Naval Facilities Engineering Systems Command

Final
NOVEMBER 2024

Fifth Five-Year Review

Sites 302, 303, and 304 and Tank 50

Naval Base Kitsap Manchester, Kitsap County, Washington

United States Department of the Navy
Naval Facilities Engineering Systems Command Northwest
1101 Tautog Circle
Silverdale, WA 98315-1101

Naval Facilities Engineering Systems Command Northwest
BRAC PMO West
Silverdale, WA

Final
Fifth Five-Year Review

Sites 302, 303, and 304 and Tank 50

Naval Base Kitsap Manchester,
Kitsap County, Washington

November 2024

DCN: LBJV-5006-4052-0005

Prepared for:

United States Department of the Navy
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Contract Number: N44255-20-D-5006; Task Order No. N4425524F4052

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Five-Year Review
Concurrence and Signature Page

This Five-Year Review addresses Sites 302, 303, and 304 and Tank 50 at Naval Base Kitsap Manchester, Washington. The lead agency for this Review is the United States Navy (Navy).

Concurrence on this review is provided by Naval Base Kitsap.

John Hale
Captain, U.S. Navy
Commanding Officer
Naval Base Kitsap, Bremerton, Washington

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Acronyms and Abbreviations

µg/L ..... micrograms per liter

AET ..... Apparent Effects Threshold
AFFF ..... aqueous film forming foam
ARAR ..... applicable or relevant and appropriate requirement
AST ..... aboveground storage tank

bgs ..... below ground surface
BTEX ..... benzene, toluene, ethylbenzene and total xylenes

CERCLA ..... Comprehensive Environmental Response, Compensation, and Liability Act
CFR ..... Code of Federal Regulations
COC ..... Chain of Custody
COPC ..... Chemical(s) of Potential Concern
cPAH ..... carcinogenic PAH
CRP ..... community relations plan
CSL ..... cleanup screening level
CUL ..... cleanup level

DON ..... United States Department of the Navy
DRO ..... diesel range organics

Ecology ..... Washington State Department of Ecology
EPA ..... United States Environmental Protection Agency
ESG ..... Environmental and Safety Guide

FCR ..... fish consumption rate
FS ..... feasibility study
FYR ..... Five-Year Review

GRO ..... gasoline range organics

HHRS ..... Human Health Risk Screening

IR ..... Installation Restoration

JP ..... jet petroleum

Kane ..... Kane Environmental, LLC

LIF ..... laser-induced fluorescence
LUC ..... land use control

MILCON ..... Military Construction
MTCA ..... Model Toxics Control Act

NAVFAC ..... Naval Facilities Engineering Systems Command
NAVSUP ..... Naval Supply Systems Command
Navy ..... The Department of the Navy
NBK ..... Naval Base Kitsap
NCP ..... National Oil and Hazardous Substances Pollution Contingency Plan
NFA ..... no further action
NPL ..... National Priorities List

PA ..... preliminary assessment
PAH ..... polycyclic aromatic hydrocarbon
PCB ..... polychlorinated biphenyl
PFAS ..... per- and polyfluoroalkyl substances
PFBS ..... perfluorobutanesulfonic acid
PFHxS ..... perfluorohexanesulfonic acid
PFNA ..... perfluorononanoic acid
PFOA ..... perfluorooctanoic acid
PFOS ..... perfluorooctane sulfonate
ppm ..... part per million
PQL ..... practical quantitation limit
PVC ..... polyvinyl chloride

RAO ..... remedial action objective
RCRA ..... Resource Conservation and Recovery Act
RI ..... remedial investigation
RME ..... reasonable maximum exposure
ROD ..... Record of Decision
RRO ..... residual-range organics

SARA ..... Superfund Amendments and Reauthorization Act of 1986
SCUM ..... Sediment Cleanup User's Manual
SI ..... site inspection
SMS ..... Sediment Management Standards
SQS ..... Sediment Quality Standards

TOC ..... total organic carbon
TPH ..... total petroleum hydrocarbons

UST ..... underground storage tank
UU/UE ..... unlimited use and unrestricted exposure

VOC ..... volatile organic compound

WAC ..... Washington Administrative Code

Executive Summary

The Department of the Navy (Navy) has conducted this Five-Year Review (FYR) for Sites 302, 303, and 304 and Tank 50 located at the Naval Base Kitsap (NBK) Manchester, Kitsap County, Washington, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121(c), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) Part 300.430(f)(4)(ii) of the Code of Federal Regulations. The report has been prepared in accordance with the United States Environmental Protection Agency (EPA) Comprehensive FYR Guidance (EPA 2001), Navy/Marine Corps Policy for Conducting CERCLA FYRs (Navy, 2011) and Washington Administrative Code (WAC) 173-340-420(3) for periodic reviews.

This is the fifth FYR for Sites 302, 303, and 304 and Tank 50. The end date of the fourth FYR period for Sites 302, 303, and 304 and Tank 50 (December 19, 2019) was used as the trigger date for this FYR.

This review included a document and data review, site inspections, personnel interviews, and regulatory agency comments. The methods, findings, conclusions, and recommendations identified during the review are presented in this report. Documents prepared between June 2019 to August 2024 were reviewed for this FYR.

NBK Manchester is not listed on the CERCLA National Priorities List. Polychlorinated biphenyl (PCBs) (i.e., found at Site 302) are a hazardous substance under CERCLA; however, Site 302 was voluntarily investigated and recommended for cleanup activities to comply with the Navy Installation Restoration (IR) Program, which is consistent with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986. All four sites (i.e., Sites 302, 303, and 304 and Tank 50) at NBK Manchester have been impacted by petroleum hydrocarbons (which are not hazardous substances under CERCLA) but are regulated under the Model Toxics Control Act (MTCA) with oversight from the Washington State Department of Ecology (Ecology). Ecology issued no further action (NFA) letters (Ecology, 1998, 2000, and 2001) for all four sites indicating that contaminants found during investigation of the sites were either properly remediated or do not pose a risk to human health or the environment. This determination was based primarily on their current and future land use (i.e., industrial/ fuel farm). As such, land use control (LUC) requirements were identified in the NFA letters to protect against exposure to residual contamination in soil and/or groundwater (Ecology, 1998, 2000, and 2001).

This FYR has been prepared due to hazardous substances, pollutants, or contaminants remaining at the sites above levels that allow for unlimited use and unrestricted

exposure (UU/UE). As a result, a statutory review is required in accordance with WAC 173-340-420(3) for periodic reviews. The purpose of the FYR is to determine whether the remedies identified (i.e., LUCs) in the NFA letters for the sites remain protective of human health and the environment. The progress since the last FYR, data review, technical assessment, issues/recommendations, and ultimately, protectiveness determinations are documented in the FYR report.

Based on the technical assessment for Sites 302, 303, and 304 and Tank 50 at NBK Manchester, the remedies are functioning as intended by the NFA letters (Ecology, 1998, 2000, and 2001); exposure assumptions, toxicity data, and cleanup levels used at the time of the remedial actions are still valid (with the exception of Site 302); and no other information has come to light that compromises the protectiveness of the remedies at this time. As a result of this FYR process, no issues (and subsequent recommendations) that affect current and/or future protectiveness of the remedy were identified; however, other findings and recommendations are identified that may improve performance of the remedy, reduce costs, improve management of operation and maintenance, or accelerate site closeout. Remedy implementation has been completed at all four sites. The remedies (i.e., LUCs) remain protective of human health and the environment, preventing exposures to residual contamination in soil and/or groundwater, as documented through the annual LUC inspections. Table ES-1 presents a summary of the technical assessment and protectiveness determinations and statements for Sites 302, 303, and 304 and Tank 50 at NBK Manchester.

Summary Forms

The following EPA FYR Summary Form provides additional information on the review assessment results and the future effectiveness of the remedies implemented at Sites 302, 303, and 304 and Tank 50.

