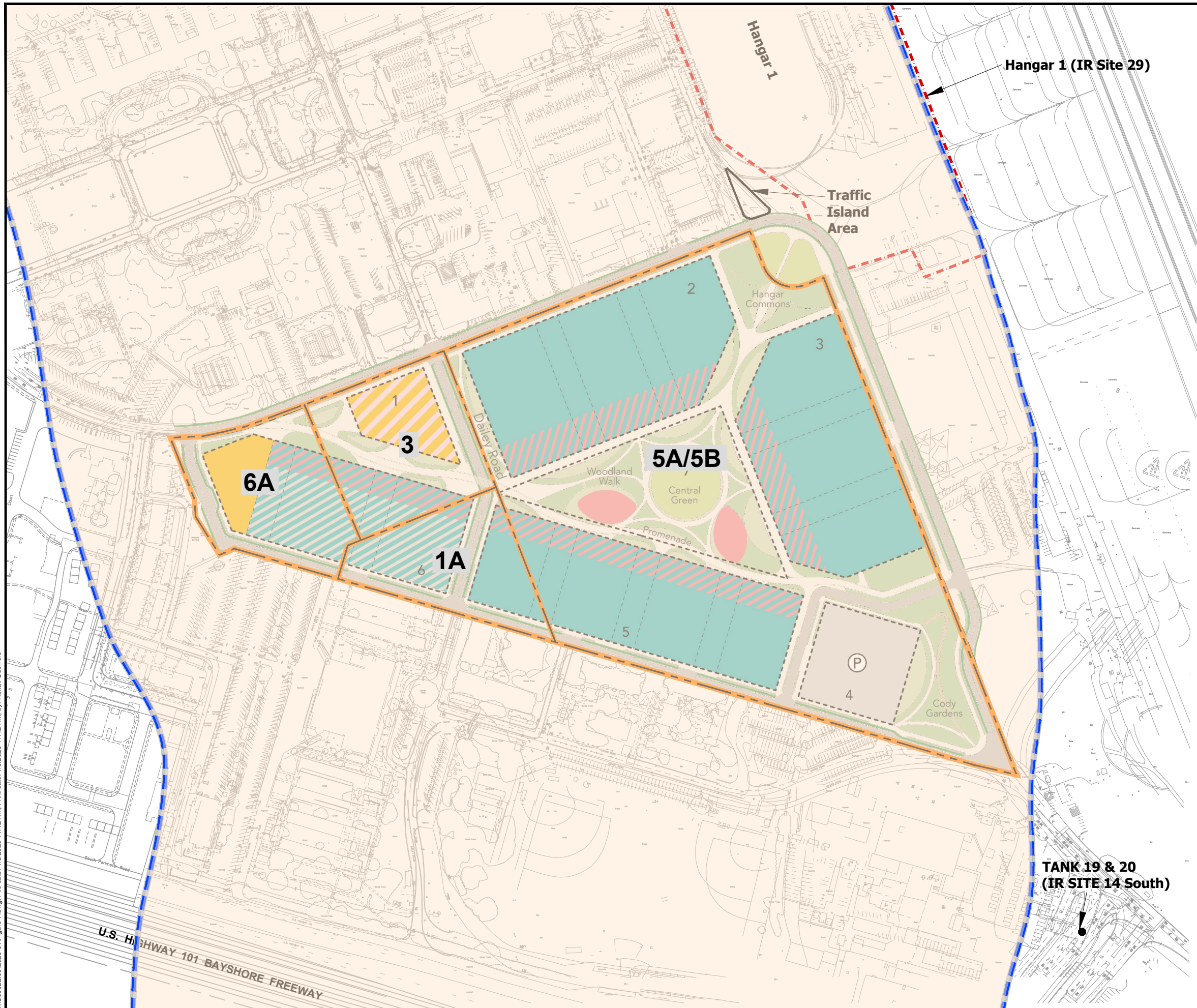
Installation Restoration Program Site Locations and Current and Former UST, AST, and/or Sump Locations

eki environment & water

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Figure 6

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Legend:

- Parcels 1A, 3, 5A/5B, and 6A (UCB Leasehold)
- MEW Vapor Intrusion Study Area
- Known TCE Groundwater Area: Sampling and Respiratory Protection Required (See Note 3)

Abbreviations:

- MEW = Middlefield-Ellis-Whisman
- MFA = Moffett Federal Airfield
- NAS = Naval Air Station
- TCE = trichloroethene
- VOC = volatile organic compound

References:

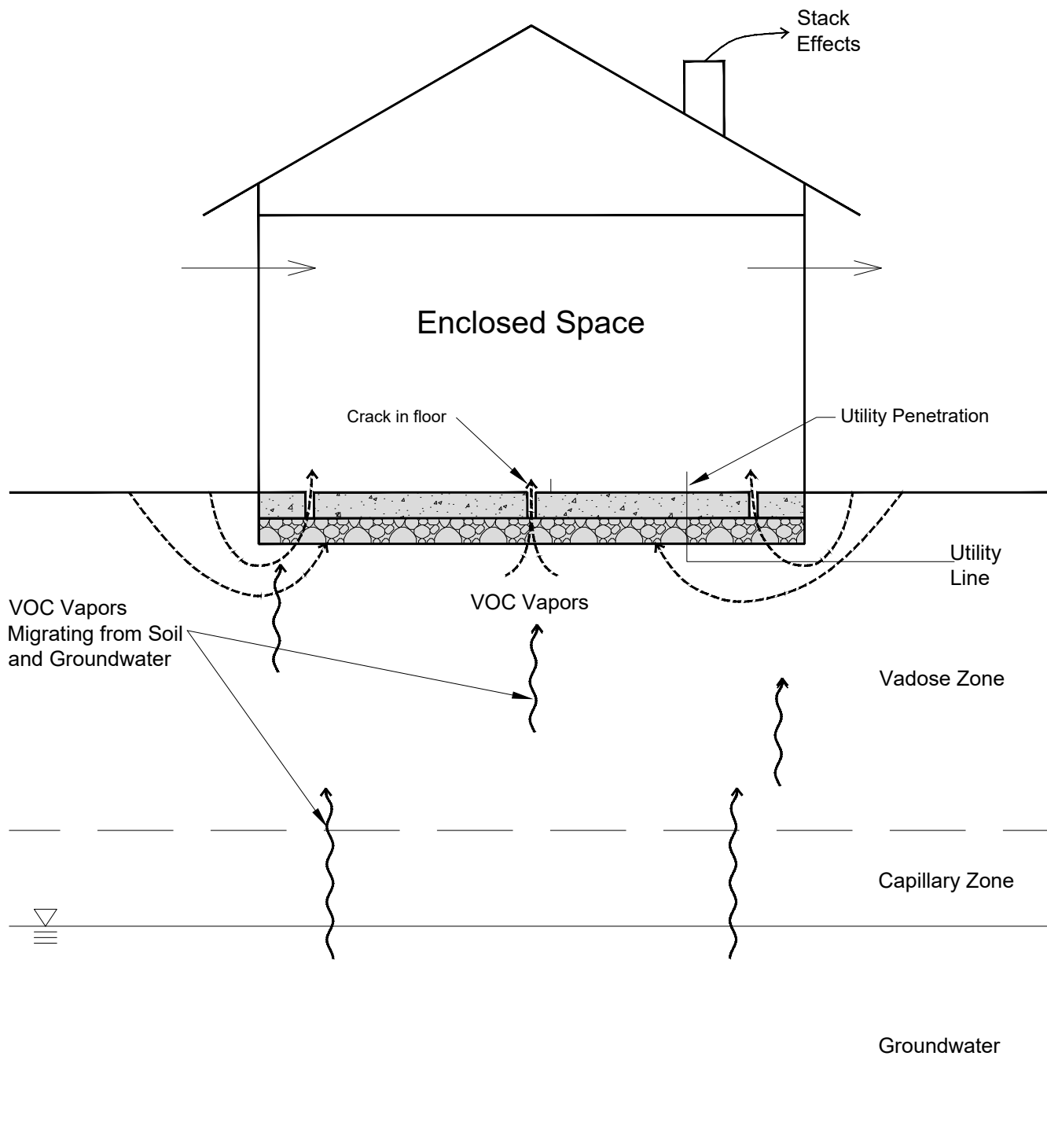
U.S. EPA, 2024. *Fifth Five-Year Review Report for Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, Santa Clara County, California*, United States Environmental Protection Agency. 30 September 2024.

Notes:

1. All locations are approximate.
2. The TCE contour is based on the 2022 data used by the U.S. EPA to delineate the MEW Vapor Intrusion Study Area (U.S. EPA, 2024). More recent groundwater data in this area is available in the annual groundwater monitoring reports at the U.S. EPA's website for the MEW Superfund Study Area.
3. Sampling or screening for TCE (see Section 6.2.3 of the EIMP) is required in areas of known or suspected TCE contamination and areas of shallow chlorinated VOC contamination (Figure 6A). During excavation entry in areas of known or suspected TCE contamination, the use of respiratory protection is required until sampling or screening results demonstrate that TCE concentrations are less than the U.S. EPA's Accelerated in areas of shallow chlorinated VOC contamination, no respiratory protection is required unless results from sampling or screening present in the excavation. If TCE is present in the excavation, follow the procedures outlined for Areas of Required Respiratory Protection and TCE Sampling (section 6.2.3 of the EIMP).



Known TCE Groundwater Area



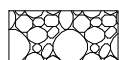
Legend

Wavy arrow → VOC Vapor Migrating from Soil or Groundwater

Dashed arrow → Air Streamline



Concrete Floor



Baserock Beneath Floor

Generalized Vapor Intrusion Process

eki environment
& water

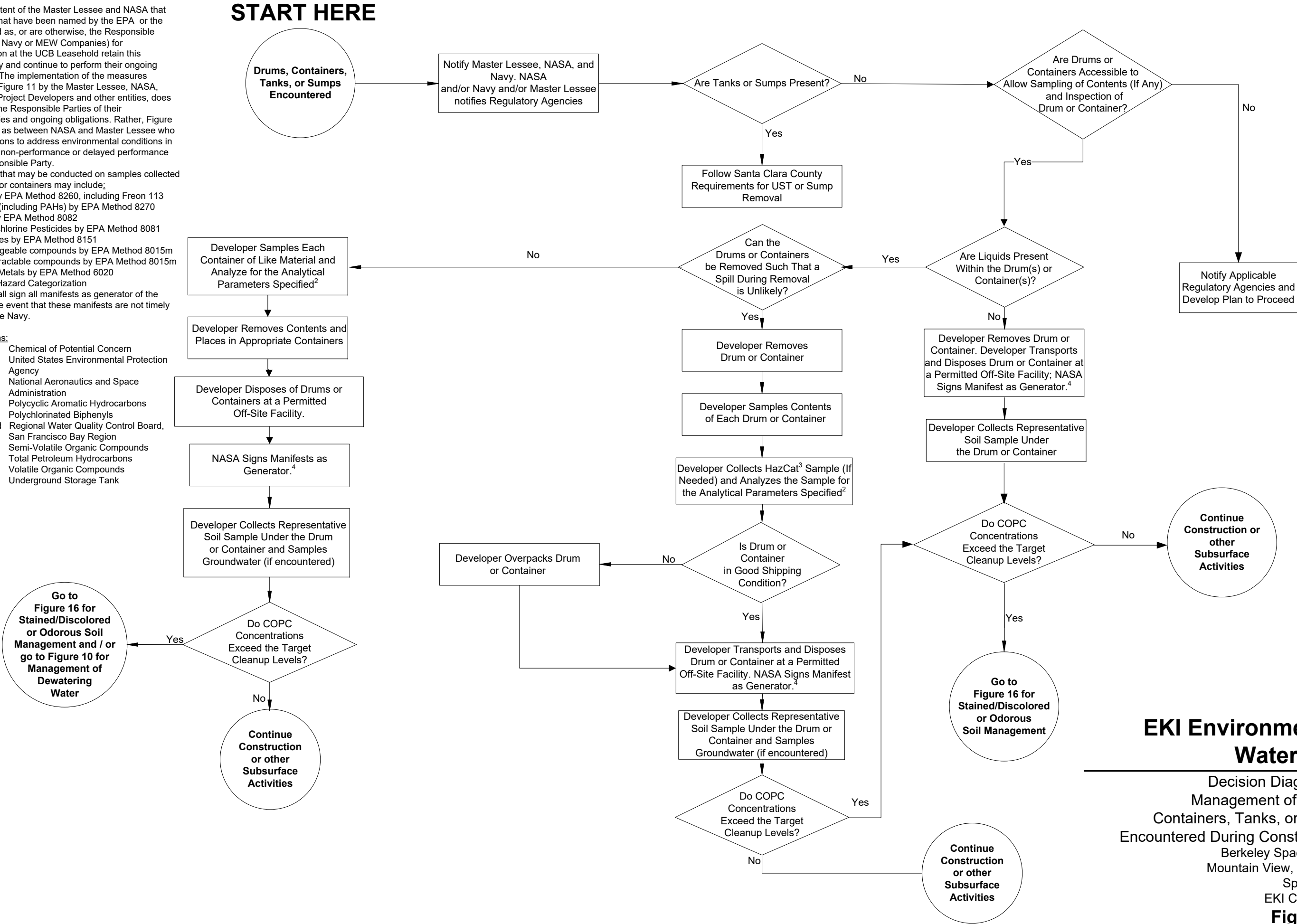
Berkeley Space Center
Mountain View, CA
Spring 2026
EKI C30022.00

Figure 8

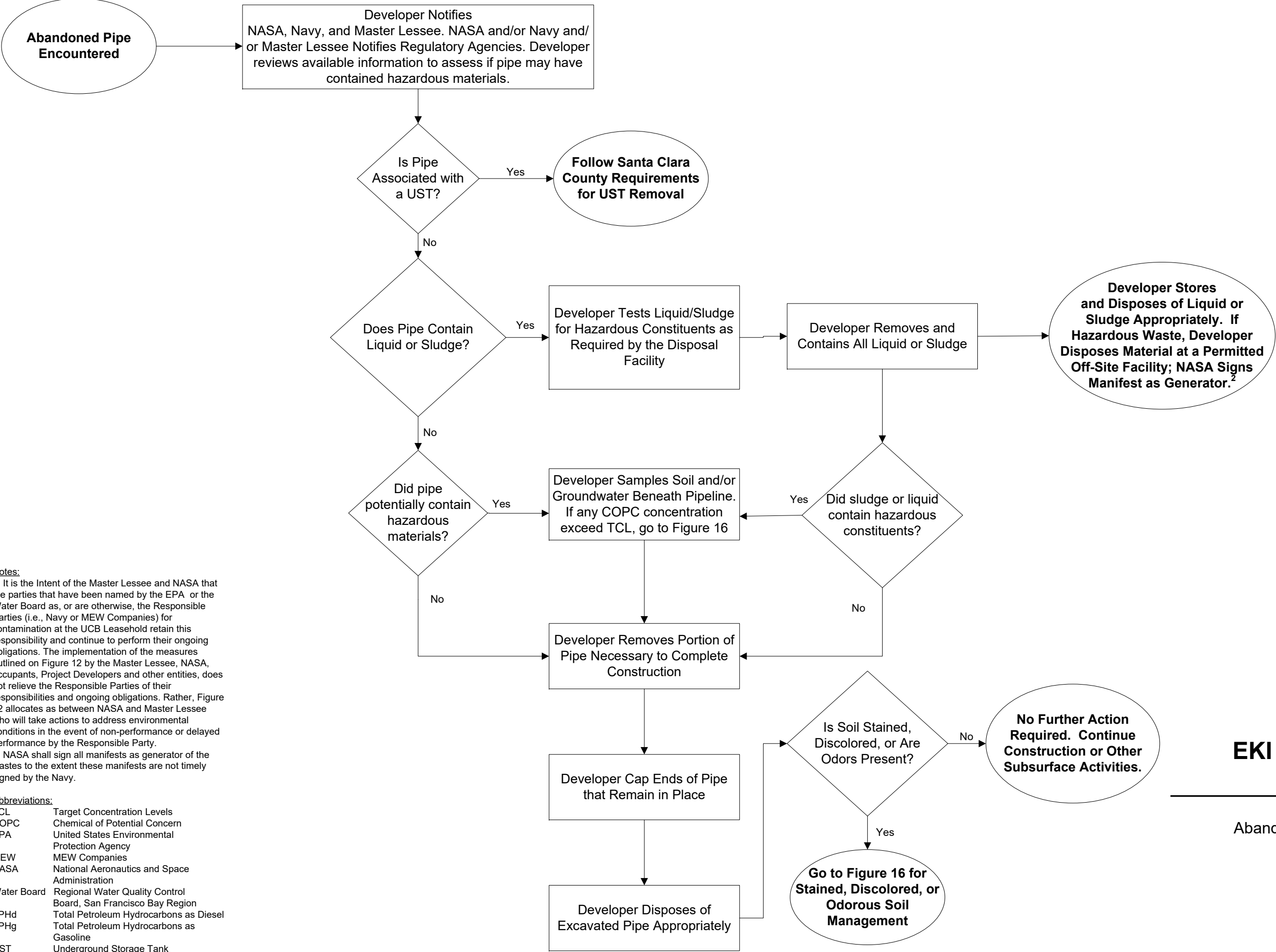
Notes:
1. It is the Intent of the Master Lessee and NASA that the parties that have been named by the EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy or MEW Companies) for contamination at the UCB Leasehold retain this responsibility and continue to perform their ongoing obligations. The implementation of the measures outlined on Figure 11 by the Master Lessee, NASA, occupants, Project Developers and other entities, does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, Figure 11 allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party.
2. Analyses that may be conducted on samples collected from drums or containers may include:
VOCs by EPA Method 8260, including Freon 113
SVOCs (including PAHs) by EPA Method 8270
PCBs by EPA Method 8082
Organochlorine Pesticides by EPA Method 8081
Herbicides by EPA Method 8151
TPH purgeable compounds by EPA Method 8015m
TPH extractable compounds by EPA Method 8015m
Title 22 Metals by EPA Method 6020
3. HazCat: Hazard Categorization
4. NASA shall sign all manifests as generator of the wastes in the event that these manifests are not timely signed by the Navy.