Table ES-1: Technical Assessment and Protectiveness Summary for Sites 302, 303, and 304 and Tank 50

Site	Question A: Is the remedy functioning as intended by the decision document?	Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used the time of the remedy selection still valid?	Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	Protectiveness Determination
Site 302	Yes	Yes	No	Short-term Protective
	Protectiveness Statement: The remedy at Site 302 remains protective of human health and the environment because: 1) PCB source soil has been removed or capped, and seven years of post-remedy monitoring results support the conclusion that off-site contamination from surface water run-off has been effectively diminished from pre-remedy conditions; 2) land use has not changed since the Record of Decisions (RODs) (Navy, 1991 and 1992), nor is it expected to change; and 3) LUCs are maintained to prevent and control exposure to PCBs at Site 302. Additionally, NBK Manchester has put an excavation/dig permit process in place. However, based the concerns regarding the sediments at Little Clam Bay, the land use concerns with the fencing repair to be conducted in the northwest corner, and the potential PFAS concerns in groundwater although the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered short-term protective.			
Site 303	Yes	Yes	No	Short-term Protective
	Protectiveness Statement: Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." This determination was based primarily on the current and future land use at the site (i.e., industrial/fuel farm). LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). The remedy (i.e., LUCs) at Site 303 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections. Additionally, underground storage tanks (UST) 24, 25, and 26 have been removed and the area was over excavated (per NBK Manchester personnel). The remaining USTs (22 and 27-30) will be removed during future stages of the military construction (MILCON) project. Aboveground storage tanks (ASTs) are currently being constructed in place of the USTs. However, due to the presence of PFAS in identified at Building 85, which is adjacent to Site 303, during the site inspection and because the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered short-term protective.			
Site 304	Yes	Yes	No	Short-term Protective
	Protectiveness Statement: Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." This determination was based primarily on the current and future land use at the site (i.e., industrial/fuel farm). LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). Additionally, NBK Manchester has put an excavation/dig permit process in place. The remedy (i.e., LUCs) at Site 304 is			

Site	Question A: Is the remedy functioning as intended by the decision document?	Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used the time of the remedy selection still valid?	Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	Protectiveness Determination
	protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections. However, due to the presence of PFAS in groundwater identified during the site inspection and because the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered Short-term protective.			
Tank 50	Yes	Yes	No	Short-term Protective
	Protectiveness Statement: Ecology issued a NFA letter in 1998 stating "Based upon the information in the reports listed above and institutional controls placed at the facility, Ecology has determined that the release of total petroleum hydrocarbons (TPHs) into the soil and groundwater near Tank 50 no longer appears to pose a threat to human health or the environment." The LUC requirements are referred to in the NFA letter and are to guard against exposure to residual petroleum hydrocarbon-contaminated soil and groundwater (Ecology, 1998). Additionally, NBK Manchester has put an excavation/dig permit process in place. The remedy (i.e., LUCs) at Tank 50 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections. However, due to the uncertainty of the presence of PFAS identified during the site inspection and because the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered short-term protective.			
Sitewide	**Protectiveness Statement:** Remedy implementation is complete at Sites 302, 303, and 304 and Tank 50 of NBK Manchester. The selected remedy (i.e., LUCs) at Sites 302, 303, and 304 and Tank 50 is protective of human health and the environment, preventing exposures to residual contamination in soil and/or groundwater, as documented through the annual LUC inspections.			

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Sites 302, 303, and 304 and Tank 50		
EPA ID: Not Applicable		
Region: 10	**State:** WA	**City/County:** Manchester/Kitsap
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: Other Federal Agency If "Other Federal Agency" was selected above, enter Agency name: United States Department of the Navy		
Author name (Federal or State Project Manager): United States Department of the Navy (DON), Naval Facilities Engineering Systems Command (NAVFAC) Northwest		
Author affiliation: DON and NAVFAC Northwest		
Review period: January 2020 to August 2024		
Date of site inspection: June 5, 2024		
Type of review: Statutory		
Review number: Five		
Triggering action date: December 19, 2019		
Due date *(five years after triggering action date)*: December 19, 2024		

Issues/Recommendations
Sites without Issues/Recommendations Identified in the Five-Year Review:
Sites 302, 303, and 304 and Tank 50 did not have any issues/recommendations during this FYR period.

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1.0 Introduction

This report presents the results of the fifth Five-Year Review (FYR) for the following four sites at Naval Base Kitsap (NBK) Manchester, Kitsap County, Washington:

- Site 302 – Polychlorinated Biphenyl (PCB) Site
- Site 303 – D-Tunnel Tanks
- Site 304 – Industrial Area
- Tank 50 – Underground Storage Tank (UST) Release Site

This FYR was initiated in May 2024 and is based on activities conducted and data generated between January 2020 and August 2024 at these four sites. The triggering action for this FYR was the fourth FYR (Navy, 2020), which was signed on 19 December 2019.

NBK Manchester is not listed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL). Although PCBs (i.e., at Site 302) are a hazardous substance under CERCLA, Site 302 was voluntarily investigated and recommended for cleanup activities to comply with the Department of the Navy (Navy) Installation Restoration (IR) Program, which is consistent with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). Sites 302, 303, and 304 and Tank 50 have been impacted by petroleum hydrocarbons (which are not hazardous substances under CERCLA), which are regulated under the Model Toxics Control Act (MTCA) with oversight from Washington State Department of Ecology (Ecology).

As a matter of policy, the Navy follows the CERCLA process to the maximum extent practical at non-NPL sites. Additionally, as remedies for the sites include institutional controls through land use restrictions, a FYR is required pursuant to Navy policy. This FYR evaluates the implementation and performance of remedies to determine if the remedies are and will continue to be protective of human health and the environment. The report has been prepared in accordance with the United States Environmental Protection Agency (EPA) Comprehensive FYR Guidance (EPA 2001), Navy/Marine Corps Policy for Conducting CERCLA FYRs (Navy, 2011) and Washington Administrative Code (WAC) 173-340-420(3) for periodic reviews.

Ecology issued NFA letters (Ecology, 1998, 2000, and 2001) for all four sites stating, “contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment.” This determination was based primarily on the current and future land use at the sites

(i.e., industrial/fuel farm). As such, LUC requirements were identified in the NFA letters to protect against exposure to residual contamination in soil and/or groundwater (Ecology, 1998, 2000, and 2001).

1.1 Purpose

This FYR has been prepared since hazardous substances, pollutants, or contaminants were historically present at the sites above levels that allow for unlimited use and unrestricted exposure (UU/UE). As a result, a statutory review is required in accordance with Washington Administrative Code (WAC) 173-340-420(3) for periodic reviews. The purpose of the FYR is to determine whether the remedies identified (i.e., LUCs) in the NFA letters for the sites remain protective of human health and the environment. The progress since the last FYR, data review, technical assessment, issues/recommendations, and ultimately, protectiveness determinations are documented in the FYR report.

1.2 Five-Year Review Approach

This FYR report was prepared as part of the FYR process using Navy and U.S. Environmental Protection Agency (EPA) guidance (Navy, 2004b, 2011, 2013, 2014; EPA, 2001, 2012, and 2016). This FYR report is organized in accordance with recommendations from EPA's 2016 recommended template (EPA, 2016) and has been streamlined to minimize information presented in the previous four FYRs. The intent of this FYR report is to focus on the activities and issues over the last 5 years and recommendations and protectiveness for the next 5 years.

NBK Manchester is located less than 1 mile southwest of Bainbridge Island, approximately 3.5 miles northeast of the town of Port Orchard, and less than 1 mile north of the town of Manchester. The facility is situated on a small peninsula on the larger Kitsap Peninsula. This peninsula is located on the eastern edge of the larger Kitsap Peninsula and adjacent to Puget Sound to the east and Clam Bay to the north. NBK Manchester is divided into an eastern and western side of the facility by Little Clam Bay with these sides of the facility being connected by a 100-feet wide causeway. Figure 1-1 depicts the vicinity map for NBK Manchester.

In the early 1940s (at the beginning of World War II), NBK Manchester was developed into a key fuel depot and remains a fuel depot for the Navy. The majority of the facility is currently used for fuel storage, including underground and aboveground petroleum storage tanks, associated pipelines, and a fuel pier. The remainder of the facility is dedicated to an industrial area with support and administrative buildings located adjacent to the fuel pier. Fuel products previously or currently stored at the fuel depot

include Navy Special Fuel (No. 6 fuel oil [Bunker C]), marine diesel fuel, jet fuel, lubricant oil, and aviation gasoline.

As stated previously, several areas of the facility, specifically Sites 302, 303, and 304 and Tank 50, have been impacted by past releases of petroleum products to the environment which have required investigations and corrective actions. A site plan of NBK Manchester depicting the fuel storage, industrial area, and locations of these specific areas is shown in Figure 1-2. Site maps for Sites 302, 303, and 304 and Tank 50 are depicted in Figures 1-3, 1-4, 1-5, and 1-6, respectively. Figure 1-7 depicts the chronology of investigations, corrective actions, and documentation at these four sites. Table 1-1 summarizes the physical characteristics of these four sites, including history of contamination, physical characteristics, primary threat, and land and resource use.

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Table 1-1: Background Information Summary for Sites 302, 303, and 304 and Tank 50

Site	History of Contamination	Physical Characteristics	Primary Threat	Land and Resource Use
Site 302 – PCB Site (Figure 1-3)	From approximately 1955 through 1976, used as a dumping area for ship bilge waste, transformer oil, and other petroleum waste from local naval facilities. No estimate of the volume of waste disposed of at the site is available. In 1983, the Navy Voluntary Sampling Program indicated elevated chemical concentrations existed at the site. The Navy continued to voluntarily investigate the site and recommend cleanup activities to comply with the Navy IR Program, which is consistent with CERCLA, as amended by SARA.	1.4-acre undeveloped area in southwest portion of NBK Manchester, west of Little Clam Bay. Situated on north trending ridge, ranging in elevation from approximately 90 to 125 feet above mean sea level. Bordered with chain-linked fencing with gates on southern (i.e., the main entrance on Alder Loop Road) and northern boundaries. Montecito Road, an unpaved road, which once bisected the site running north-south, is no longer visible.	Per the Record of Decision (ROD; Navy, 1991), PCBs in soil and their migration off-site to impact surface water and sediment. Per the NFA letter (Ecology, 2000), residual PCB- and petroleum hydrocarbon- contaminated soil.	Industrial land use. Periphery covered with heavy vegetation (i.e., grasses, shrubbery, and trees).
Site 303 – D- Tunnel Tanks (Figure 1-4)	From 1980 through 1985, marine diesel fuel spill at Tank 29; however, all fuel reportedly recovered by oil-water separator. In February 1990, diesel fuel spill of approximately 38,000 to 40,000 gallons at Tank 30; however, most fuel captured by backfill drainage system and directed to oil-water separator 8. In March 1990, marine diesel fuel spill of approximately 10,000 gallons at Tank 24.	Located on the east side of Little Clam Bay; along west, southwest, south portion of the peninsula, where it slopes steeply towards Little Clam Bay. Consisted of eight concrete USTs (each with a capacity 2.1 Mgal) used to store marine diesel fuel; however, three of the USTs (Tanks 24, 25, and 26) have been removed. Aboveground storage tanks (ASTs) are currently under construction in the area of the removed tanks. USTs are covered with approximately 4 to 6 feet of soil with the base of the tanks extending from 30 to 32 feet below ground surface (bgs). USTs and ASTs are located adjacent to the D-tunnel line, extending from Tank 30 to Building 12 in the Industrial Area. USTs are surrounded by a backfill drainage system extending 6 to 8 feet outside the exterior wall and any groundwater collected is directed towards an oil-water separator.	Per the NFA letter (Ecology, 2001), residual petroleum hydrocarbon-contaminated soil.	Industrial land use/fuel farm. UST Tanks 24, 25, and 26 have been removed and the area was over excavated (per NBK Manchester personnel). UST 27 will be removed during a future stage of the military construction (MILCON) project. ASTs are currently being constructed where the USTs have been removed. Area directly above USTs is open; only vents, vaults, and mechanicals. Periphery is vegetated with grasses, shrubbery, and trees.
Site 304 – Industrial Area (Figure 1-5)	In 1989, soil samples were collected as part of a construction project at the fuel pier to assess the potential for contamination in the area. Fuel was encountered in one sample collected at the water table. In 1993, a site assessment was conducted to support closure and removal of three USTs located near Buildings 1 and 12. Soil sampling indicated diesel concentrations above cleanup levels. In 1996, an expedited removal action was conducted to support construction of a secondary containment boom around oily waste Tanks 115 and 116. A subsurface investigation indicated TPH concentrations in soil and groundwater above cleanup levels.	Located on east side of Little Clam Bay, in the eastern portion of NBK Manchester. Central transfer point for most of the fuel products stored at NBK Manchester. Groundwater ranges from 4 to 9 feet bgs, only marginally tidally influenced, and flows southeast towards Puget Sound.	Per the NFA letter (Ecology, 2001), residual petroleum hydrocarbon-contaminated soil.	Industrial land use/fuel farm. Flat, mostly paved, and comprised of maintenance, administration, fuel pumping, and water treatment buildings.
Tank 50 – UST Release Site (Figure 1-6)	In 1996, discovered a 2-inch diameter hole in the steel wall on the southwest side of tank, 12 feet from the bottom, during cleaning and maintenance activities. A steel patch was welded into the wall of the tank to repair the hole.	Located on the west side of Little Clam Bay. Southernmost tank in a set of four USTs built on the top of a small knoll. Steel cylinder tank approximately 100 feet diameter and 22 feet tall with a capacity of 1.1 Mgal. Field constructed and covered with approximately 4 feet of earthen fill.	Per the NFA letter (Ecology, 1998), petroleum hydrocarbons in soil and groundwater.	Industrial land use/fuel farm. Central portion is open; only piping and housing for tank mechanicals. Periphery slopes steeply to the southeast, south, and southwest and is heavily vegetated with shrubbery and trees. Building 185, a fueling station, is located along the southern boundary.