Abbreviations:

COPC	Chemical of Potential Concern
EPA	United States Environmental Protection Agency
NASA	National Aeronautics and Space Administration
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
Water Board	Regional Water Quality Control Board, San Francisco Bay Region
SVOCs	Semi-Volatile Organic Compounds
TPH	Total Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds
UST	Underground Storage Tank



START HERE



Notes:
1. It is the Intent of the Master Lessee and NASA that the parties that have been named by the EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy or MEW Companies) for contamination at the UCB Leasehold retain this responsibility and continue to perform their ongoing obligations. The implementation of the measures outlined on Figure 12 by the Master Lessee, NASA, occupants, Project Developers and other entities, does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, Figure 12 allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party.
2. NASA shall sign all manifests as generator of the wastes to the extent these manifests are not timely signed by the Navy.

Abbreviations:

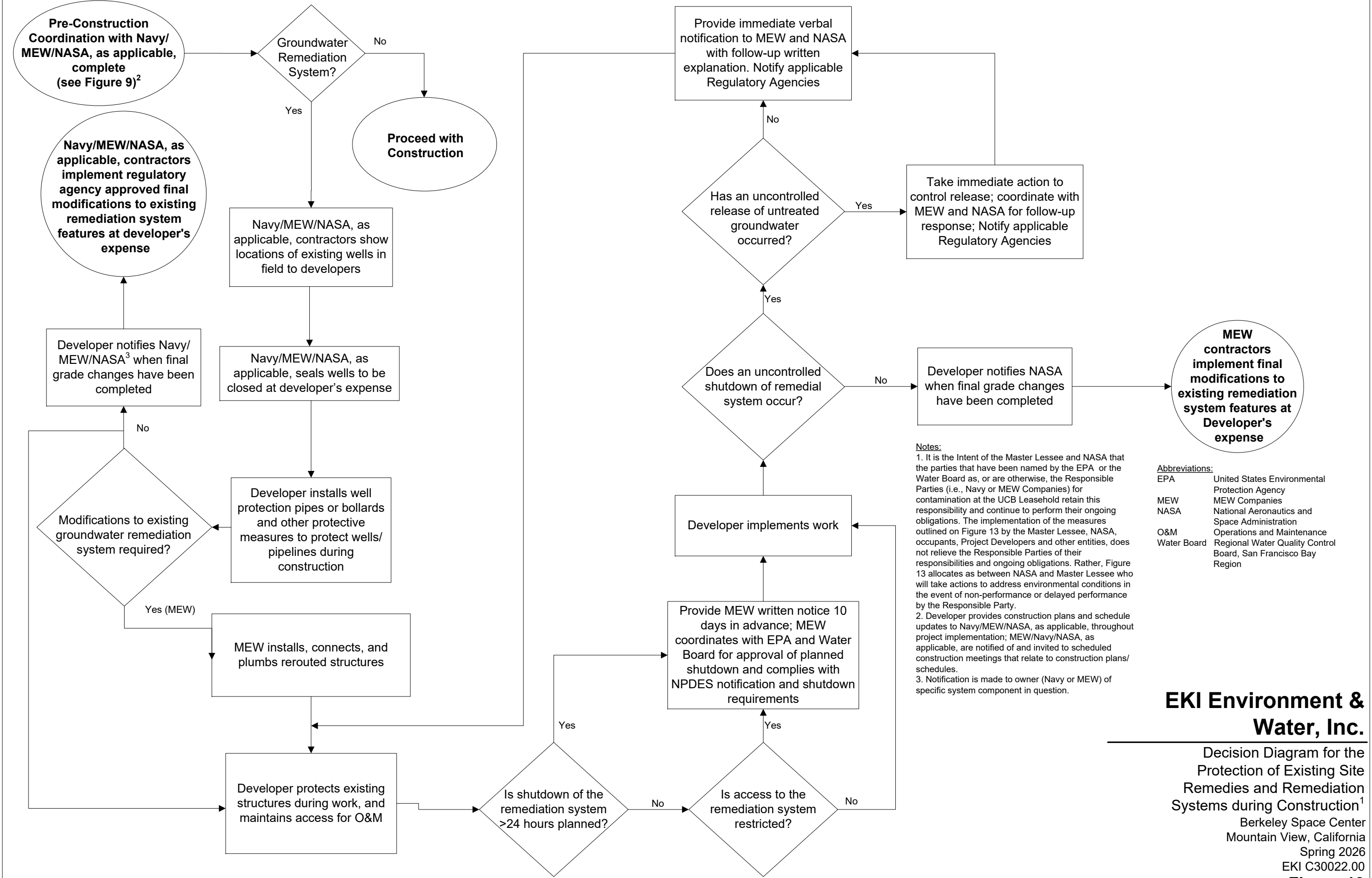
TCL	Target Concentration Levels
COPC	Chemical of Potential Concern
EPA	United States Environmental Protection Agency
MEW	MEW Companies
NASA	National Aeronautics and Space Administration
Water Board	Regional Water Quality Control Board, San Francisco Bay Region
TPHd	Total Petroleum Hydrocarbons as Diesel
TPHg	Total Petroleum Hydrocarbons as Gasoline
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

EKI Environment & Water, Inc.

Decision Diagram for Abandoned Pipe Management during Construction¹

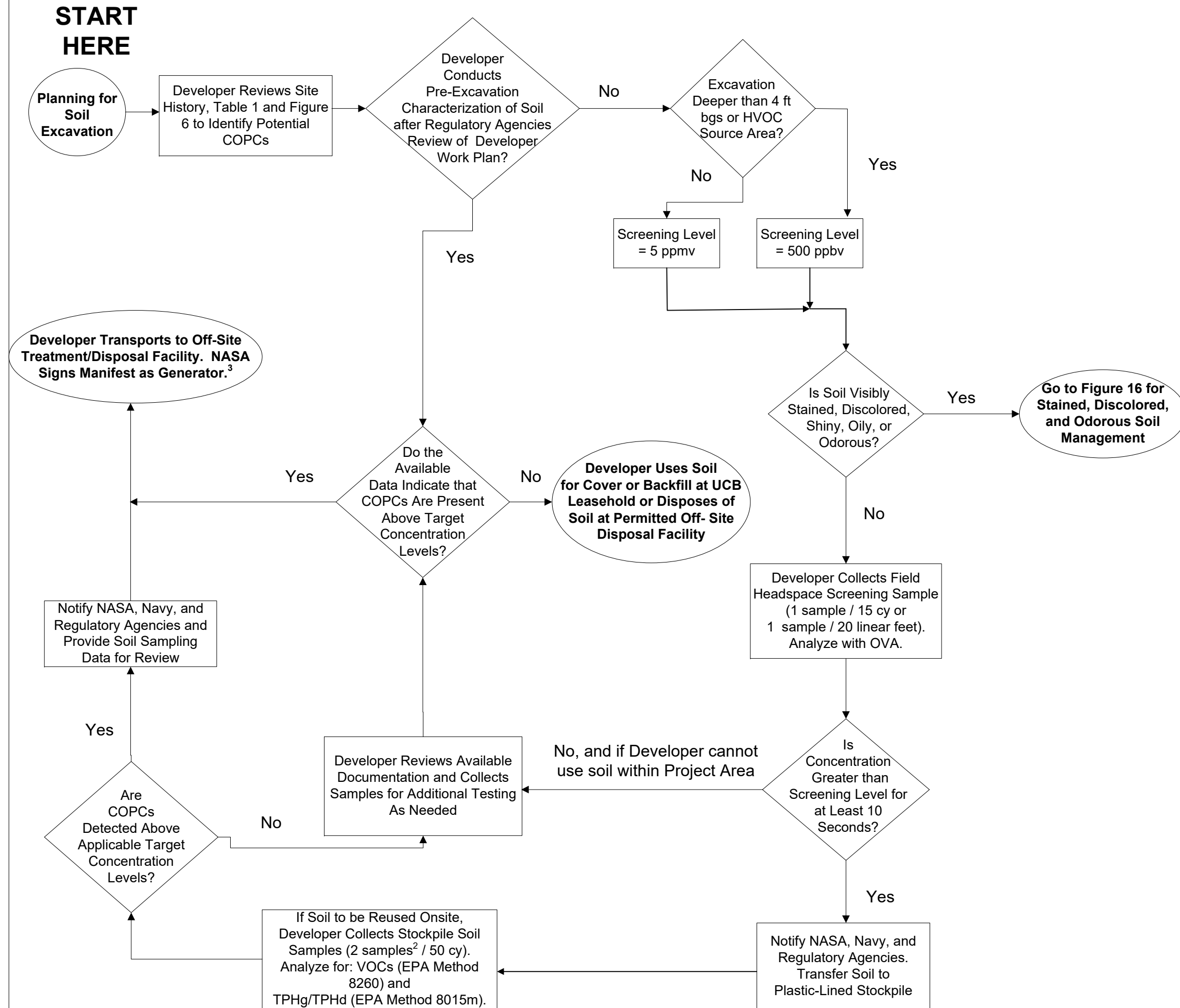
Berkeley Space Center
Mountain View, California
Spring 2026
EKI C30022.00
Figure 12

START HERE



EKI Environment & Water, Inc.

Decision Diagram for the Protection of Existing Site Remedies and Remediation Systems during Construction¹
Berkeley Space Center
Mountain View, California
Spring 2026
EKI C30022.00
Figure 13



Notes:

1. It is the Intent of the Master Lessee and NASA that the parties that have been named by the EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy, MEW Companies, or NASA) for contamination at the MFA Leasehold retain this responsibility and continue to perform their ongoing obligations. The implementation of the measures outlined on Figure 14 by the Master Lessee, NASA, tenant, Project Developers and other entities, does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, Figure 14 allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party.

2. Consistent with EPA Method 5035, Encore™ Samplers, or equivalent, should be used to collect samples for the analysis of VOCs and TPHg. A 16-ounce jar should be collected for TPHd, moisture content, and other analyses (if needed). Each sample should be a 4-point composite sample.

3. NASA shall sign all manifests as generator of the wastes to the extent that these manifests are not timely signed by the Navy or MEW Companies.

4. If soil is to be disposed of off-site, Developer collects stockpile soil samples at rate required by waste disposal facility.

Abbreviations:

COPC	Chemical of Potential Concern
cy	cubic yard
EIMP	Environmental Issues Management Plan
EPA	United States Environmental Protection Agency
HVOC	Halogenated Volatile Organic Compound
MEW	MEW Companies
OVA	Organic Vapor Analyzer
ppbv	part per billion by volume
ppmv	parts per million by volume
Water Board	Regional Water Quality Control Board, San Francisco Bay Region
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbons
VI	Vapor Intrusion
VOCs	Volatile Organic Compounds

EKI Environment & Water, Inc.

Decision Diagram for Management of Excavated Soil¹

Berkeley Space Center
Mountain View, California
Spring 2026
EKI C30022.00

Figure 14

**START
HERE**

Development
Planned in Area with
Buildings that Potentially
Used Lead and/or PCB-
Based Paints

Have Lead and PCB-
Based Paint Surveys
Been Performed?

No

Developer Conducts Survey for
Lead and PCB-Based Paint

Yes

Were Lead and/or PCBs
Detected at concentrations
greater than 5,000 mg/kg and
50 mg/kg, respectively?

No

No Further Action
Required

Yes

Has Initial
Assessment of Lead
and PCBs in Soil Been
Performed?

No

Developer Conducts Initial or
Additional Assessment of Lead
and/or PCBs in Soil

No

Was Soil Data
Collected Adequate to
Identify Potential Areas
with Elevated Soil Lead
and/or PCB
Concentrations?

Yes

Was Total Lead
and/or PCBs
Detected in Soil Greater
than
Applicable TCL?²

Yes

Developer Excavates Soil with
Elevated Lead and/or PCB
Concentrations as Defined
Through Soil Sampling as
Needed for Development

No

No Further Action
Required

Excavation
Complete

No

Do Confirmation
Sample Results Exceed
Applicable TCL?²

Yes

Developer Samples Excavated
Soil in Accordance with
Treatment/Disposal Facility
Requirements

Developer Transports Impacted
Materials to Off-Site
Treatment/Disposal Facility. NASA
Signs Manifest as Generator.³

Developer Notifies NASA and Navy.
Proceed with Track 1, 2, or 3, as Shown
on Figure 16

Developer Collects
Confirmation Samples from
Excavation Floor and Sidewalls

Notes:

1. It is the Intent of the Master Lessee and NASA that the parties that have been named by the EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy or NASA) for contamination at the UCB Leasehold retain this responsibility and continue to perform their ongoing obligations. The implementation of the measures outlined on Figure 15 by the Master Lessee, NASA, tenants, Project Developers and other entities, does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, Figure 15 allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party.

2. Applicable TCLs are as follows:

Lead (residential) 80 mg/kg
Lead (commercial) 320 mg/kg
PCBs (residential/commercial) 1 mg/kg

3. NASA shall be designated as the generator of the wastes and shall sign all waste manifests, to the extent these manifests are not signed in a timely manner by the Navy

Abbreviations:

EPA	United States Environmental Protection Agency
PCBs	Polychlorinated Byphenyls
TCL	Target Concentration Levels
mg/kg	milligrams per kilogram
Water Board	Regional Water Quality Control Board, San Francisco Bay Region

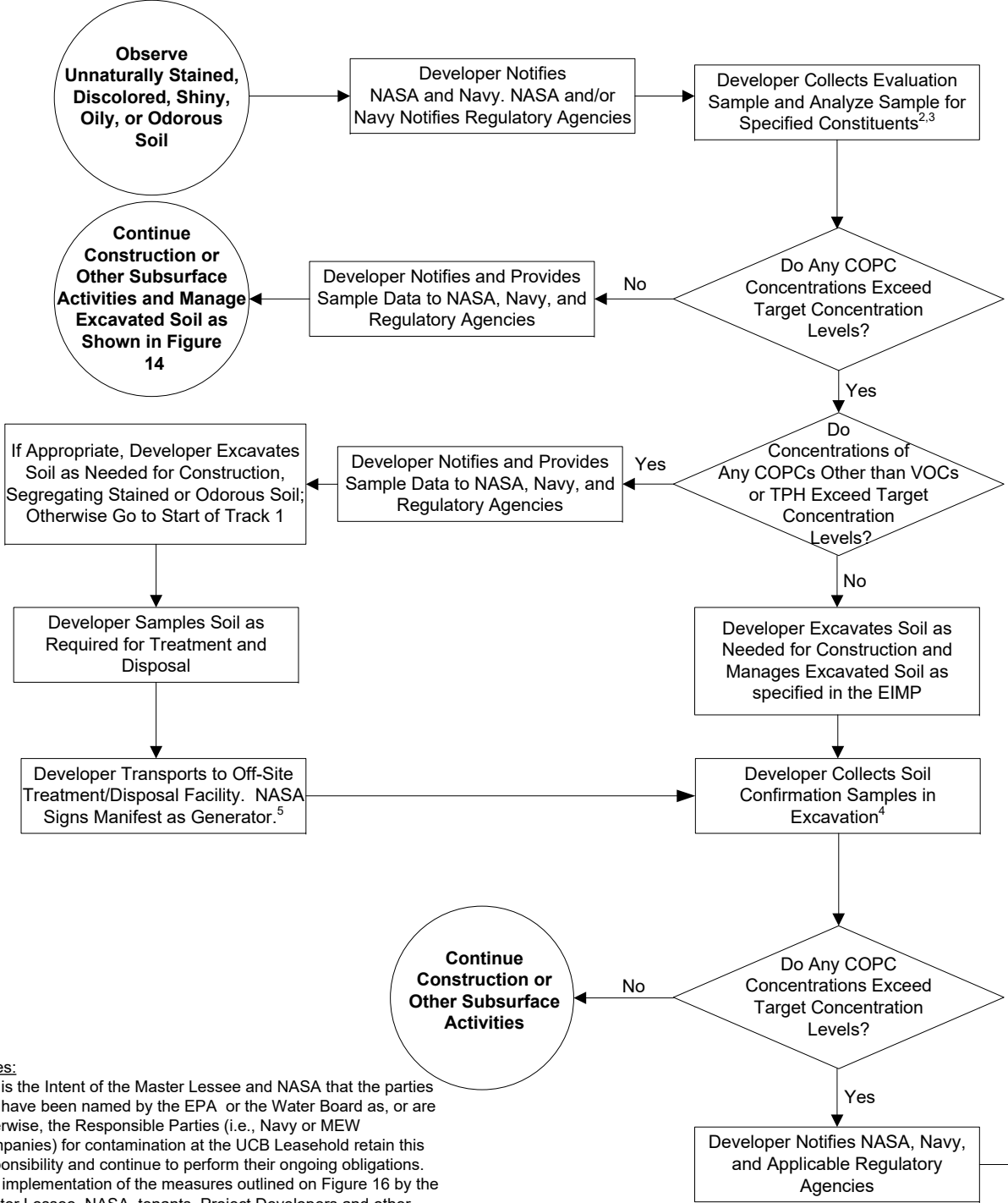
**EKI Environment &
Water, Inc.**

Decision Diagram for
Management of
Lead and/or PCB-Impacted Soil¹

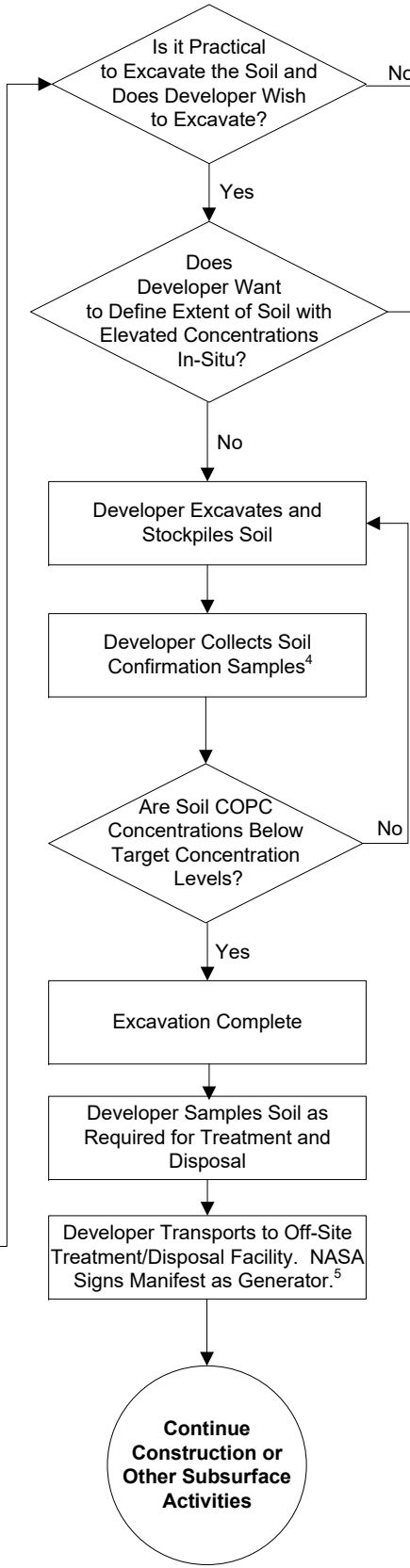
Berkeley Space Center
Mountain View, California
Spring 2026
EKI C30022.00

Figure 15

START HERE

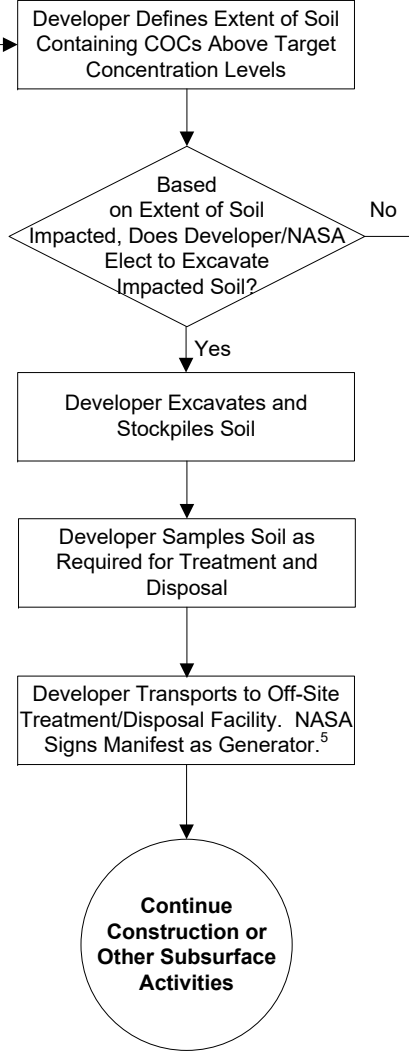


TRACK 1



TRACK 3

TRACK 2



Notes:

1. It is the Intent of the Master Lessee and NASA that the parties that have been named by the EPA or the Water Board as, or are otherwise, the Responsible Parties (i.e., Navy or MEW Companies) for contamination at the UCB Leasehold retain this responsibility and continue to perform their ongoing obligations. The implementation of the measures outlined on Figure 16 by the Master Lessee, NASA, tenants, Project Developers and other entities, does not relieve the Responsible Parties of their responsibilities and ongoing obligations. Rather, Figure 16 allocates as between NASA and Master Lessee who will take actions to address environmental conditions in the event of non-performance or delayed performance by the Responsible Party.

2. Required analyses to be conducted on the "Evaluation Sample":
VOCs by EPA Method 8260B, including Freon 113
TPH purgeable compounds by EPA Method 8015m
TPH extractable compounds by EPA Method 8015m

3. Potential additional analyses to be conducted, if appropriate based on site use history:
SVOCs by EPA Method 8270
Title 22 Metals by EPA Method 6020
PCBs by EPA Method 8082
Organochlorine Pesticides by EPA Method 8081
Herbicides by EPA Method 8151

4. Analyses to be conducted on the soil confirmation samples will depend on the COPCs identified in the Evaluation Samples (see Notes 2 and 3).

5. NASA shall sign all manifests as generator of the wastes to the extent that these manifests are not timely signed by the Navy or MEW Companies.

Abbreviations:

COPC	Chemical of Potential Concern
EPA	United States Environmental Protection Agency
MEW	MEW Companies
NASA	National Aeronautics and Space Administration
PCB	Polychlorinated Biphenyl
Water Board	Regional Water Quality Control Board, San Francisco Bay Region
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbon
VOCs	Volatile Organic Compound

EKI Environment & Water, Inc.

Decision Diagram for
Unnaturally Stained, Discolored,
or Odorous Soil Management¹
Berkeley Space Center
Mountain View, California
Spring 2026
EKI C30022.00
Figure 16

START HERE

During excavation entry:
1. Respiratory Protection is required.
2. Actively ventilate the excavation.
3. Sample/screen ambient air within the excavation for TCE.⁵

Excavation Entry > 3 ft bgs

No
Is TCE
present at
concentrations
≥ 7ug/m³?
Yes

Use of Respiratory
Protection and
sampling/screening
for TCE may be
discontinued.

Notify Master
Lessee immediately.

No
Is TCE
present at
concentrations
≥ 50 ug/m³?
Yes

TCE sampling/screening
may be discontinued.
Respiratory Protection is
required during excavation
entry.

1. Implement additional engineering controls.
2. Respiratory Protection is required during
excavation entry. A CIH will reevaluate the level of
Respiratory Protection and upgrade as necessary.
3. Continue sampling/screening until TCE
concentrations < 50 ug/m³.
4. Consider monitoring TCE concentrations
in ambient air outside of excavation.

Continue activities within excavation until:
1. Groundwater enters excavation.
2. The excavation has been enlarged by 20 feet or more.
3. The excavation begins in a new area. If excavation activities begin in a new area, go to "Start Here" on this figure and restart.

Resume sampling/screening for TCE if
groundwater enters the excavation or the
excavation is enlarged by 20 feet or more.

Notes:

1. See Section 6.2.3 and Figure 6 in the Environmental Issues Management Plan.
2. The OVA will be a direct-read instrument capable of reading down to 0.1 ppmv or lower. Total VOC concentrations in ambient air within and outside the excavation will be monitored. Monitoring with a direct-read instrument will continue throughout the duration of the excavation activities.
3. Additional engineering controls may include covering exposed stockpiles and/or sidewalls of the excavation with visqueen, adding additional forced air ventilation, etc.
4. "Excavation entry" is defined as entry for at least 15 minutes over the course of a single day into an excavation that is greater than 3 feet deep.
5. Ambient air may be sampled using TCE air sampling badges or screened using a Hapsite or portable GC-MS (or equivalent). Sampling badges (e.g. Radiello 130 or Radiello 145 sampling badges) may be placed in the excavation at breathing zone height or worn by workers that are working within the excavation. Air sampling badges will be worn for one full 8-hour workday and will be analyzed and reported on a 24-hour turnaround time. Sampling data will have a reporting limit of 5 ug/m³ or lower. If air screening is conducted using a GC-MS, at a minimum, ambient air within the excavation will be screened on an hourly basis for a period of one full work day. Screening data will have a reporting limit of 5 ug/m³ or lower.

Abbreviations:

CIH	Certified Industrial Hygienist
GC-MS	Gas Chromatography Mass Spectrometry
CVOCs	Chlorinated Volatile Organic Compounds
OVA	Organic Vapor Analyzer
ppmv	Parts per Million by Volume
TCE	Trichloroethene
TCLs	Target Concentration Level
ug/m ³	Micrograms per Cubic Meter
VOCs	Volatile Organic Compounds

**EKI Environment &
Water, Inc.**

Decision Diagram for Worker Respiratory
Protection and Trichloroethene Sampling
Requirements

Berkeley Space Center
Mountain View, California
Spring 2026

EKI C30022.00

Figure 17

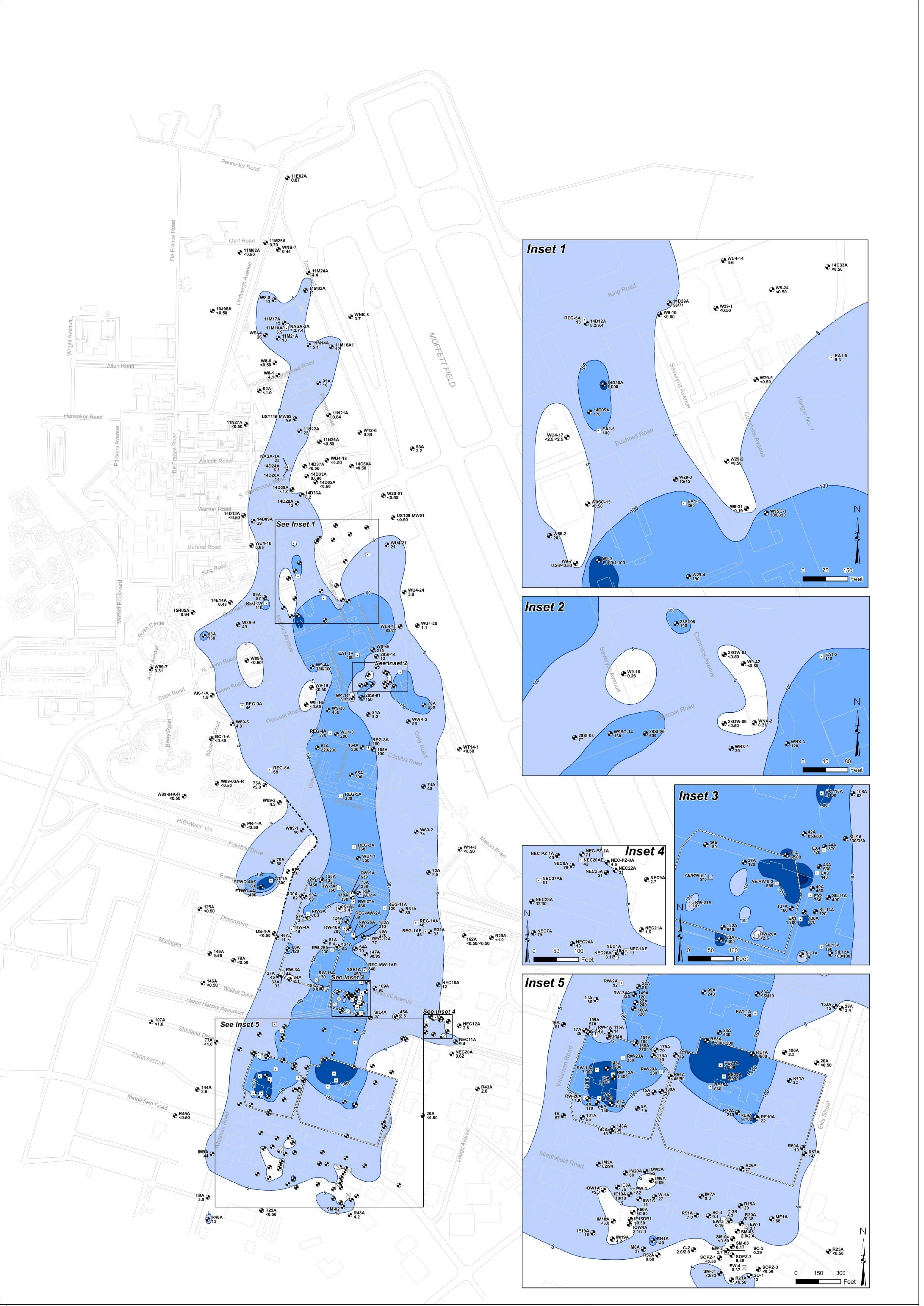
APPENDIX A

2024 MEW Groundwater Data

Appendix C – TCE, cis-1,2-DCE, Vinyl Chloride, and PCE, Concentrations and Isoconcentration Contour Maps – All MEW Wells, September/October 2024 from *2024 Annual Progress Report, Middlefield-Ellis-Whisman Fairchild and Regional Groundwater Remediation Programs, Mountain View, California*, Geosyntec Consultants, 15 April 2025.

Table 2c – RGRP Wells North of 101 Listed by Owner from *2024 Annual Progress Report, Middlefield-Ellis-Whisman Fairchild and Regional Groundwater Remediation Programs, Mountain View, California*, Geosyntec Consultants, 15 April 2025.

Figures 2-13 through 2-20 – 2024 Estimated Isoconcentration Contours from *2024 Annual Progress Report, NASA Ames Regional Groundwater Remediation Program, NASA Area of Responsibility and Site 28 WATS Area*, BB&E, Inc., April 2025.