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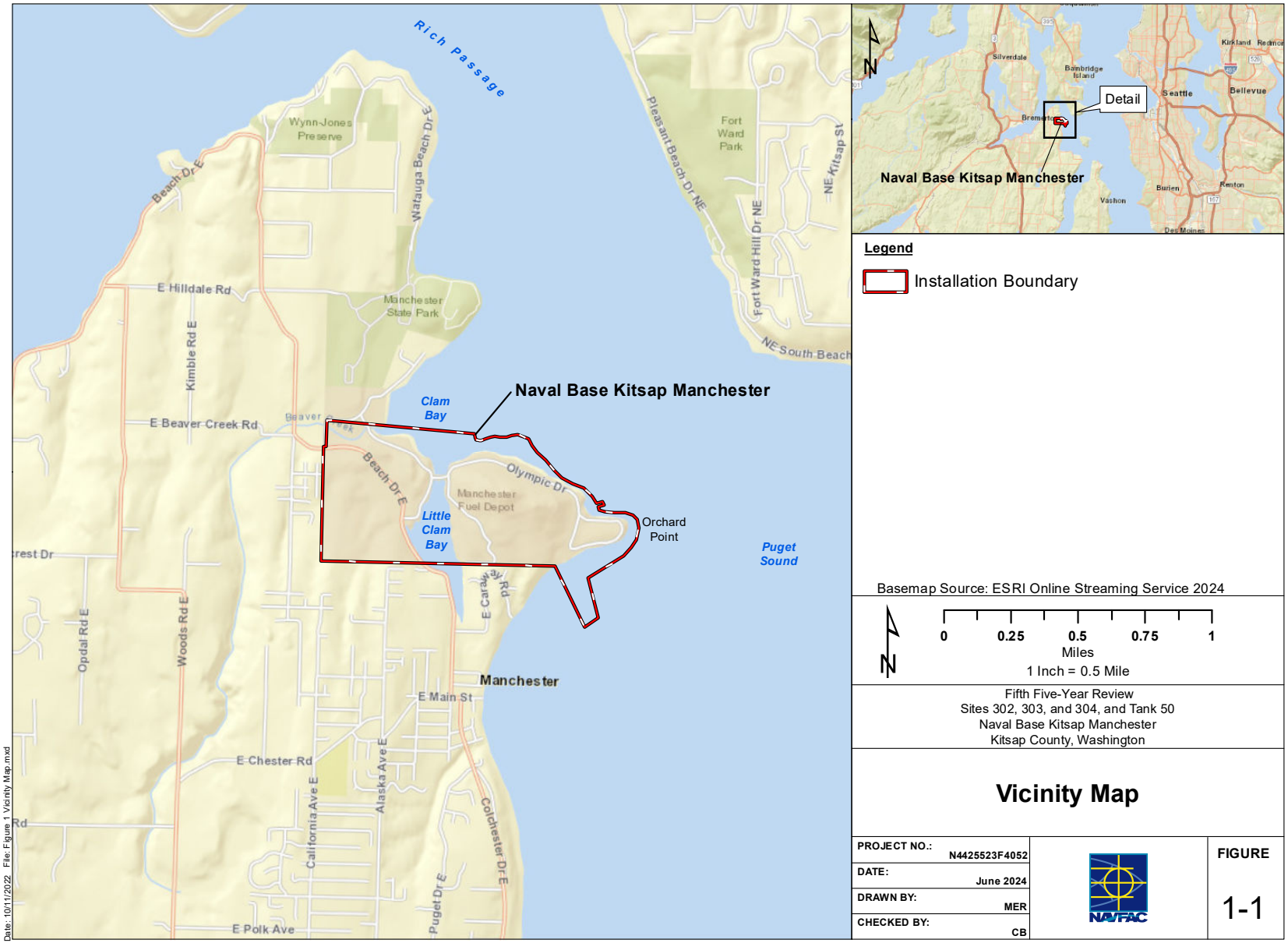
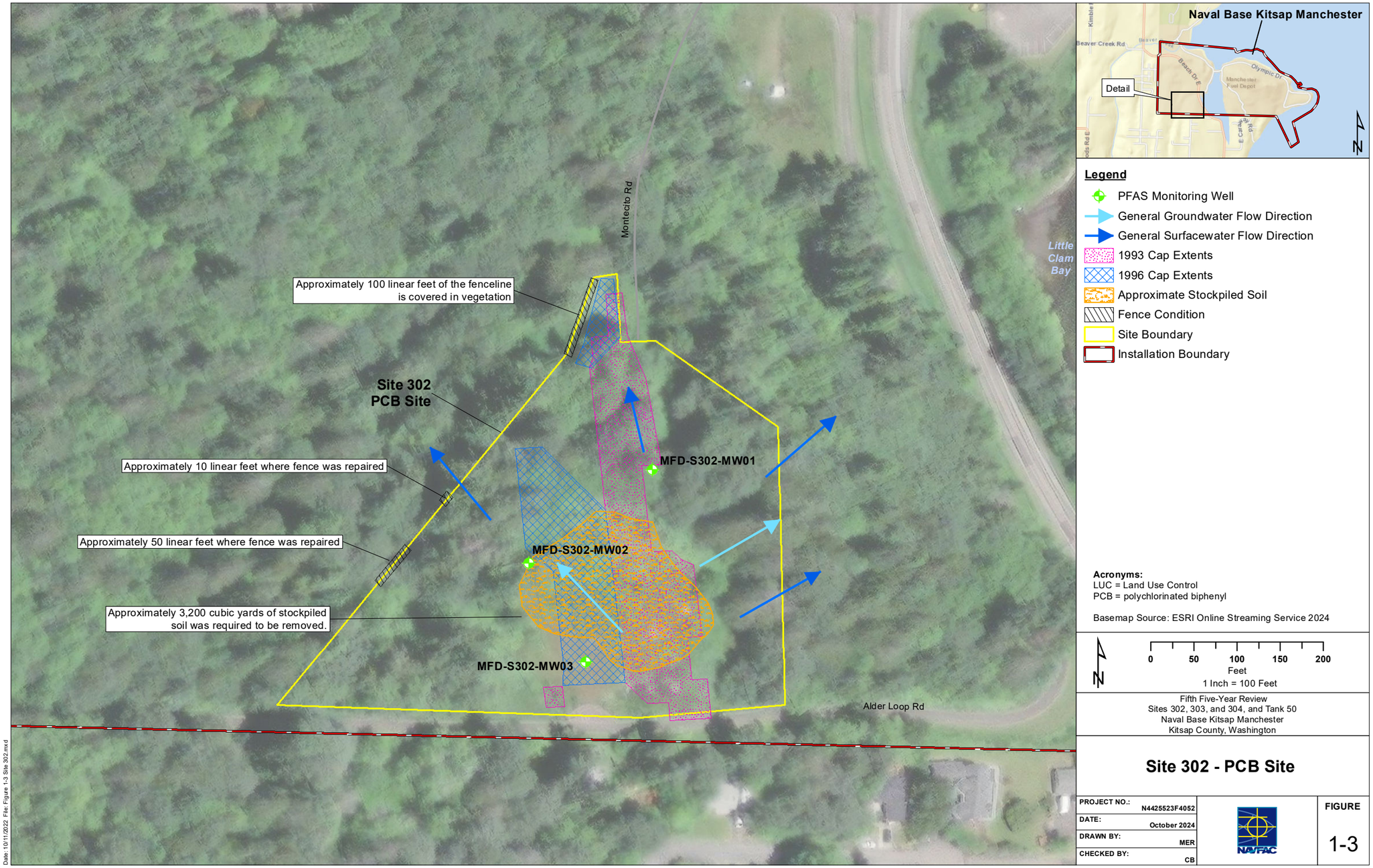

Rich Passage
Wynn-Jones Preserve
Watauga Beach Dr E
Beach Dr E
Pleasant Beach Dr NE
Fort Ward Park
Fort Ward Hill Dr NE
NE Kitsap St
NE South Beach
E Hilldale Rd
Kimble Rd E
Manchester State Park
Naval Base Kitsap Manchester
Clam Bay
E Beaver Creek Rd
Beaver Creek
Beach Dr E
Olympic Dr
Manchester Fuel Depot
Little Clam Bay
Orchard Point
Puget Sound
Opdal Rd E
Woods Rd E
E Main St
Manchester
E Chester Rd
California Ave E
Alaska Ave E
Colchester Dr E
Puget Dr E
E Polk Ave
Detail
Silverdale
Bainbridge Island
Bremerton
Seattle
Bellevue
Kirkland
Redmond
Burien
Renton
Vashon
Des Moines
Legend
Installation Boundary
Basemap Source: ESRI Online Streaming Service 2024
0
0.25
0.5
0.75
1
Miles
1 Inch = 0.5 Mile
Fifth Five-Year Review
Sites 302, 303, and 304, and Tank 50
Naval Base Kitsap Manchester
Kitsap County, Washington
Vicinity Map
PROJECT NO.: N4425523F4052
DATE: June 2024
DRAWN BY: MER
CHECKED BY: CB
NAVFAC
FIGURE
1-1
Date: 10/11/2022 File: Figure 1 Vicinity Map.mxd


Clam Bay
Naval Base Kitsap Manchester
Site 303
D-Tunnel Tanks
Tank 50
Release Site
Barge
Mooring
Pier
Little
Clam
Bay
Orchard
Point
Site 302
PCB Site
Fuel
Pier
Site 304
Industrial Area
Puget
Sound
Silverdale
Bainbridge
Island
Seattle
Naval Base Kitsap Manchester
Bremerton
Detail
Legend
Fuel Tank
Fuel Tank (Phase III Planned Decommissioning)
Fuel Tank (Phase II Planned Decommissioning)
Fuel Tank (Phase I Decommissioned)
Site Boundary
Installation Boundary
Acronyms:
PCB = polychlorinated biphenyl
Basemap Source: ESRI Online Streaming Service 2024
0
500
1,000
1,500
2,000
Feet
1 Inch = 1,000 Feet
Fifth Five-Year Review
Sites 302, 303, and 304, and Tank 50
Naval Base Kitsap Manchester
Kitsap County, Washington
Site Plan
PROJECT NO.: N4425523F4052
DATE: August 2024
DRAWN BY: MER
CHECKED BY: CB
NAVFAC
FIGURE
1-2
Date: 10/11/2022 File: Figure 2 Site Plan.mxd


Naval Base Kitsap Manchester
Detail
Beaver Creek Rd
Olympic Dr
Manchester Fuel Depot
N
Montecito Rd
Little Clam Bay
Approximately 100 linear feet of the fenceline is covered in vegetation
Site 302
PCB Site
Approximately 10 linear feet where fence was repaired
Approximately 50 linear feet where fence was repaired
Approximately 3,200 cubic yards of stockpiled soil was required to be removed.
MFD-S302-MW01
MFD-S302-MW02
MFD-S302-MW03
Alder Loop Rd
Legend
PFAS Monitoring Well
General Groundwater Flow Direction
General Surfacewater Flow Direction
1993 Cap Extents
1996 Cap Extents
Approximate Stockpiled Soil
Fence Condition
Site Boundary
Installation Boundary
Acronyms:
LUC = Land Use Control
PCB = polychlorinated biphenyl
Basemap Source: ESRI Online Streaming Service 2024
0 50 100 150 200
Feet
1 Inch = 100 Feet
Fifth Five-Year Review
Sites 302, 303, and 304, and Tank 50
Naval Base Kitsap Manchester
Kitsap County, Washington
Site 302 - PCB Site
PROJECT NO.: N4425523F4052
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CHECKED BY: CB
NAVFAC
FIGURE
1-3
Date: 10/11/2022, File: Figure 1-3 Site 302.mxd