Legend
TCE Concentration
5 – 100 µg/L
100 – 1,000 µg/L
1,000 – 10,000 µg/L
Greater than 10,000 µg/L

Estimated Edge of MEW Plume,
--- Commingled with Volatile Organic
Compounds from Non-MEW Sources

Monitoring Well

Recovery Well On

Recovery Well Off

R46A
12

Well ID

TCE Concentration (µg/L)

Slurry Wall

Building

Road

Notes:
MEW = Middlefield-Ellis-Whisman
TCE = trichloroethene
µg/L = micrograms per liter
95/110 = sample/duplicate sample
<# = analyte not detected at or above the laboratory reporting limit (#).
- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit.
- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 156A, which was resampled on February 12, 2025.
- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.
- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

**A Zone TCE Concentration in Groundwater
September/October 2024**

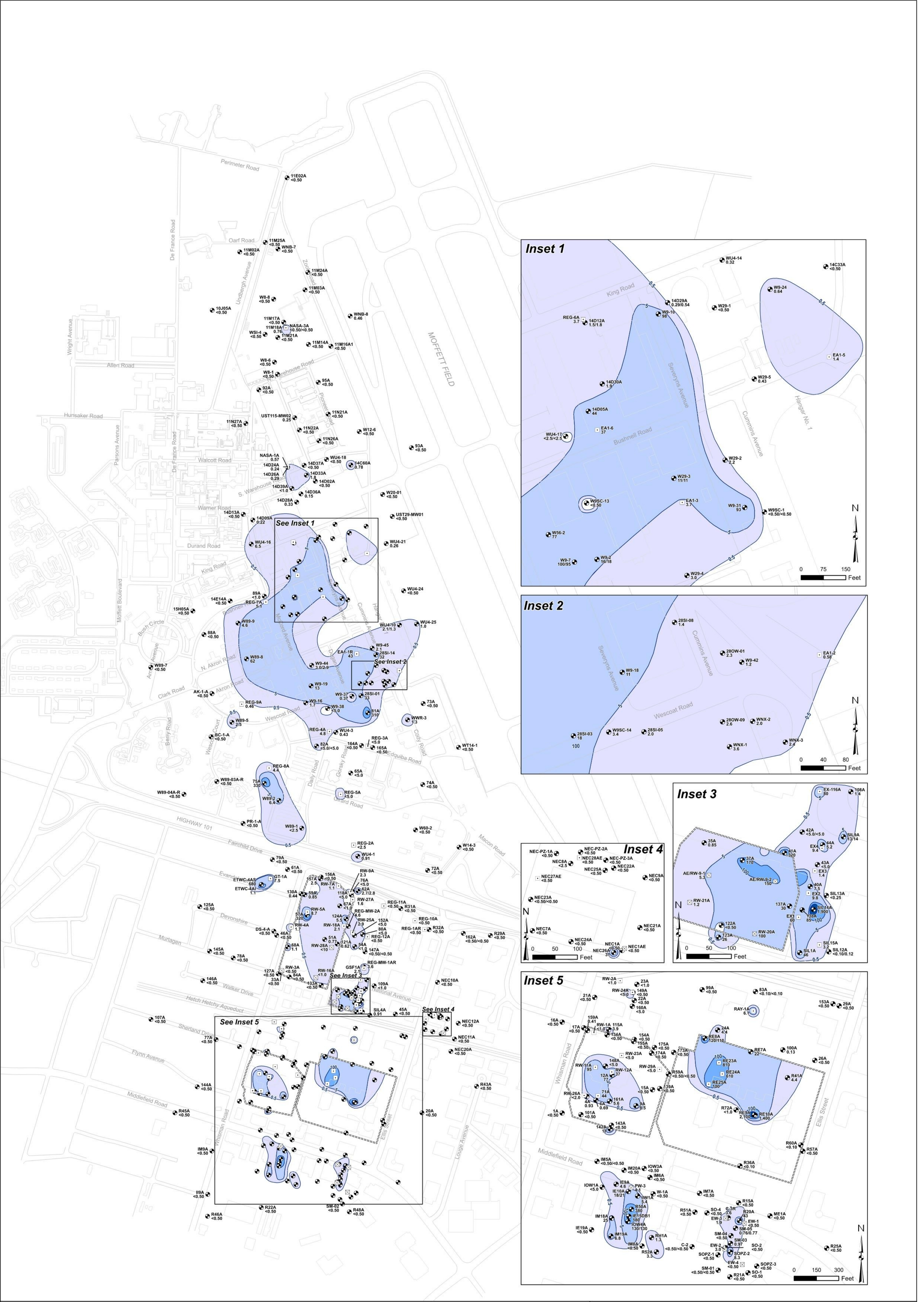
**MEW Fairchild & Regional Groundwater Remediation Programs
Mountain View, California**

Geosyntec
consultants

**Figure
C-1**

Oakland

April 2025



Legend

VC Concentration

0.5 – 5 µg/L

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

Slurry Wall

Building

Road

R46A

<0.50

Well ID

VC Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

VC = vinyl chloride

µg/L = micrograms per liter

<0.50/<0.50 = Sample/Duplicate Sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyte has not been historically detected were contoured as less than 0.50 µg/L.

- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 156A, which was resampled on February 12, 2025.

- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

0

500

1,000

Feet

N

A Zone VC Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

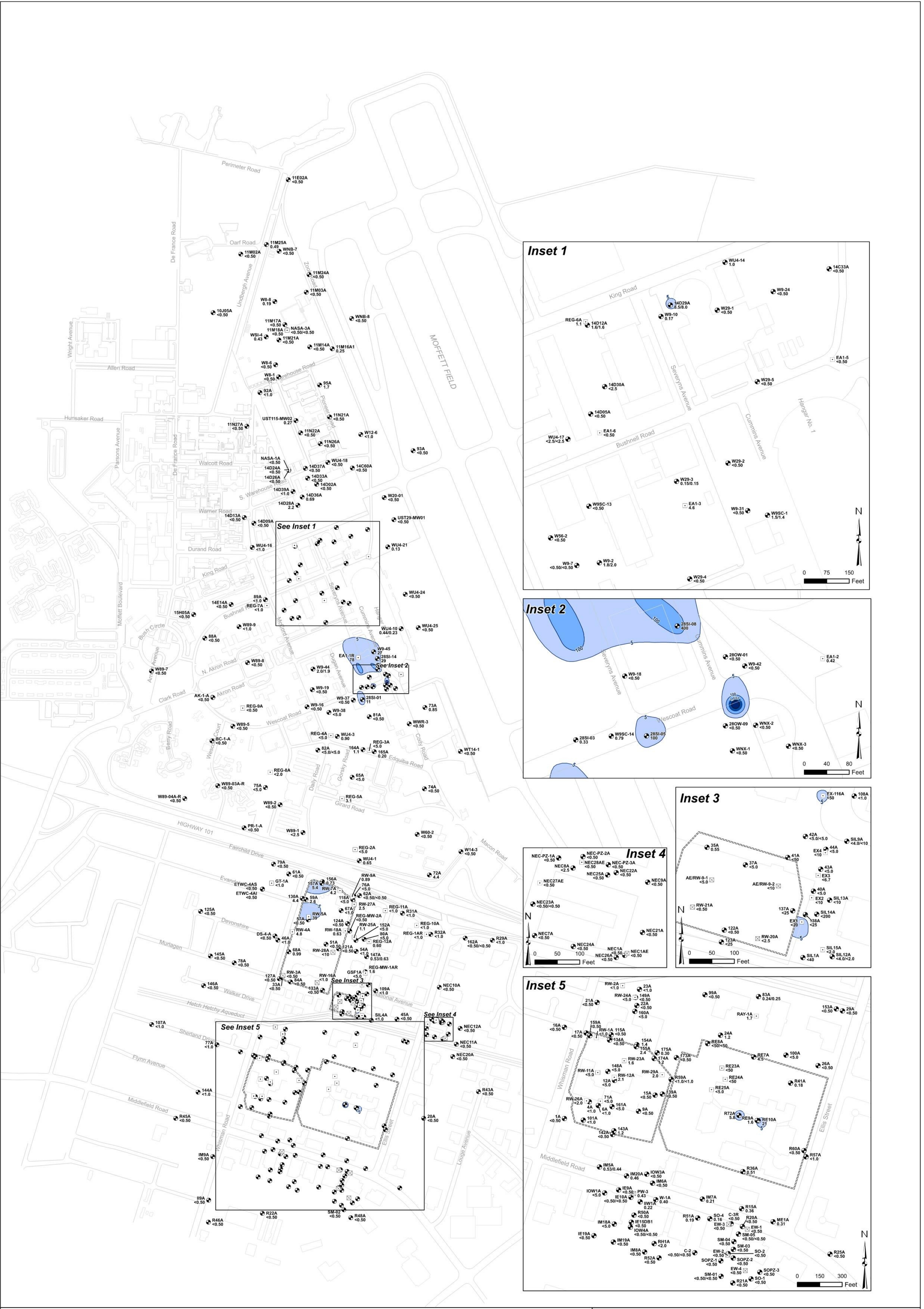
Oakland

April 2025

Figure

C-3

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneA.aprx\FigC-03_VC_Contours_A 2/28/2025 4:02 PM (Howie.Chen)



Legend

PCE Concentration
5 – 100 µg/L
100 – 1,000 µg/L
1,000 – 10,000 µg/L
Greater than 10,000 µg/L

Monitoring Well

Recovery W

Recovery Well Of

R46A

<0.50

Well ID

PCE Concentration (µg/L)

Slurry Wall

Building

Road

Notes:
MEW = Middlefield-Ellis-Whisman
PCE = tetrachloroethene
µg/L = micrograms per liter
<0.50/<0.50 = Sample/Duplicate Sample
<# = analyte not detected at or above the laboratory reporting limit (#).
- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyte has not been historically detected were contoured as less than 5 µg/L.
- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 156A, which was resampled on February 12, 2025.
- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.
- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

0

500

1,000

Feet

**A Zone PCE Concentration in Groundwater
September/October 2024**

**MEW Fairchild & Regional Groundwater Remediation Programs
Mountain View, California**

Geosyntec

consultants

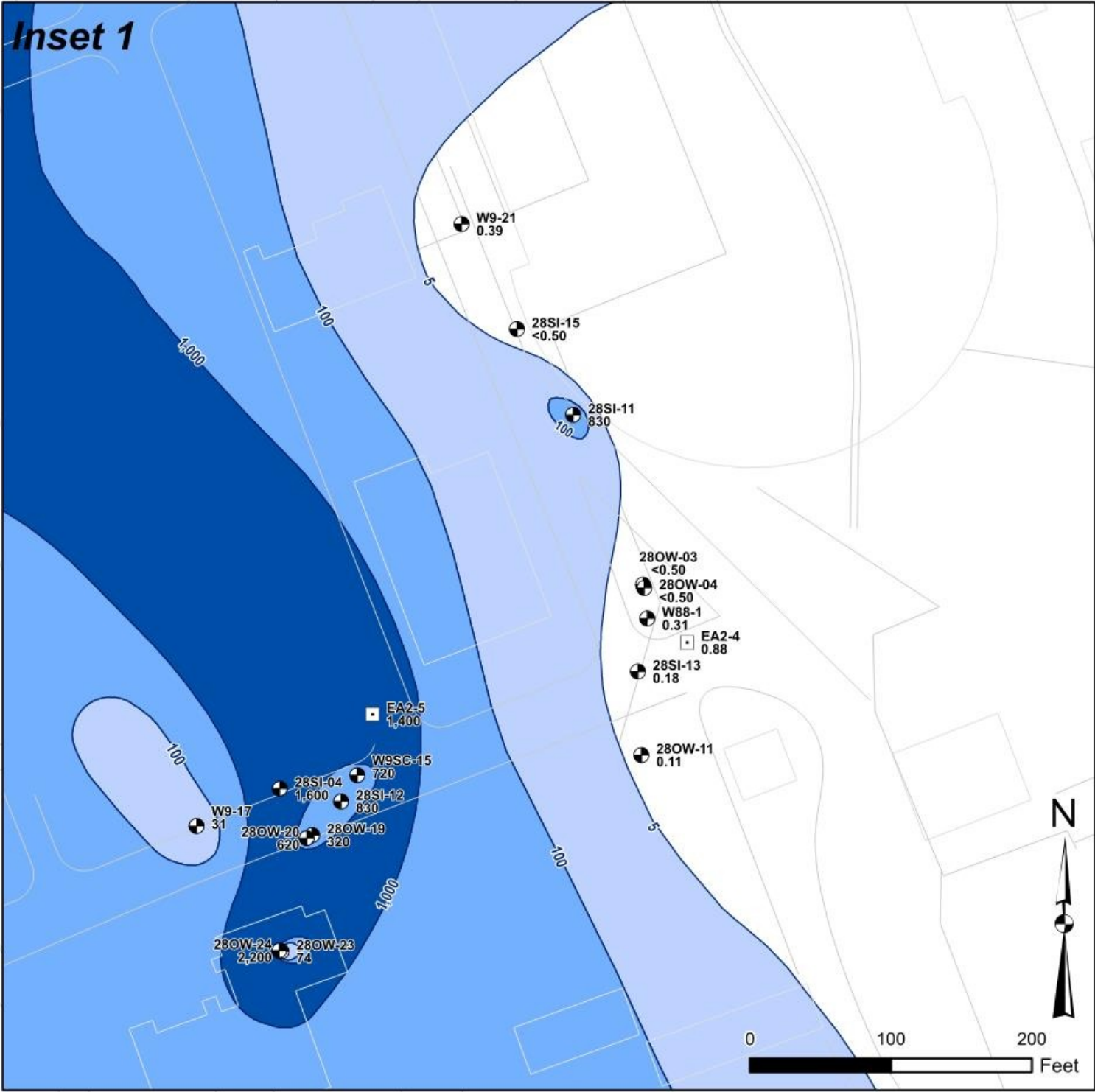
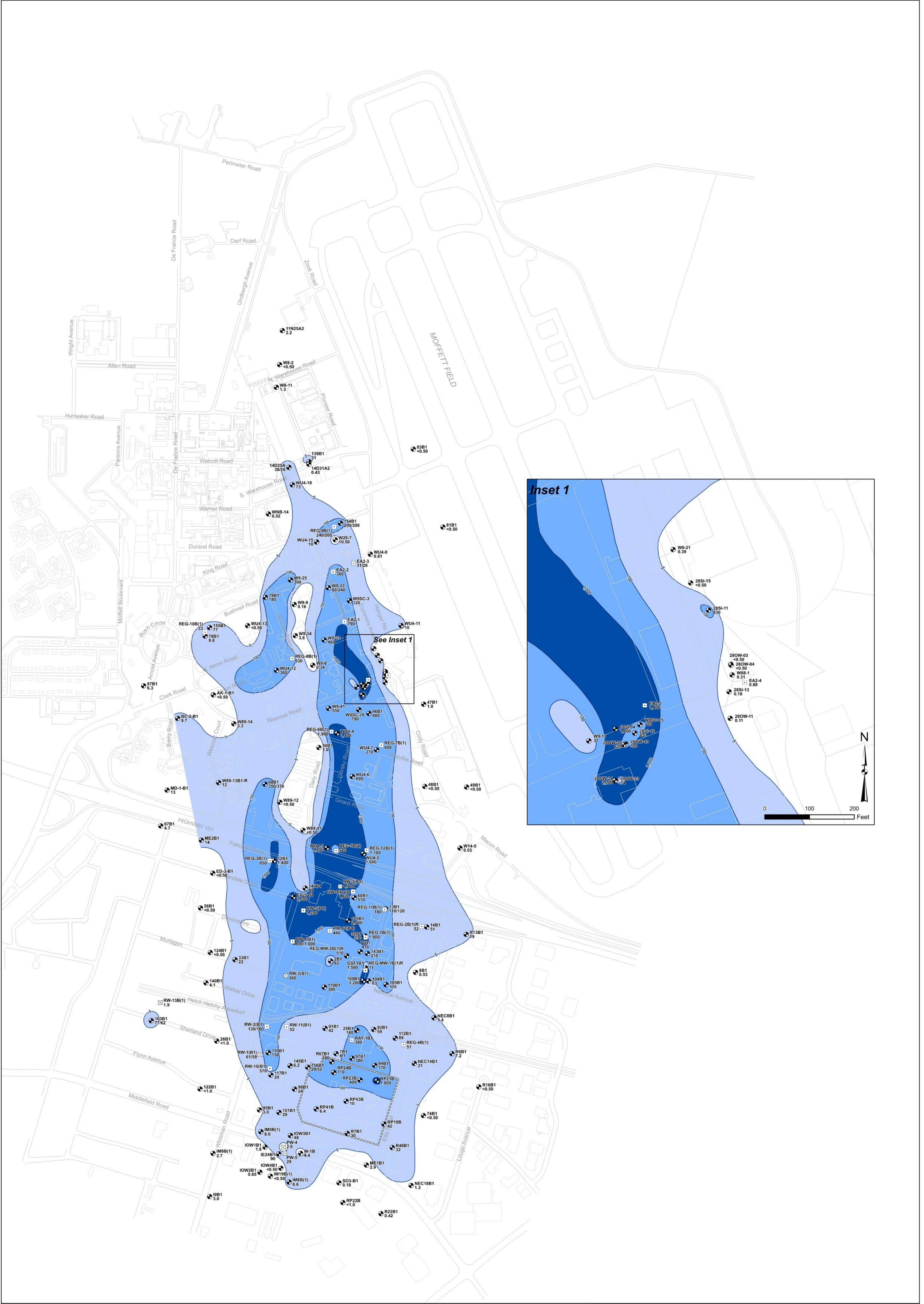
Oakland

April 2025

Figure

C-4

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneA.aprx\FigC-04_PCE_Contours_A 2/28/2025 4:02 PM (Howie.Chen)



Legend

TCE Concentration
5 – 100 µg/L
100 – 1,000 µg/L
1,000 – 10,000 µg/L
Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

Slurry Wall

Building

Road

R22B1

Well ID

0.42

TCE Concentration (µg/L)

Notes:
MEW = Middlefield-Ellis-Whisman
TCE = trichloroethene
µg/L = micrograms per liter
<0.50/<0.50 = sample/duplicate sample
<# = analyte not detected at or above the laboratory reporting limit (#).
- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit.
- Figure shows only those wells sampled and analyzed for TCE September/October in 2024.
- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.
- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

N

0

500

1,000

Feet

B1 Zone TCE Concentration in Groundwater
September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs
Mountain View, California