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MW-1
MW-3
Clam Bay
Rich Passage
30
37
43
21
29
36
42
20
19
41
17
18
28
35
40
16
178
33
39
Site 304
Industrial Area
D-Tunnel Line
Little Clam Bay
Site 303
D-Tunnel Tanks
27
34
31
38
32
1
26
14
23
85
25
24
12
22
MW-1
Puget Sound
Naval Base Kitsap Manchester
Detail
Legend
Monitoring Well
General Groundwater Flow Direction
General Surfacewater Flow Direction
Tunnel Line
Fuel Tank
Fuel Tank (Phase I
Fuel Tank (Phase II Planned Decommissioning)
Fuel Tank (Phase III Planned Decommissioning)
Site Boundary
Installation Boundary
Acronyms:
MILCON = Military Construction
Basemap Source: ESRI Online Streaming Service 2024
0 110 220 330 440
Feet
1 Inch = 250 Feet
Fifth Five-Year Review
Sites 302, 303, and 304, and Tank 50
Naval Base Kitsap Manchester
Kitsap County, Washington
Site 303 - D-Tunnel Tanks
PROJECT NO.: N4425523F4052
DATE: October 2024
DRAWN BY: MER
CHECKED BY: CB
FIGURE 1-4
Date: 10/11/2022 File: Figure 1-4 Site 303 D.mxd

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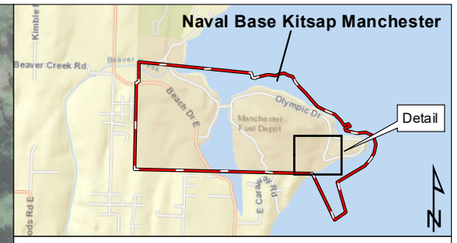

Legend

- Monitoring Well
- PFAS Monitoring Well
- General Groundwater Flow
- General Surfacewater Flow
- Tunnel Line
- Fuel Tank
- Fuel Tank
- Site Boundary
- Installation Boundary

Basemap Source: ESRI Online Streaming Service 2024

N

0 50 100 150 200
Feet
1 Inch = 100 Feet

Fifth Five-Year Review
Sites 302, 303, and 304, and Tank 50
Naval Base Kitsap Manchester
Kitsap County, Washington

Site 304 - Industrial Area

PROJECT NO.:	N4425523F4052
DATE:	October 2024
DRAWN BY:	MER
CHECKED BY:	CB

NAVFAC

FIGURE 1-5

Date: 8/24/2023 File: Figure 1-5 Site 304.mxd

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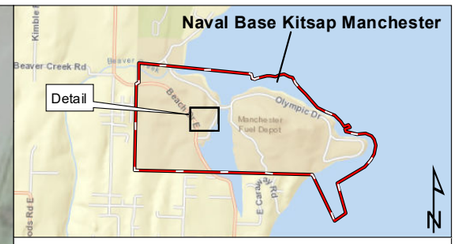

Legend

- General Groundwater Flow Direction
- General Surfacewater Flow Direction
- Fuel Tank
- Site Boundary
- Installation Boundary

Basemap Source: ESRI Online Streaming Service 2024

N

0 30 60 90 120
Feet
1 Inch = 60 Feet

Fifth Five-Year Review
Sites 302, 303, and 304, and Tank 50
Naval Base Kitsap Manchester
Kitsap County, Washington

Tank 50 - Release Site

PROJECT NO.:	N4425523F4052
DATE:	October 2024
DRAWN BY:	MER
CHECKED BY:	CB

NAVFAC

FIGURE 1-6

Date: 10/11/2022 File: Figure 1-6 Tank 50.mxd

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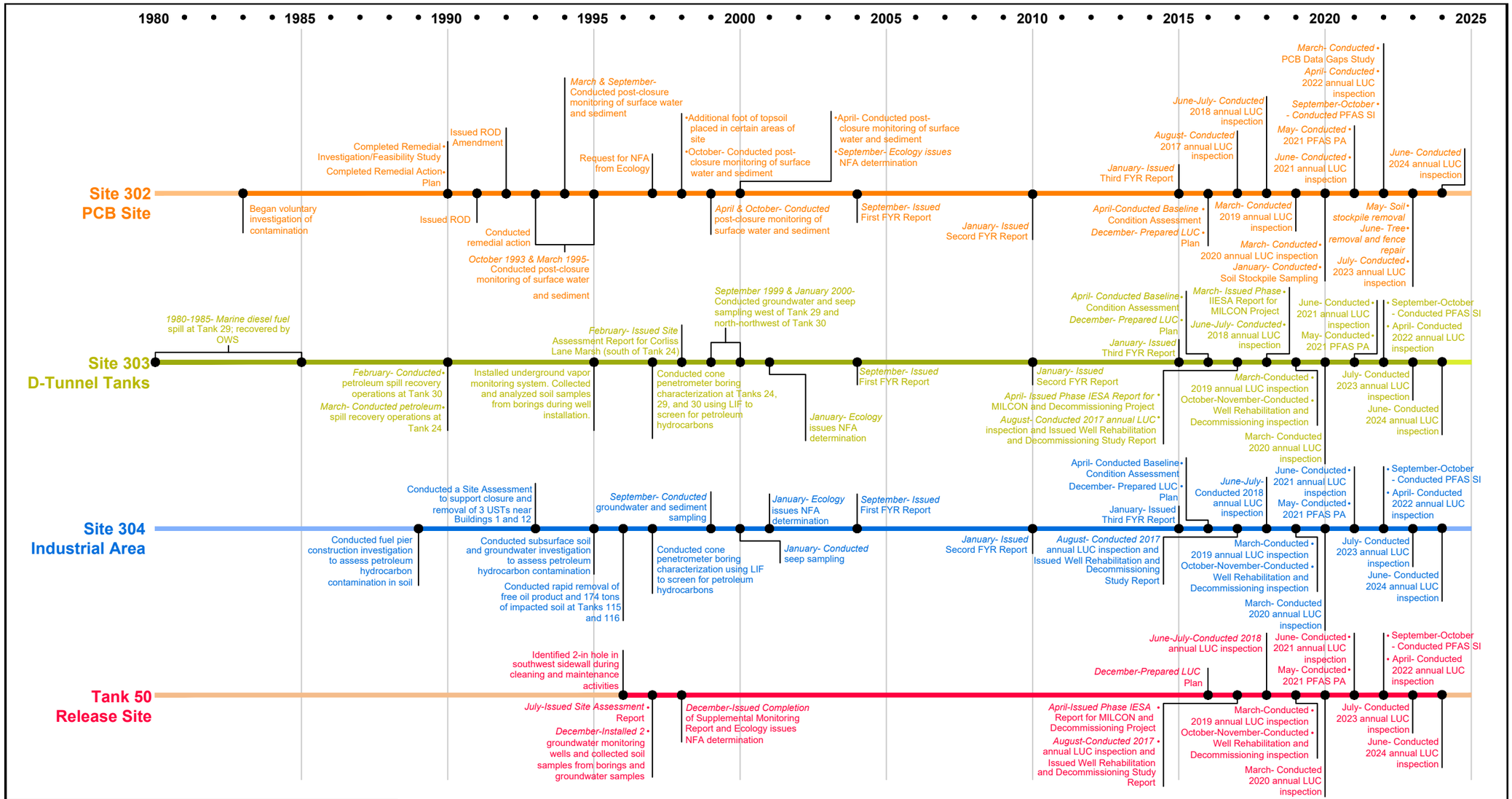

NAVFAC
Naval Facilities Engineering Systems Command

DRAWN BY MER	**Figure 1-7. Chronology of Events at Sites 302, 303, and 304 and Tank 50**
CHECKED BY CB	MFD, MANCHESTER, WA
PROJECT N4425523F4052	FILE Figure 7 Chronology of Events.DWG
DATE 05/24	

Explanation

ESA Environmental SiteAssessment
FYR FiveYear Review
LIF Laser-Induced Fluorescence
LUC Land Use Control
NFA No Further Action
ROD Record of Decision

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2.0 Response Action Summary

This section summarizes the environmental actions conducted at Sites 302, 303, and 304 and Tank 50 at NBK Manchester. Table 2-1 presents the reasonably anticipated land use, contaminants of concern (COCs) requiring action, impacted media, cleanup levels, remedial action objectives (RAOs), remedy components, remedy construction complete, and site closeout strategy for each site. As stated previously, Figure 1-7 depicts the chronology of investigations, corrective actions, and documentation for each site, which is also discussed in the subsections below.