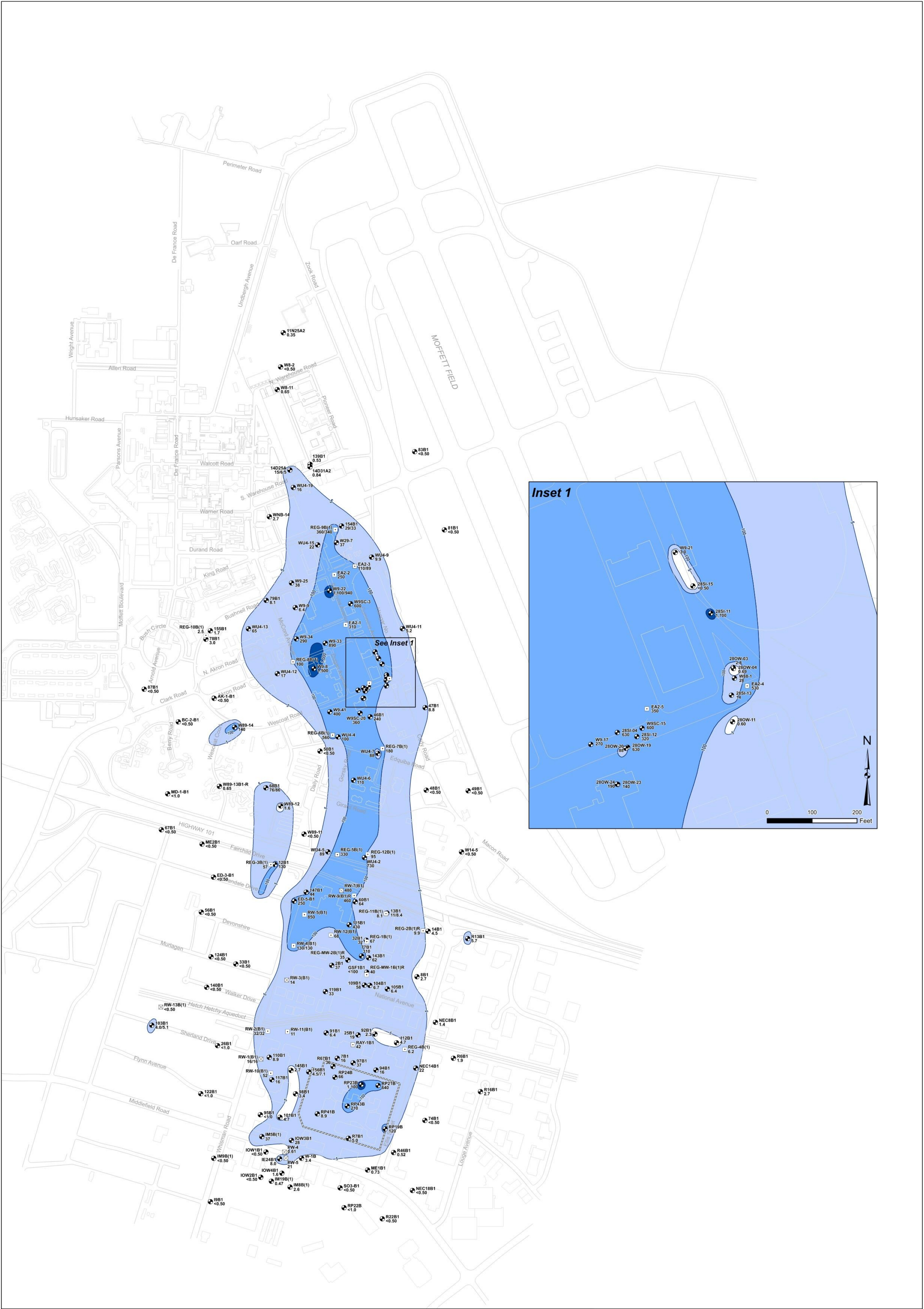
Geosyntec
consultants

Figure
C-5

Oakland

April 2025

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB1-B2.aprx\FigC-05_TCE_Contours_B1 2/13/2025 12:04 PM (Howie.Chen)



Legend

cDCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

Slurry Wall

Building

Road

R22B1

Well ID

<0.50

cDCE Concentration (µg/L)

Notes:

cDCE = cis-1,2-dichloroethene

MEW = Middlefield-Ellis-Whisman

µg/L = micrograms per liter

2.4/0.94 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit.

- Figure shows only those wells sampled and analyzed for cDCE in September/October 2024.

- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

B1 Zone cDCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Figure

C-6

Oakland

April 2025

0

500

1,000

Feet

N

0

100

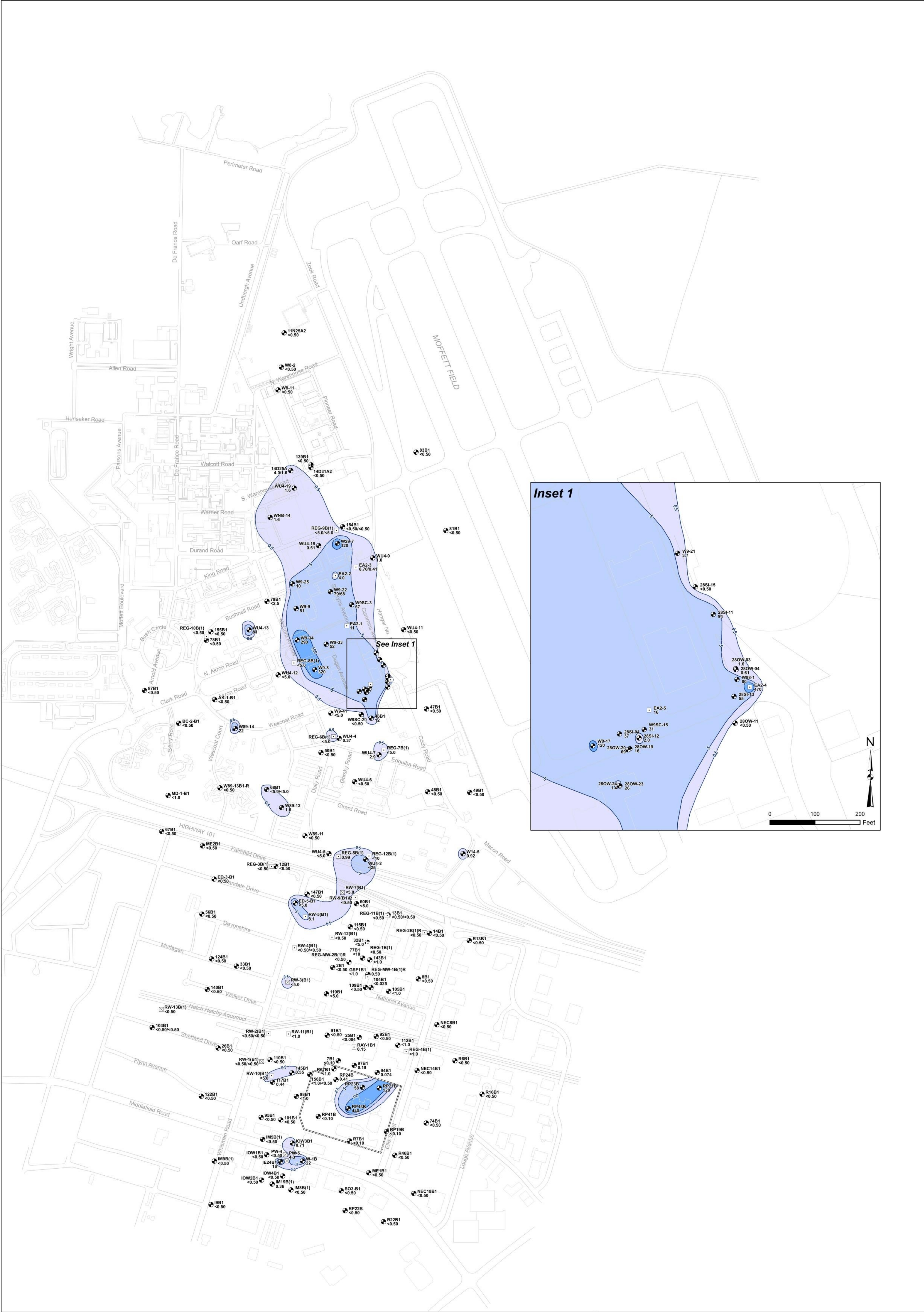
200

Feet

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB1-B2.aprx

FigC-06_cDCE_Contours_B1

2/13/2025 12:04 PM (Howie.Chen)



Legend

VC Concentration
0.5 – 5 µg/L
5 – 100 µg/L
100 – 1,000 µg/L
1,000 – 10,000 µg/L
Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

R22B1 — Well ID

<0.50 — VC Concentration (µg/L)

Slurry Wall

Building

Road

Notes:
MEW = Middlefield-Ellis-Whisman
VC = vinyl chloride
µg/L = micrograms per liter
<0.50/<0.50 = sample/duplicate sample
<# = analyte not detected at or above the laboratory reporting limit (#).
- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyte has not been historically detected were contoured as less than 0.50 µg/L.
- Figure shows only those wells sampled and analyzed for VC in September/October 2024.
- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.
- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

05001,000

Feet

**B1 Zone VC Concentration in Groundwater
September/October 2024**

**MEW Fairchild & Regional Groundwater Remediation Programs
Mountain View, California**

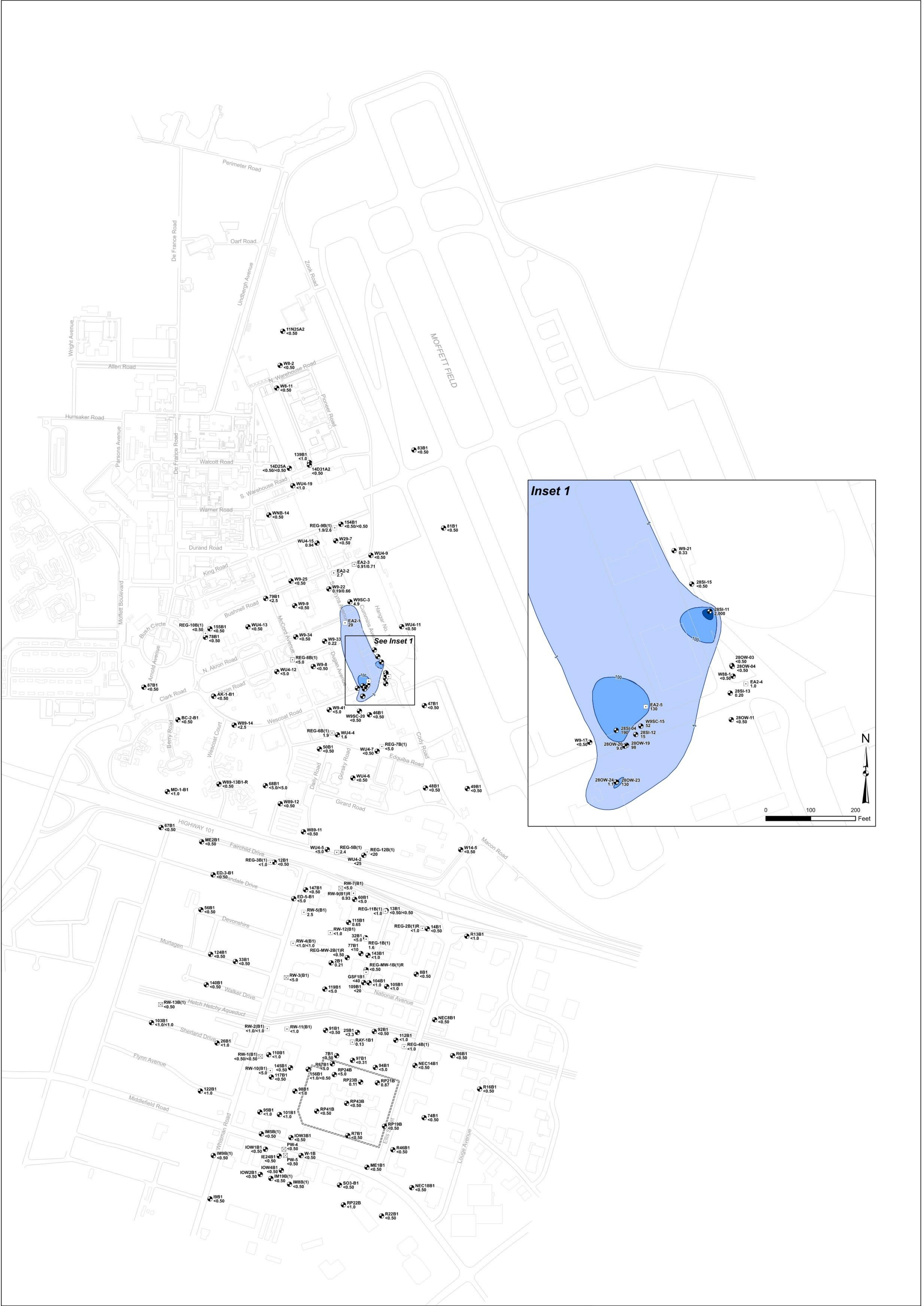
Geosyntec
consultants

**Figure
C-7**

Oakland

April 2025

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB1-B2.aprx\FigC-07_VC_Contours_B1 2/13/2025 12:04 PM (Howie.Chen)



5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

Slurry Wall

Building

Road

R22B1

Well ID

<0.50

PCE Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

PCE = tetrachloroethene

µg/L = micrograms per liter

<0.50/<0.50 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyte has not been historically detected were contoured as less than 5 µg/L.

- Figure shows only those wells sampled and analyzed for PCE in September/October 2024.

- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

0

500

1,000

Feet

0

100

200

Feet

0

100

200

Feet

B1 Zone PCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-8

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB1-B2.aprx\FigC-08_PCE_Contours_B1 2/13/2025 12:04 PM (Howie.Chen)



Legend

TCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

Slurry Wall

Building

Road

R30B2

9.2

Well ID

TCE Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

TCE = trichloroethene

µg/L = micrograms per liter

<0.50/<0.50 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

NS = not sampled due to pump issues.

- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit.

- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 11B2, which was resampled on January 27, 2025.

- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

B2 Zone TCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Figure

C-9

Oakland

April 2025

0

500

1,000

Feet

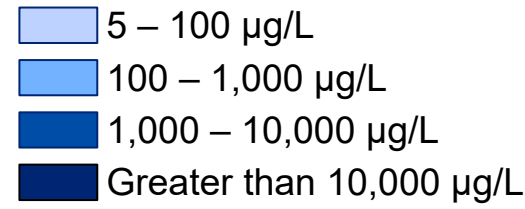
North Arrow

P:\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB1-B2.aprxFigC-09_TCE_Contours_B2 2/18/2025 10:23 AM (kwallon)



Legend

cDCE Concentration



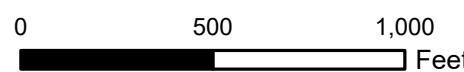
- ☒ Monitoring Well
- ☐ Recovery Well On
- ☒ Recovery Well Off

- R30B2** — Well ID
<0.50 — cDCE Concentration (µg/L)

- 
- Slurry Wall
Building
Road

Notes:
cDCE = cis-1,2-dichloroethene
MEW = Middlefield-Ellis-Whisman
µg/L = micrograms per liter
≤0.50/0.50 = sample/duplicate sample
≤# = analyze not detected at or above the laboratory reporting limit (#).
N/A = not sampled due to pump issues.

- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyze has not been historically detected were contoured as less than 5 µg/L.
- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 11B2, which was resampled on January 27, 2025.
- Concentration contours are based on the 2024 groundwater concentrations and professional judgment.
- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.



B2 Zone cDCE Concentration in Groundwater September/October 2024

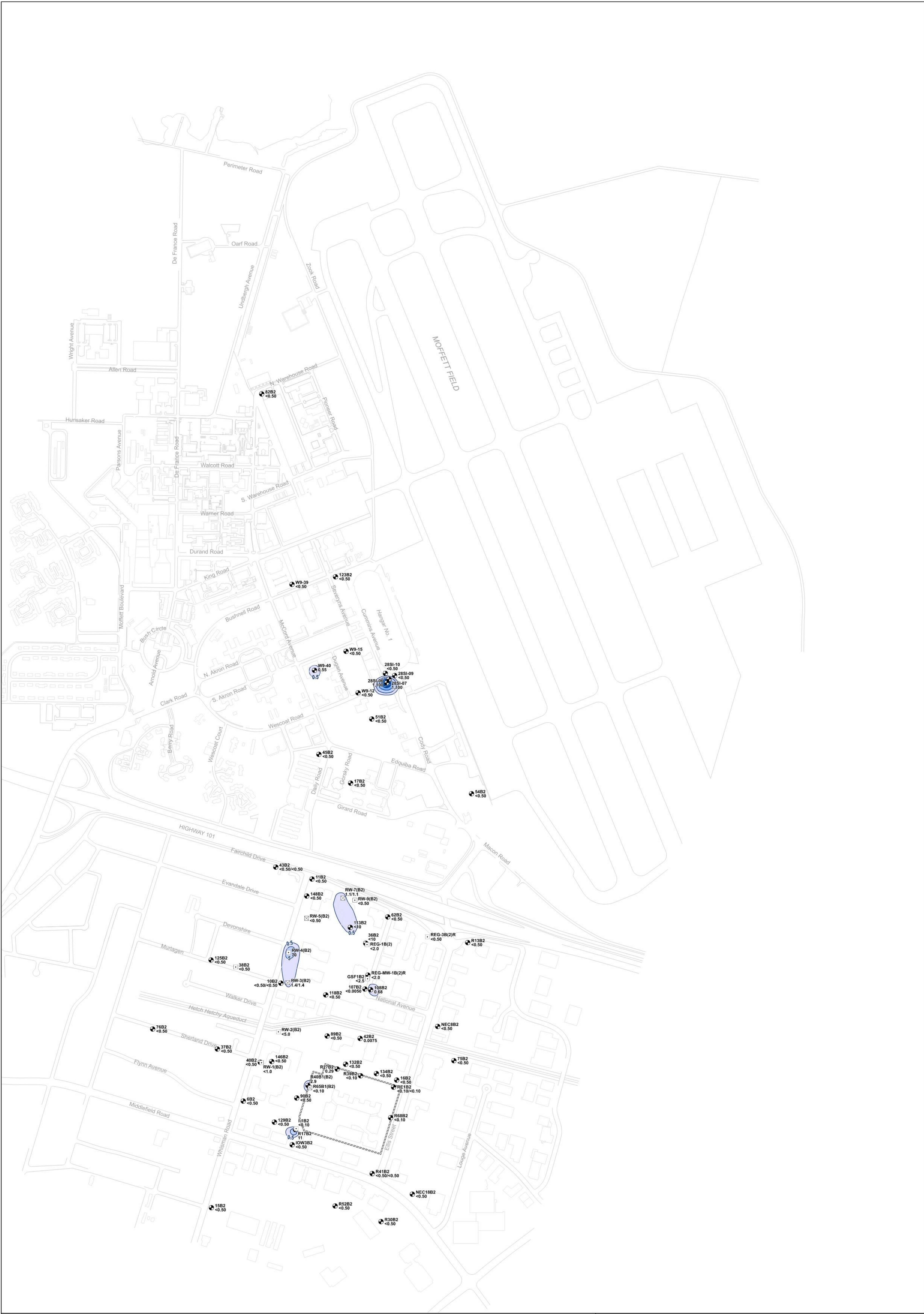
**MEW Fairchild & Regional Groundwater Remediation Programs
Mountain View, California**

Geosyntec 
consultants

**Figure
C-10**

Oakland

April 2025



Legend

VC Concentration
0.5 – 5 µg/L
5 – 100 µg/L
100 – 1,000 µg/L
1,000 – 10,000 µg/L
Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

R30B2 — Well ID

<0.50 — VC Concentration (µg/L)

Slurry Wall

Building

Road

Notes:
MEW = Middlefield-Ellis-Whisman
VC = vinyl chloride
µg/L = micrograms per liter
<0.50/<0.50 = sample/duplicate sample
<# = analyte not detected at or above the laboratory reporting limit (#).
NS = not sampled due to pump issues.
- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyte has not been historically detected were contoured as less than 0.50 µg/L.
- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 11B2, which was resampled on January 27, 2025.
- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.
- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

05001,000

Feet

B2 Zone VC Concentration in Groundwater
September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs
Mountain View, California

Geosyntec
consultants

Figure
C-11

Oakland

April 2025

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Legend

PCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well On

Recovery Well Off

Slurry Wall

Building

Road

R30B2

Well ID

<0.50

PCE Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

PCE = tetrachloroethene

µg/L = micrograms per liter

<0.50/<0.50 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

NS = not sampled due to pump issues.

- Wells with non-detections were contoured assuming a value of one-half the laboratory reporting limit. Wells with non-detections where the analyte has not been historically detected were contoured as less than 5 µg/L.

- Groundwater samples were collected during the September/October 2024 biennial sampling event, with the exception of 11B2, which was resampled on January 27, 2025.

- Concentration contours are based on the 2024 groundwater concentrations and professional judgement.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

0

500

1,000

Feet

N

B2 Zone PCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

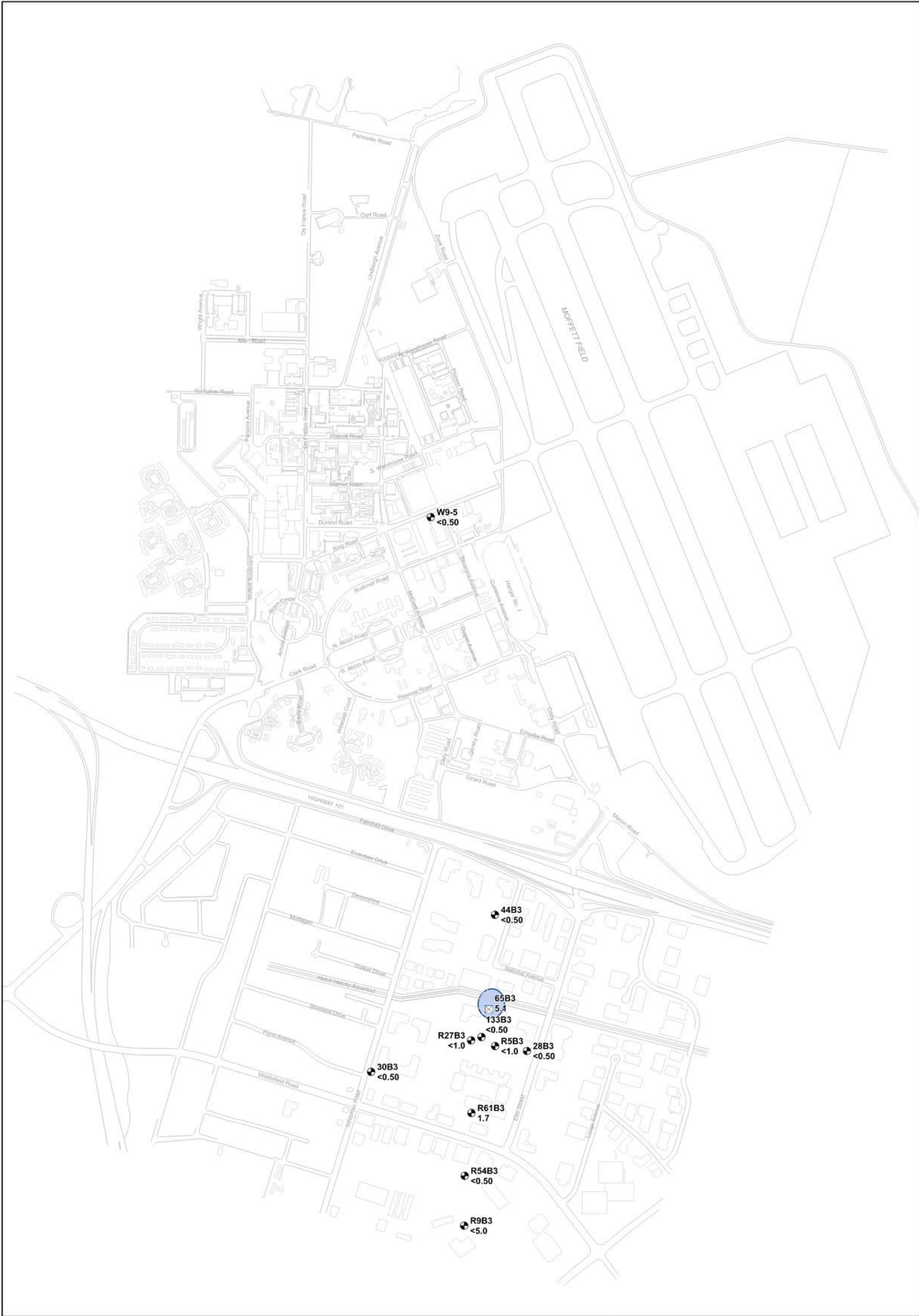
Figure

C-12

Oakland

April 2025

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Legend

TCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

R9B3

<5.0

Well ID

TCE Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

TCE = trichloroethene

µg/L = micrograms per liter

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for TCE in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

- Concentration contours are based on 2024 groundwater concentrations and professional judgement.

N

0

1,000

Feet

B3 Zone TCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-13

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-13_TCE_Contours_B3 2/13/2025 12:29 PM (Howie.Chen)



Legend

cDCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

R9B3

<5.0

Well ID

cDCE Concentration (µg/L)

Notes:

cDCE = cis-1,2-dichloroethene

MEW = Middlefield-Ellis-Whisman

µg/L = micrograms per liter

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for cDCE in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

N

0

1,000

Feet

B3 Zone cDCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-14

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-14_cDCE_Contours_B3 2/13/2025 12:29 PM (Howie.Chen)



Legend

VC Concentration

0.5 – 5 µg/L

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

R9B3

<5.0

Well ID

VC Concentration (µg/L)

Building

Road

Notes:

MEW = Middlefield-Ellis-Whisman

VC = vinyl chloride

µg/L = micrograms per liter

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for VC in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

N

0

1,000

Feet

B3 Zone VC Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-15

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-15_VC_Contours_B3 2/13/2025 12:29 PM (Howie.Chen)



Legend

PCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

R9B3

<5.0

Well ID

PCE Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

PCE = tetrachloroethene

µg/L = micrograms per liter

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for PCE in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

Building

Road

0

1,000

Feet

N

B3 Zone PCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-16

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-16_PCE_Contours_B3 2/13/2025 12:29 PM (Howie.Chen)



Legend

TCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

Building

Road

Well ID

TCE Concentration (µg/L)

W9-3

6C

11C

RW-1C

8C

DW2-234

9C

10C

DW1-230

R4C

<0.50

<0.50

<0.50

0.65/<0.50

11

<0.50

<0.50

<0.50

<1.0

<0.50

Notes:

MEW = Middlefield-Ellis-Whisman

TCE = trichloroethene

µg/L = micrograms per liter

0.65/<0.50 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for TCE in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

- Concentration contours are based on 2024 groundwater concentrations and professional judgement.

C and Deep Zone TCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-17

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-17_TCE_Contours_CD 2/13/2025 12:29 PM (Howie.Chen)



Legend

cDCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

Building

Road

R4C

— Well ID

<0.50

— cDCE Concentration (µg/L)

Notes:

cDCE = cis-1,2-dichloroethene

MEW = Middlefield-Ellis-Whisman

µg/L = micrograms per liter

5.8/6.0 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for cDCE in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

- Concentration contours are based on 2024 groundwater concentrations and professional judgement.

C and Deep Zone cDCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-18

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-18_cDCE_Contours_CD 2/13/2025 12:29 PM (Howie.Chen)



Legend

VC Concentration

0.5 – 5 µg/L

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

Building

Road

R4C

<0.50

Well ID

VC Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

VC = vinyl chloride

µg/L = micrograms per liter

<0.50/<0.50 = sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for VC in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

- Concentration contours are based on 2024 groundwater concentrations and professional judgement.

0

1,000

Feet

N

C and Deep Zone VC Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

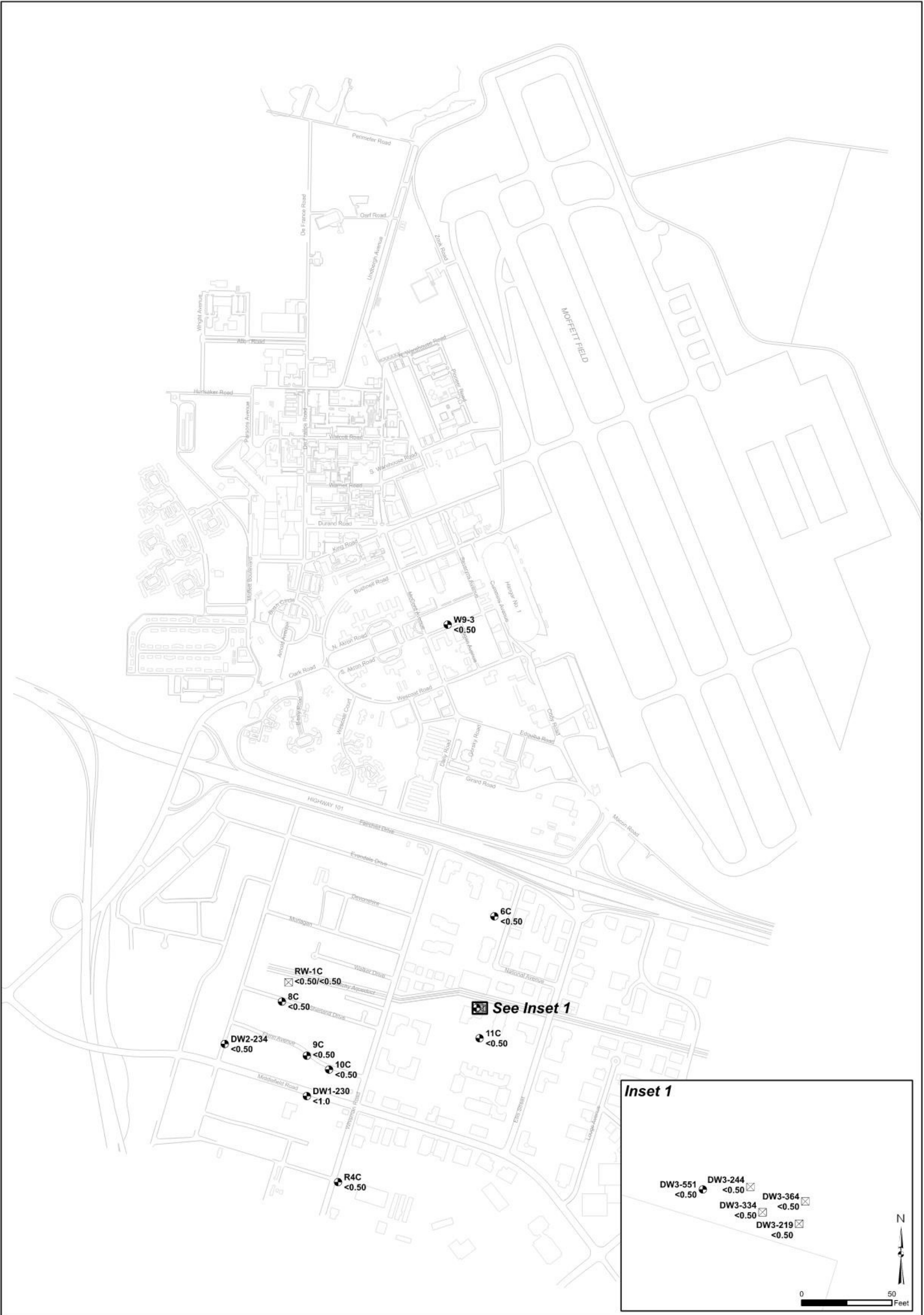
Oakland

April 2025

Figure

C-19

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-19_VC_Contours_CD 2/13/2025 12:29 PM (Howie.Chen)



Legend

PCE Concentration

5 – 100 µg/L

100 – 1,000 µg/L

1,000 – 10,000 µg/L

Greater than 10,000 µg/L

Monitoring Well

Recovery Well Off

Building

Road

R4C

<0.50

Well ID

PCE Concentration (µg/L)

Notes:

MEW = Middlefield-Ellis-Whisman

PCE = tetrachloroethene

µg/L = micrograms per liter

<0.50/<0.50= sample/duplicate sample

<# = analyte not detected at or above the laboratory reporting limit (#).

- Figure shows only those wells sampled and analyzed for PCE in September/October 2024.

- Recovery well symbology reflects the well operational status during the 2024 biennial sampling event.

- Concentration contours are based on 2024 groundwater concentrations and professional judgement.