2.1 Site 302 – PCB Site

The Navy performed a Remedial Investigation (RI)/Feasibility Study (FS) for Site 302 (Hart Crowser, 1990). The RI characterized contamination in soil, surface water, and sediments. PCBs were detected in the majority of surface soil samples at Site 302 at concentrations ranging from 0.1 to 1,500 parts per million (ppm). PCB concentrations greater than 1 ppm were confined primarily to the immediate disposal area. PCB concentrations greater than 5 ppm were confined primarily to the top 1 to 2 feet of soil. In addition to PCBs, other compounds were detected at elevated concentrations, including polynuclear chlorinated dibenzodioxins (dioxins), chlorinated dibenzofurans (furans), polynuclear aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs). The concentrations of these other compounds were located in the areas with the highest PCB concentrations. PCBs were also detected in surface water and sediment samples downgradient of the site. Notably, PCBs were not detected in fish tissue or shellfish collected from Little Clam Bay.

As stated in the ROD (Navy, 1991), the major components of the selected remedy to address the principal threats posed by PCB-contaminated soils at Site 302 included:

- Excavation of soil with PCB concentrations greater than 10 ppm;
- Treatment of excavated soil using solvent extraction;
- Off-site incineration of oil/PCBs extracted in the treatment process;
- Off-site incineration or chemical-waste landfilling of treated soil with residual PCB concentrations greater than 2 ppm;
- Placement of treated soil on the site;
- Installation of a soil cover over all soils containing PCB concentrations greater than 1 ppm;
- Construction of diversion trenching to prevent draining onto the site;

- Land use restrictions against residential use of the site; and
- Post construction testing of soil, sediments, and surface water.

In 1992, a ROD Amendment (Navy, 1992) was needed due to difficulties in locating contractors with experience in conducting treatment of PCB soils using solvent extraction and the higher-than-expected costs associated with this treatment method. The treatment method of soils with PCB concentrations greater than 10 ppm was changed to off-site incineration instead of solvent extraction.

In 1993, the selected remedy detailed in the ROD and ROD Amendment (Navy, 1991 and 1992) was implemented at Site 302. During these activities, approximately 3,000 cubic yards of PCB- and petroleum hydrocarbon-contaminated soil were removed for off-site incineration and excavated areas then received a minimum of 1 foot of granular fill material followed by capping with 4 inches of topsoil over the entire site. Certain areas received an additional foot of topsoil in 1998.

Following the remedial action, two years of semiannual surface water and sediment sampling were conducted (i.e., in October 1993, March 1994, September 1994, and March 1995). Samples were collected at six locations adjacent to Site 302 along freshwater drainage pathways. Samples in the first year were analyzed for PCBs. Samples in the second year were analyzed for PCBs and petroleum hydrocarbons. PCBs and petroleum hydrocarbons were not detected in the surface water samples, except in a seep observed during one of the four rounds. PCBs were detected in sediment samples located along the shore of Little Clam Bay with most concentrations significantly lower than the cleanup level and Marine Sediment Quality Standards (SQS). One PCB sediment concentration [12.9 milligrams per kilogram (mg/kg)] slightly exceeded the SQS of 12 mg/kg (Hart Crowser, 2000a).

In 1997, the Navy requested an NFA determination from Ecology. Ecology requested further monitoring be completed at the seep location and along the western shoreline of Little Clam Bay. Beginning in October 1998, two additional years of semiannual surface water and sediment sampling were completed at three locations (i.e., one surface water location and two sediment locations), per Ecology's request. Sediment samples were analyzed for PCBs and surface water samples were analyzed for PCBs and petroleum hydrocarbons. PCBs and petroleum hydrocarbons were not detected in any surface water samples. PCBs were detected in sediment samples, but at concentrations significantly less than the ROD cleanup level of 10 mg/kg and SQS of 12 mg/kg (Hart Crowser, 2000a).

Based on the results of the post-remedial action monitoring and anticipated future industrial use of the NBK Manchester, Ecology issued an NFA letter in 2000 stating

"contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." LUC requirements were identified in the NFA letter to guard against exposure to residual PCB-and petroleum hydrocarbon-contaminated soil (Ecology, 2000). Table 2-2 details the LUCs for Site 302 as presented in the Land Use Control (LUC) Plan (Navy, 2016a).

2.2 Site 303 – D-Tunnel Tanks

In February 1990, an approximately 38,000 to 40,000-gallon diesel fuel spill occurred at Tank 30. Most of the spill was apparently contained by the footing drainage system under the tank and directed to an oil- water separator where it was recovered. Diesel fuel not contained by the drainage system flowed down the steep slope north of Tank 30. Some of this fuel flowed into the North Dike and was recovered. The remaining portion of the fuel infiltrated into the ground, where some of it discharged through seeps along the steep slopes and beaches north of Tank 30. Collection sumps and sorbent pads were used to collect fuel from the beach areas. Product and/or sheens were observed in monitoring wells and test pits installed along the beach to the north and test pits along Pine Road to the west.

In March 1990, an approximately 10,000-gallon diesel fuel spill occurred at Tank 24. Most of the spill was reported to have been recovered on base. Approximately 100 to 200 gallons leaked off base into the marsh area adjacent to Corliss Lane. Based on a review of data collected in 1990, 1991, 1995, and 1997, the following was identified: 1) residual concentrations of petroleum hydrocarbons in soil near Tank 24 do not present a source of dissolved petroleum hydrocarbons in groundwater migrating towards the marsh area; 2) historical data indicate residual petroleum hydrocarbon contamination in the marsh area does not pose a significant risk to human health and the environment; and 3) PAHs were detected in a surface water sample collected in the marsh area at concentrations which may pose unacceptable risk (Hart Crowser, 1998a).

In 1995, an underground vapor monitoring system was installed within the porous backfill drainage area surrounding each of the D-Tunnel tanks. Soil samples collected during installation of the soil vapor monitoring wells indicated petroleum hydrocarbon-contaminated soil was present in the immediate vicinity (i.e., within the backfill drainage area) of all eight D-Tunnel tanks. In 1997, cone penetrometer borings were installed adjacent to Tanks 24, 29, and 30 in an attempt to characterize the extent of petroleum hydrocarbon contamination in the soil using laser induced fluorescence (LIF). The results of the investigation were generally inconclusive.

Between September 1999 and June 2000, a groundwater and seep investigation was conducted to determine if releases from Site 303 were adversely impacting the marine

environment adjacent to NBK Manchester. In total, groundwater samples were collected from five monitoring wells and seep samples were collected from two locations west of Tank 29 and north-northwest of Tank 30. Based on the groundwater and seep sampling results, this investigation concluded petroleum hydrocarbons are not being discharged into the marine environment at concentrations that pose an unacceptable risk, and no remedial actions are necessary to address residual petroleum hydrocarbon contamination (Hart Crowser, 2000b).

Based on the lack of impacts to the marine environment and the anticipated future industrial land use of NBK Manchester, Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum- contaminated soil (Ecology, 2001). Table 2-2 details the LUCs for Site 303 as presented in the LUC Plan (Navy, 2016a).

2.3 Site 304 – Industrial Area

In 1989, a soil investigation was conducted as part of a construction project at the fuel pier. Of the three soil samples collected, one soil sample collected at the water table (i.e., approximately 7 feet bgs) contained elevated petroleum hydrocarbon concentrations of 10,000 ppm.

In 1993, a site assessment was performed to support the closure and removal of three USTs located near Building 1 (i.e., UST P-3) and Building 12 (i.e., USTs T-4 and T-5). At UST P-3, soil sampling results for gasoline, VOCs, and lead were below MTCA Method A cleanup levels. At USTs T-4 and T-5, diesel concentrations were detected above MTCA Method A cleanup levels (i.e., at 475 to 5,800 ppm). As a result, approximately 120 cubic yards of contaminated soil was excavated from the area until levels of total petroleum hydrocarbon (TPH) from the sidewalls of the excavation were below MTCA Method A cleanup levels (Severson Construction, 1993a and 1993b).

In 1995, a subsurface soil and groundwater investigation was performed to assess petroleum hydrocarbon contamination at Site 304. In total, 50 soil samples were submitted for laboratory analysis from 23 different locations. TPH concentrations were detected above the MTCA Method A cleanup levels in 12 of the 50 soil samples. The vertical extent of petroleum hydrocarbon contamination in soil was generally limited to the top 8 feet bgs; however, contamination was observed to approximately 12 feet bgs at locations closer to Puget Sound. TPH concentrations were detected above the MTCA Method A cleanup level in groundwater near the base of the fuel pier, which is most likely associated with the numerous fuel lines from the pier and carried fuel to upland

areas. Through this investigation, it was determined petroleum hydrocarbon contamination in soil and groundwater at Site 304 has minimal potential for migration since there is no current source and significant contamination does not exist in groundwater (URS Consultants, Inc., 1995).

In 1996, an expedited removal action was performed to support construction of a secondary containment boom around oily waste Tanks 115 and 116. Free product oil and approximately 174 tons of visibly contaminated soil were removed from the area. No confirmation soil sampling was conducted following the removal action.

In 1997, a site characterization investigation was conducted using cone penetrometer borings. Soils were screened for the presence of petroleum hydrocarbons using LIF. Evidence of petroleum hydrocarbon contamination (including diesel, jet petroleum #5 [JP-5], and heavy oil) was found in many borings throughout Site 304.

In 1999 and 2000, a groundwater, seep, and sediment investigation was conducted to determine if releases from Site 304 were adversely impacting the marine environment adjacent to NBK Manchester. Groundwater samples were collected from four monitoring wells and one seep at Site 304. Sediment samples were collected from 11 of 12 locations offshore of Site 304. Based on the groundwater, seep, and sediment sampling results, this investigation concluded petroleum hydrocarbons are not being discharged into the marine environment at concentrations that pose an unacceptable risk and no remedial actions are necessary to address residual petroleum hydrocarbon contamination (Hart Crowser, 2000b).

Based on the lack of impacts to the marine environment and the anticipated future industrial land use of NBK Manchester, Ecology issued an NFA letter in 2001 stating “contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment.” LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum- contaminated soil (Ecology, 2001). Table 2-2 details the LUCs for Site 304 as presented in the LUC Plan (Navy, 2016a).

2.4 Tank 50 – Release Site

In late 1996, the Navy hired a contractor to clean and line fuel storage tanks. Following cleaning and preparation for application of epoxy-based liner compound, the contractor identified an approximately 2-inch-diameter hole in the steel wall on the southwest side of Tank 50. The contractor reported the hole was located approximately 12 feet above the bottom of the UST. Tank 50 was used to store JP-8 at the time. A steel patch was welded into the wall of Tank 50 to repair the hole. The steel around the hole in the tank wall reportedly was not rusted, suggesting the hole may have been an artifact of the

construction of the tank or work performed on the tank after construction. Cleaning and lining were then completed, and the tank was restored to service.

A soil sample collected from a depth of 6 inches below the damaged area during repair of the tank hole contained a TPH concentration of 1,000 mg/kg and a total combined benzene, toluene, ethylbenzene, and xylenes (BTEX) concentration of 60 mg/kg, both over the MTCA Method A cleanup levels.

Based on these results, a site assessment was conducted in 1997 to determine the nature and extent of petroleum contamination in soil near the tank and whether groundwater had been impacted by petroleum hydrocarbons released from this tank. Results of the site assessment indicated TPH, identified as JP-8, was present at concentrations exceeding the MTCA Method A cleanup level at the time in soil adjacent to the hole found in the tank; approximately 75 feet downgradient of the hole found in the tank; and along the eastern perimeter of the tank at depths of roughly 16 to 32 feet bgs (Hart Crowser, 1997).

Based on sample results and the nature of the TPH product, BTEX, PAHs and lead were determined not to be associated with the release. Although TPH was also detected above MTCA Method A cleanup level in groundwater, only one boring could be advanced to groundwater and the sample collected was unfiltered.

Based on the uncertainties regarding the presence of groundwater contamination, an additional well installation and sampling investigation was performed at Tank 50 (Hart Crowser, 1998b). The findings of this investigation concluded the following:

- While TPH concentrations in several soil samples exceeded the MTCA Method A cleanup level of 200 mg/kg, there is little potential for ingestion of petroleum hydrocarbons from this site because the higher concentrations were observed at depth (generally more than 10 feet bgs), and the site has restricted access with few people visiting on a regular basis.
- Off-site migration of petroleum hydrocarbons at concentrations above the MTCA Method A cleanup level is unlikely and the closest drinking water wells are located more than a 1/4-mile northwest of the site, across a groundwater divide, and are screened at considerably greater depth than shallow groundwater encountered near Tank 50.
- The source of the petroleum release (i.e., the hole in the tank) has been repaired.

Based on a meeting with Ecology conducted in May 1998, the following additional actions were performed to support an NFA determination for the site by Ecology (Hart Crowser, 1998c):

- Installed 1-foot-high by 2-foot-wide aluminum warning signs at two locations near Tank 50 reading "PRIOR TO DIGGING IN THIS AREA CONTACT FACILITIES ENGINEER OR ENVIRONMENTAL DEPARTMENT."
- NBK Manchester modified their facility map with notation that reads "Area of Oil Contamination" indicating the area of concern to prevent contractors and base personnel working in the area from disturbing potential petroleum-contaminated soil without obtaining proper authorization and reviewing health and safety procedures with the facility environmental personnel.
- Collected one additional groundwater sample from monitoring well MW-2 in October 1998. TPH was not detected above the MTCA Method A cleanup level.

Based on the results of these investigations and the LUCs implemented at the site, Ecology issued a NFA letter in 1998 stating “Based upon the information in the reports listed above and institutional controls placed at the facility, Ecology has determined that, at this time, the release of TPHs into the soil and groundwater near Tank 50 no longer appears to pose a threat to human health or the environment.” The LUC requirements referred to in the NFA letter are to guard against exposure to residual petroleum-contaminated soil and groundwater (Ecology, 1998). Table 2-2 details the LUCs for Tank 50 as presented in the LUC Plan (Navy, 2016a).

2.5 Status of Implementation

Specific LUC requirements were identified for Sites 302, 303, and 304 and Tank 50 to ensure continued protection of human health and the environment in the NFA letters (Ecology, 1998, 2000 and 2001). Additional LUCs for these sites were also recommended in the Third FYR (Navy, 2015a). Therefore, the LUC Plan formalized site-specific LUCs that prevent UU/UE due to contaminated soil and/or groundwater at the four sites (Navy, 2016a). Table 2-2 presents the specific LUCs at each of the sites.

Access control for NBK Manchester is the responsibility of NBK Manchester Base Security or site personnel. Warning signs are installed at site access points (i.e., vehicle and pedestrian access points) delineating the areas and prohibiting any type of ground disturbance without prior site notification and approval.

As recommended in the Third FYR (Navy, 2015a), the continued use of LUCs at NBK Manchester will be evaluated at the time of each FYR. The annual LUC inspection

checklists will be the basis for evaluating the effectiveness of the LUCs as part of this five-year review process.

The LUC Inspections and Maintenance activities began in 2016 and have been conducted annually.