C and Deep Zone PCE Concentration in Groundwater

September/October 2024

MEW Fairchild & Regional Groundwater Remediation Programs

Mountain View, California

Geosyntec

consultants

Oakland

April 2025

Figure

C-20

\\Oakland-01\data\GIS\MEW\Project\Regional\2024_AR\AppendixC_ZoneB3-CD.aprx\FigC-20_PCE_Contours_CD 2/13/2025 12:29 PM (Howie.Chen)

Table 2c
RGRP Wells North of 101 Listed by Owner
 MEW Fairchild and Regional Groundwater Remediation Programs
 Mountain View, California

Geosyntec Consultants

Owner: Fairchild (North of 101)					
A Zone	B1 Zone	B2 Zone	B3 Zone	C Zone	Deep Zone
65A	46B1	17B2			
72A	47B1	51B2			
73A	48B1	54B2			
74A	49B1	82B2			
75A	50B1	123B2			
81A	68B1				
82A	78B1				
88A	79B1				
89A	81B1				
92A ¹	83B1				
93A	87B1				
95A	139B1				
	154B1 ¹				
	155B1 ¹				

Owner: MEW RGRP (North of 101)					
A Zone	B1 Zone	B2 Zone	B3 Zone	C Zone	Deep Zone
AK-1-A	AK-1-B1				
BC-1-A	BC-2-B1				
PR-1-A	MD-1-B1				
REG-2A	REG-5B(1)				
REG-3A	REG-6B(1)				
REG-4A	REG-7B(1)				
REG-5A	REG-8B(1)				
REG-6A	REG-9B(1)				
REG-7A	REG-10B(1)				
REG-8A	REG-12B(1)				
REG-9A					

Owner: NASA (North of 101)					
A Zone	B1 Zone	B2 Zone	B3 Zone	C Zone	Deep Zone
14D02A					
14D09A					
14D13A					
14E14A					
15H05A					

Owner: Navy (North of 101)					
A Zone	B1 Zone	B2 Zone	B3 Zone	C Zone	Deep Zone
W9-16	W9-17				
W9-38	W9-25				
W12-6	W9-41				
W14-3	W9SC-20				
W60-2	W14-5				
W89-1	W89-11				
W89-2	W89-12				
W89-03A-R	W89-13B1-R				
W89-04A-R	W89-14				
W89-5	WNB-14				
W89-7	WU4-2				
W89-8	WU4-4				
W89-9	WU4-5				
WT14-1	WU4-6				
WU4-1	WU4-7				
WU4-3	WU4-12				
WU4-16	WU4-13				
WU4-18	WU4-19				

Notes:

1. Voluntary well included in RGRP in 2024.

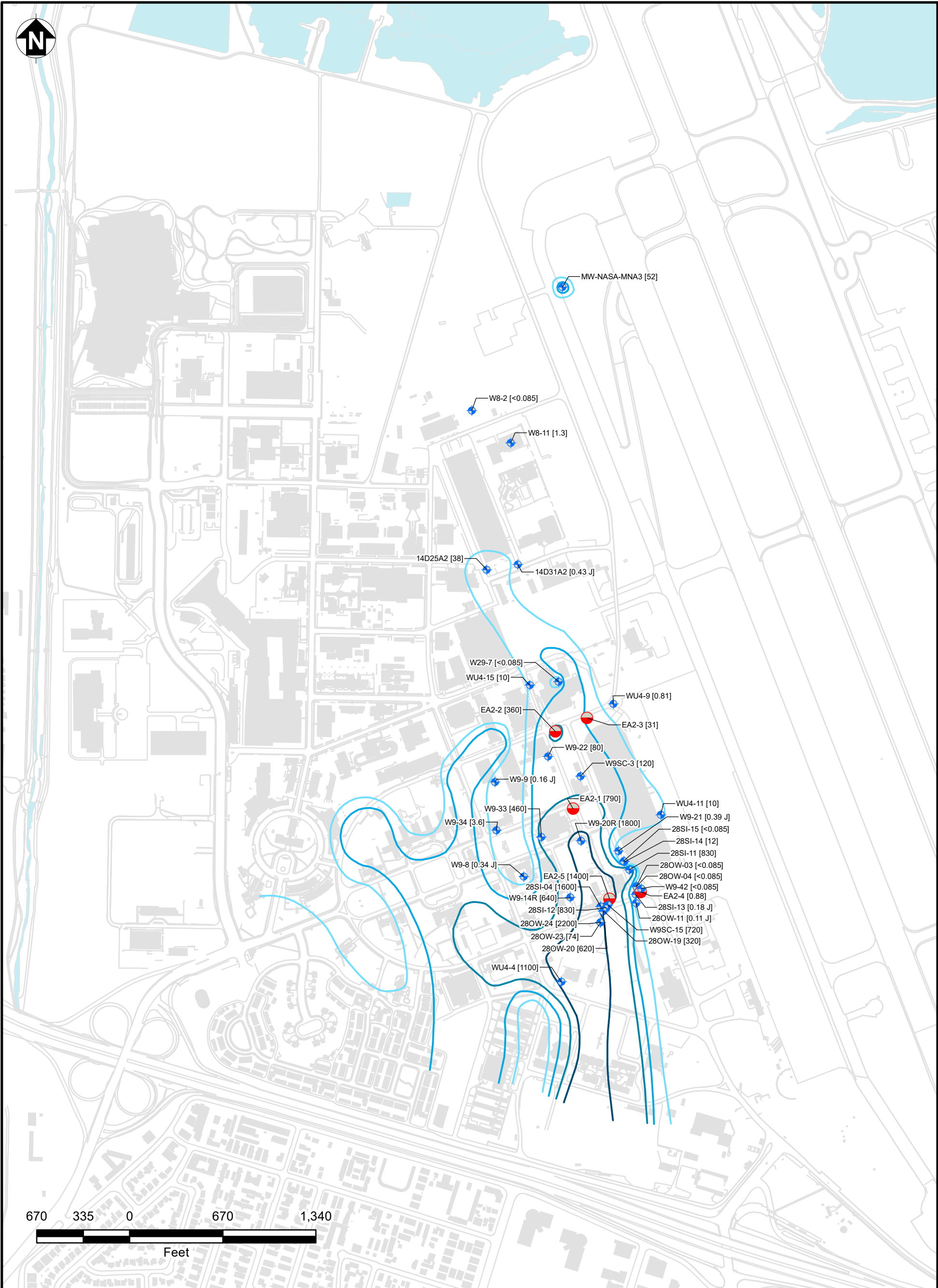
Wells in **bold** are RGRP Regional Recovery Wells (RRWs).

MEW = Middlefield-Ellis-Whisman

NASA = United States National Aeronautics and Space Administration

Navy = United States Navy

RGRP = Regional Groundwater Remediation Program



Monitoring Well

Extraction Well

TCE ISO-CONCENTRATION CONTOUR - 1,000 µg/L

TCE ISO-CONCENTRATION CONTOUR - 250 µg/L

TCE ISO-CONCENTRATION CONTOUR - 50 µg/L

TCE ISO-CONCENTRATION CONTOUR - 5 µg/L

ROAD

FACILITY INFRASTRUCTURE

Notes:
1. Samples collected in Sept-Oct. 2024
2. TCE concentrations shown in µg/L

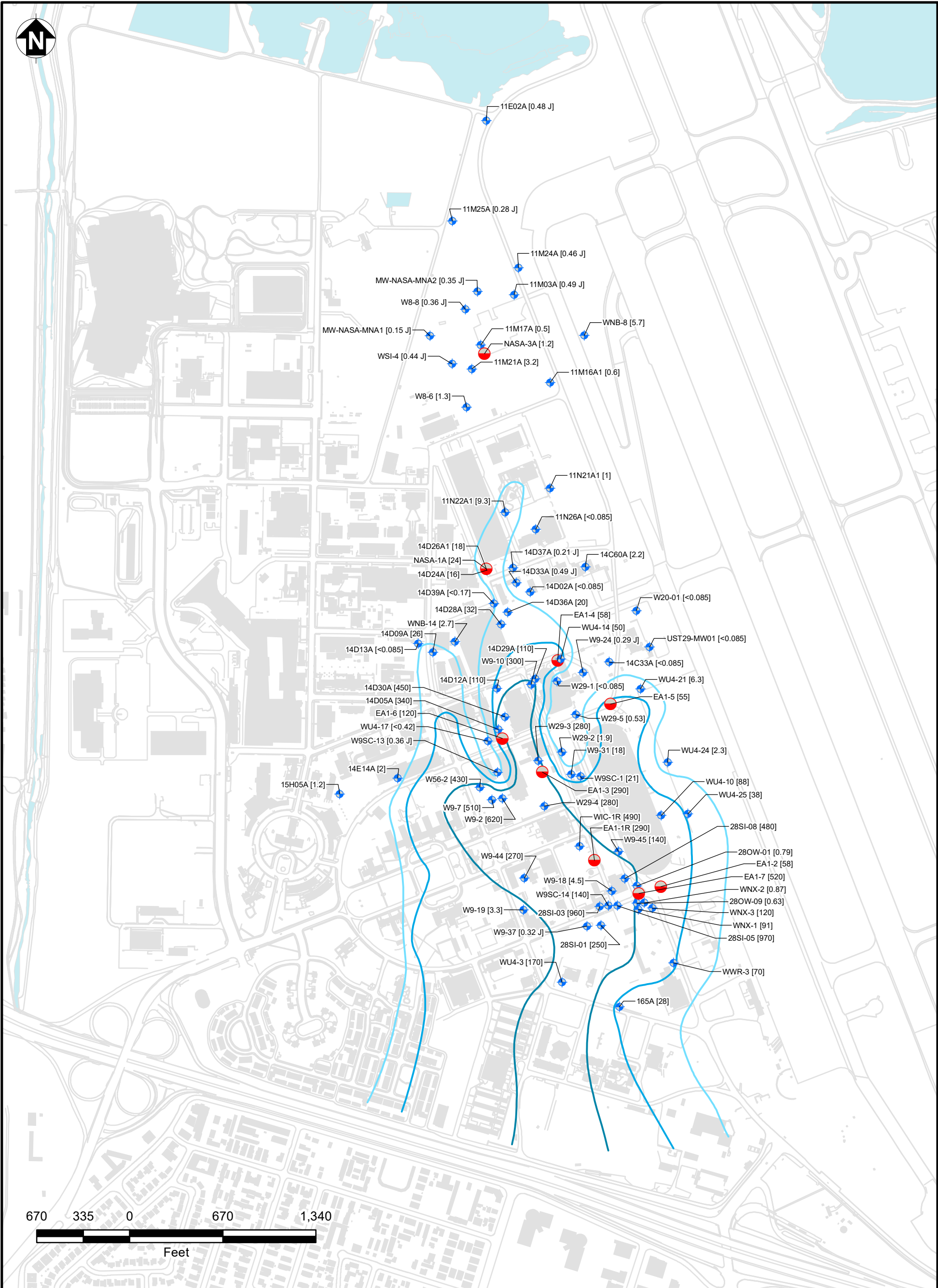
µg/L- Micrograms per Liter
J - Estimated Value
MEW - Middlefield-Ellis-Whisman
NS - Not Sampled
NASA - National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT
NASA RGRP

FIGURE 2-14
CY2024 ESTIMATED ISO-CONCENTRATION CONTOURS
TRICHLOROETHENE (TCE) IN THE A2/B1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA



Monitoring Well

Extraction Well

DCE ISO-CONCENTRATION CONTOUR - 1,000 µg/L

DCE ISO-CONCENTRATION CONTOUR - 250 µg/L

DCE ISO-CONCENTRATION CONTOUR - 50 µg/L

DCE ISO-CONCENTRATION CONTOUR - 6 µg/L

ROAD

FACILITY INFRASTRUCTURE

Notes:
1. Samples collected in Sept-Oct. 2024
2. DCE concentrations shown in µg/L

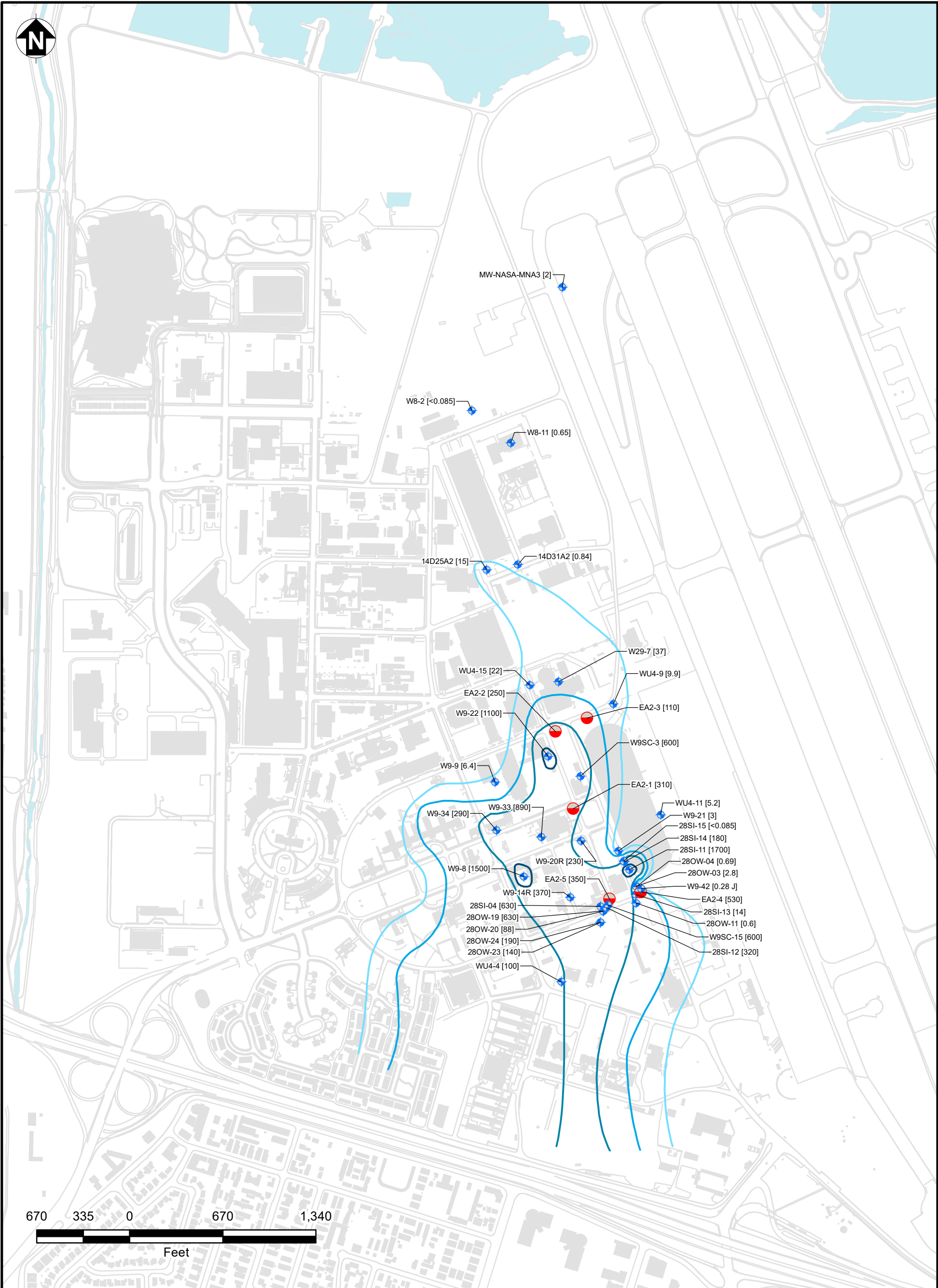
µg/L- Micrograms per Liter
J - Estimated Value
MEW - Middlefield-Ellis-Whisman
NS - Not Sampled
NASA - National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT
NASA RGRP

FIGURE 2-15
CY2024 ESTIMATED ISO-CONCENTRATION CONTOURS
CIS-1,2-DICHLOROETHENE (DCE) IN THE A1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA



Monitoring Well

Extraction Well

DCE ISO-CONCENTRATION CONTOUR - 1,000 µg/L

DCE ISO-CONCENTRATION CONTOUR - 250 µg/L

DCE ISO-CONCENTRATION CONTOUR - 50 µg/L

DCE ISO-CONCENTRATION CONTOUR - 6 µg/L

ROAD

FACILITY INFRASTRUCTURE

Notes:

1. Samples collected in Sept-Oct. 2024

2. DCE concentrations shown in µg/L

µg/L- Micrograms per Liter

J - Estimated Value

MEW - Middlefield-Ellis-Whisman

NS - Not Sampled

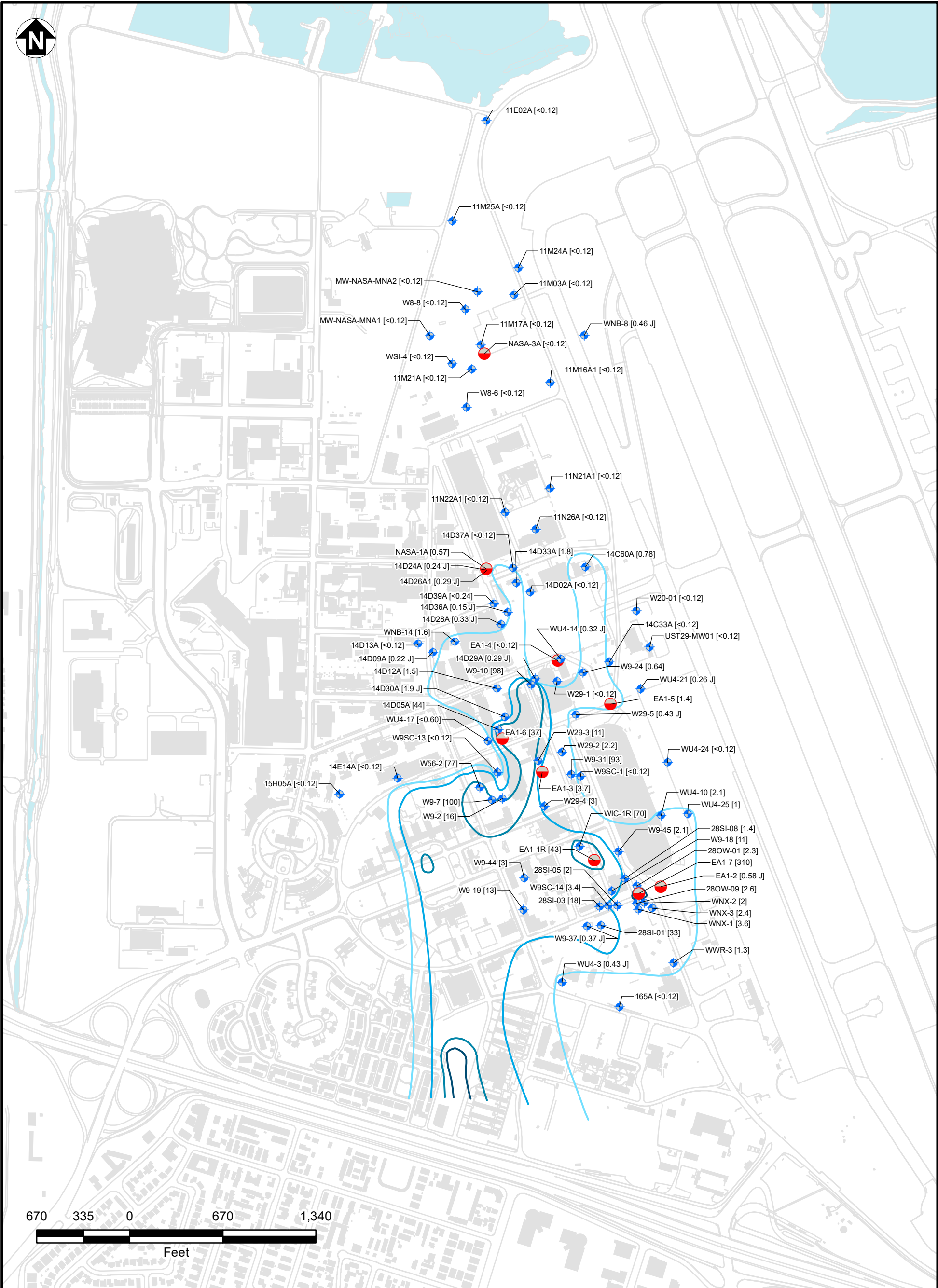
NASA - National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT
NASA RGRP

FIGURE 2-16
CY2024 ESTIMATED ISO-CONCENTRATION CONTOURS
CIS-1,2-DICHLOROETHENE (DCE) IN THE A2/B1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA



Monitoring Well

Extraction Well

VC ISO-CONCENTRATION CONTOUR - 100 µg/L

VC ISO-CONCENTRATION CONTOUR - 25 µg/L

VC ISO-CONCENTRATION CONTOUR - 5 µg/L

VC ISO-CONCENTRATION CONTOUR - 0.5 µg/L

ROAD

FACILITY INFRASTRUCTURE

Notes:

1. Samples collected in Sept-Oct. 2024

2. VC concentrations shown in µg/L

µg/L - Micrograms per Liter

J - Estimated Value

MEW - Middlefield-Ellis-Whisman

NS - Not Sampled

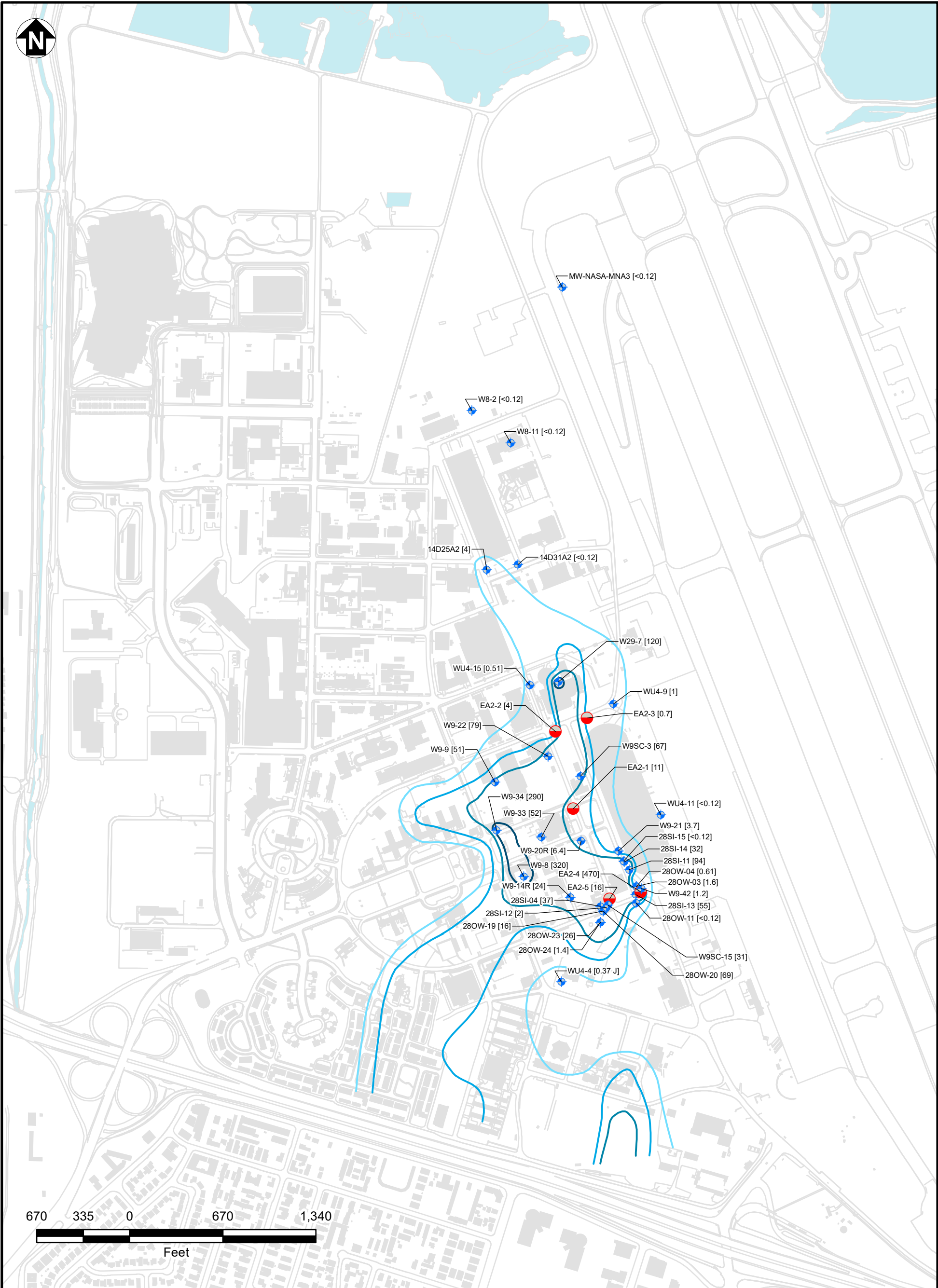
NASA - National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT
NASA RGRP

FIGURE 2-17
CY2024 ESTIMATED ISO-CONCENTRATION
CONTOURS VINYL CHLORIDE (VC) IN THE A1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA



Monitoring Well

Extraction Well

VC ISO-CONCENTRATION CONTOUR - 100 µg/L

VC ISO-CONCENTRATION CONTOUR - 25 µg/L

VC ISO-CONCENTRATION CONTOUR - 5 µg/L

VC ISO-CONCENTRATION CONTOUR - 0.5 µg/L

ROAD

FACILITY INFRASTRUCTURE

Notes:

1. Samples collected in Sept-Oct. 2024

2. VC concentrations shown in µg/L

µg/L- Micrograms per Liter

J - Estimated Value

MEW - Middlefield-Ellis-Whisman

NS - Not Sampled

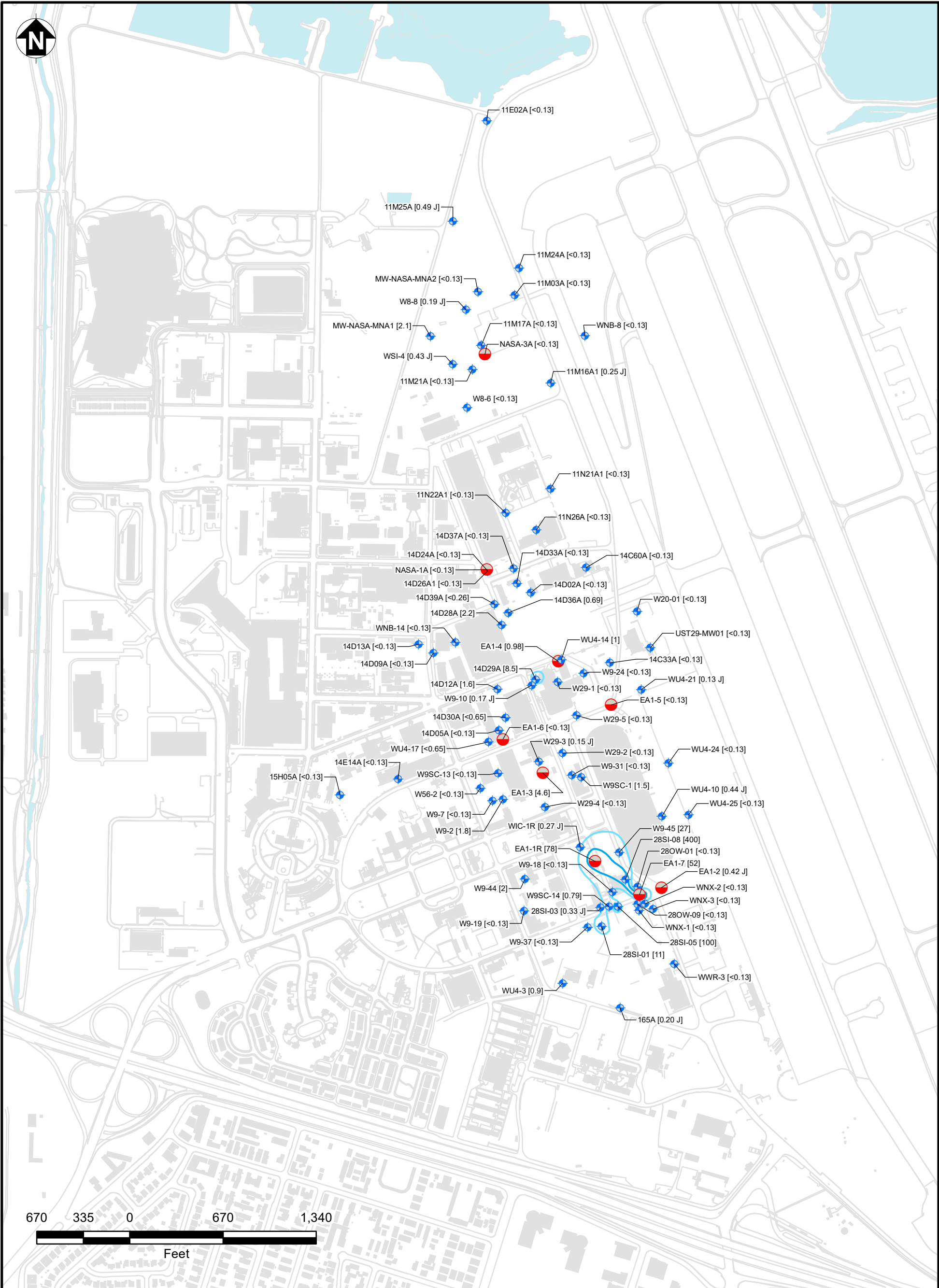
NASA - National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT
NASA RGRP

FIGURE 2-18
CY2024 ESTIMATED ISO-CONCENTRATION CONTOURS
VINYL CHLORIDE (VC) IN THE A2/B1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA



Monitoring Well

Extraction Well

PCE ISO-CONCENTRATION CONTOUR - 50 µg/L

PCE ISO-CONCENTRATION CONTOUR - 5 µg/L

ROAD

FACILITY INFRASTRUCTURE

Notes:

1. Samples collected in Sept-Oct. 2024
2. PCE concentrations shown in µg/L

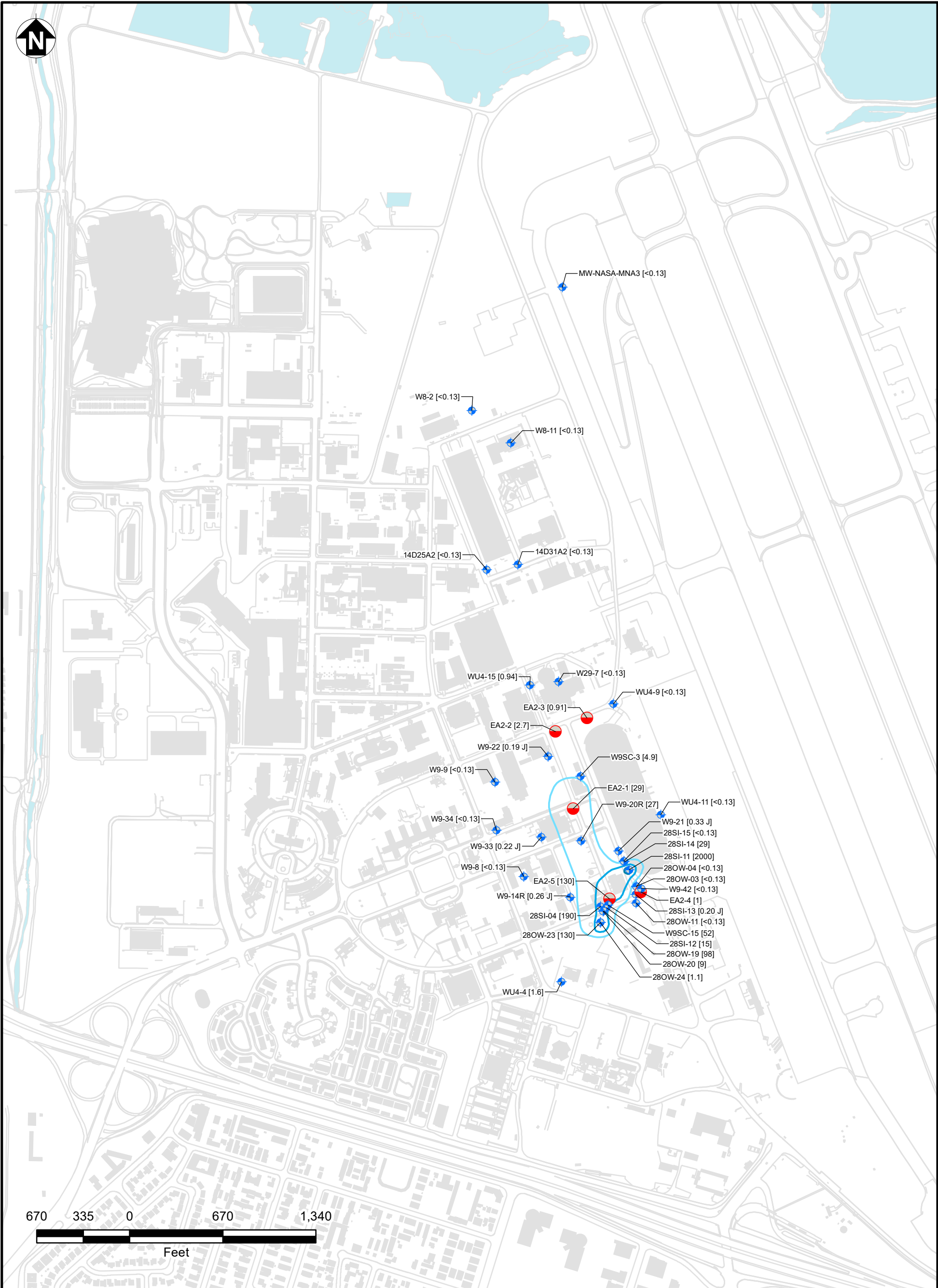
µg/L - Micrograms per Liter
J - Estimated Value
MEW - Middlefield-Ellis-Whisman
NS - Not Sampled
NASA - National Aeronautics and Space Administration

Ames Research Center
Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT
NASA RGRP

FIGURE 2-19
CY2024 ESTIMATED ISO-CONCENTRATION CONTOURS
TETRACHLOROETHENE (PCE) IN THE A1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA





Monitoring Well



Extraction Well



PCE ISO-CONCENTRATION CONTOUR - 250 µg/L



PCE ISO-CONCENTRATION CONTOUR - 50 µg/L



PCE ISO-CONCENTRATION CONTOUR - 5 µg/L



ROAD



FACILITY INFRASTRUCTURE

Notes:

1. Samples collected in Sept-Oct. 2024

2. PCE concentrations shown in µg/L

µg/L- Micrograms per Liter

J - Estimated Value

MEW - Middlefield-Ellis-Whisman

NS - Not Sampled

NASA - National Aeronautics and Space Administration



Ames Research Center

Moffett Field, CA 94035

2024 ANNUAL PROGRESS REPORT

NASA RGRP

FIGURE 2-20

CY2024 ESTIMATED ISO-CONCENTRATION CONTOURS

TETRACHLOROETHENE (PCE) IN THE A2/B1 AQUIFER

NASA AMES RESEARCH CENTER, MOFFETT FIELD, CALIFORNIA

APPENDIX B

NEX (Building 503) and Former Building 88 Data

(Provided Separately)