Table 2-1: Summary of Remedial Actions at Sites 302, 303, and 304 and Tank 50

Site	Reasonably Anticipated Land Use	COC Requiring Action[(a)]	Media[(a)]	Cleanup Levels	RAOs	Remedy Component	Removal Actions Performed	Remedy Construction Complete	Site Closeout Strategy
Site 302 – PCB Site	Industrial, Navy installation	PCBs, petroleum hydrocarbons	Soil	Soil: • Per remedial action (Navy, 1991 and 1992), 1 mg/kg for total PCBs. Sediment: • Ecology Sediment Quality Standard of 12 milli gram per kilogram (mg/kg) for total PCBs (normalized for total organic carbon). Surface water: • Clean Water Act Marine Chronic Criteria of 0.03 microgram per liter (μg/L) for total PCBs. • Calculated Freshwater Chronic Criteria of 0.014 μg/L for total PCBs.	Per the ROD and ROD Amendment (Navy, 1991 and 1992): To prevent current and future exposure to contaminated soil. To prevent contamination from entering surface waters.	Per the ROD and ROD Amendment (Navy, 1991 and 1992) and completed in 1993: • Excavation of soil with PCB concentrations greater than 10 ppm; Treatment of excavated soil using off-site incineration; • Off-site incineration of oil/PCBs extracted in the treatment process; • Off-site incineration or chemical-waste landfilling of treated soil with residual PCB concentrations greater than 2 ppm; • Placement of treated soil on the site; • Installation of a soil cover over all soils containing PCB concentrations greater than 1 ppm; • Construction of diversion trenching to prevent draining onto the site; • Land use restrictions against residential use of the site; and • Post construction testing of soil, sediments, and surface water.	• In 1993, approximately 3,000 cubic yards of PCB- and petroleum hydrocarbon-impacted soil were excavated for off-site incineration per the ROD and ROD Amendment (Navy, 1991 and 1992). • Excavated areas received minimum 1 foot of granular fill, followed by capping with 4 inches of topsoil over the entire site. • In 1998, certain areas received an additional minimum 1 foot of soil cover	Yes	Ongoing LUC maintenance; evaluate continued use of LUCs at the time of each FYR
Site 303 – D-Tunnel Tanks	Industrial/fuel farm, Navy installation	Petroleum hydrocarbons	Soil	See Tables 5-3 through 5-5.	1999 to 2000 investigation concluded no remedial actions were necessary to address residual petroleum hydrocarbon contamination (Hart Crowser, 2000b); therefore, there were no RAOs. However, the NFA Letter (Ecology, 2001) states institutional controls are needed to prevent exposure to residual soil contaminants.	LUCs	At Tank 30, fuel was recovered from the north dike and collection sumps and sorbent pads were used to recover fuel from the beach areas to the north.	Yes	Ongoing LUC maintenance; evaluate continued use of LUCs at the time of each FYR
Site 304 – Industrial Area	Industrial/fuel farm, Navy installation	Petroleum hydrocarbons	Soil	See Tables 5-6 and 5-7.	1999 to 2000 investigation concluded no remedial actions were necessary to address residual petroleum hydrocarbon contamination (Hart Crowser, 2000b); therefore, there were no RAOs. However, the NFA Letter (Ecology, 2001) states institutional controls are needed to prevent exposure to residual soil contaminants.	LUCs	At Buildings 1 and 12, oily water was pumped out of the UST excavation and 120 cubic yards of petroleum hydrocarbon-impacted soil were excavated. At Tanks 115 and 116, free oil product and 174 tons of visibly, petroleum hydrocarbon-impacted soil were removed.	Yes	Ongoing LUC maintenance; evaluate continued use of LUCs at the time of each FYR
Tank 50 – UST Release Site	Industrial/fuel farm, Navy installation	Petroleum hydrocarbons	Soil, groundwater	See Tables 5-8 and 5-9.	No remedial actions were conducted; therefore, there were no RAOs.	LUCs	None	Yes	Ongoing LUC maintenance; evaluate continued use of LUCs at the time of each FYR

Notes:
(a) COC requiring action and media information is based on NFA letters (Ecology, 1998, 2000, and 2001).

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Table 2-2: LUCs for Sites 302, 303, and 304 and Tank 50

Site	LUCs
Site 302 – PCB Site	• ***Ensure that site signage is readable and adequate.*** • Ensure that land use remains for industrial purposes. • Ensure that there has been no unauthorized soil excavation or disturbance. • Ensure that there has been no unauthorized placement of excess soil from another location. • Ensure integrity of the soil cover vegetation, so that any excavation or improper disposal is apparent. • Ensure that any soil excavated from the site is properly characterized and disposed offsite and that on-site workers are protected during such activities. • Ensure that site fencing is intact and that gates are secured and locked.
Site 303 – D-Tunnel Tanks	• ***Ensure that land use remains for industrial purposes. Coordinate with Ecology prior to change in property ownership or land use concerning the need for remedial actions.*** • ***Ensure that warnings are posted for workers to guard against exposure to residual petroleum contaminated soil.*** • ***Identify remaining areas of concern on facility maps and specify in facility excavation permit instruction.*** • Ensure no production wells are installed and groundwater is not used except for monitoring and/or remediation. • Protect existing vapor monitoring wells until formally abandoned. • Ensure that there has been no unauthorized soil excavation or disturbance. • Confine authorized reusable material* to approved staging area. • Ensure that any soil excavated from the site is properly characterized and disposed offsite and that on-site workers are protected during such activities. *Those materials for which on-site placement has been coordinated with the Ecology Cleanup Project Manager and that have been characterized in collaboration with the Ecology Cleanup Project Manager.
Site 304 – Industrial Area	• ***Ensure that land use remains for industrial purposes. Coordinate with Ecology prior to change in property ownership or land use concerning the need for remedial actions.*** • ***Ensure that warnings are posted for workers to guard against exposure to residual petroleum contaminated soil.*** • ***Identify remaining areas of concern on facility maps and specify in facility excavation permit instruction.*** • Ensure no production wells are installed and groundwater is not used except for monitoring and/or remediation. • Protect existing monitoring wells until formally abandoned. • Ensure that there has been no unauthorized soil excavation or disturbance.

Site	LUCs
	• Ensure that any soil excavated from the site is properly characterized and disposed offsite and that on-site workers are protected during such activities.
Tank 50 – UST Release Site	• ***Ensure that warnings are posted for workers to guard against exposure to residual petroleum contaminated soil.*** • ***Identify remaining areas of concern on facility maps and specify in facility excavation permit instruction.*** • Ensure that land use remains for industrial purposes. Coordinate with Ecology prior to change in property ownership or land use concerning the need for remedial actions. • Ensure no production wells are installed and groundwater is not used except for monitoring and/or remediation. • Protect existing monitoring wells until formally abandoned. • Ensure that there has been no unauthorized soil excavation or disturbance. • Ensure that any soil excavated from the site is properly characterized and disposed offsite and that on-site workers are protected during such activities.

Note:
LUCs identified with ***bold-italicized*** are required LUCs from the NFA letters (Ecology, 1998, 2000, and 2001).
Source: Battelle, 2016. *Land Use Control Plan for Sites 302, 303, 304 and Tank 50.* Contract No. N44255-14-D-9013, Delivery Order No. 0011. December.

3.0 Progress Since Last Five-Year Review

Per EPA FYR Guidance (EPA, 2016), Table 3-1 details the protectiveness statement and determination from the Fourth FYR for Sites 302, 303, and 304 (Navy, 2020).

Table 3-1: Protectiveness Statement(s) from the Fourth FYR

Site	Protectiveness Determination	Protectiveness Statements(s)
302	Protective	The remedy at Site 302 remains protective of human health and the environment because PCB source soil has been removed or capped; off-site contamination from surface water run-off has been effectively diminished from pre-remedy conditions; land use remains industrial; and LUCs are maintained to prevent exposure. In addition, Ecology issued an NFA letter in 2000 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment" which was based primarily on the current and future land use at the site (i.e., industrial).
303	Protective	Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." This determination was based primarily on the current and future land use at the site (i.e., industrial/fuel farm). LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). The remedy (i.e., LUCs) at Site 303 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections.
304	Protective	Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." This determination was based primarily on the current and future land use at the site (i.e., industrial/fuel farm). LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). The remedy (i.e., LUCs) at Site 304 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections.
Tank 50	Protective	Ecology issued a NFA letter in 1998 stating "Based upon the information in the reports listed above and institutional controls placed at the facility, Ecology has determined that, at this time, the release of TPHs into the soil and groundwater near Tank 50 no longer appears to pose a threat to human health or the environment." The LUC requirements are referred to in the NFA letter and are to guard against exposure to residual petroleum hydrocarbon-contaminated soil and groundwater (Ecology, 1998). The remedy (i.e., LUCs) at Tank 50 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections.
Sitewide	Protective	Remedy construction is complete at Sites 302, 303, and 304 and Tank 50 of NBK Manchester. The selected remedy (i.e., LUCs) at Sites 302, 303, and 304 and Tank 50 is protective of human health and the environment, preventing exposures to residual contamination in soil and/or groundwater, as documented through the annual LUC inspections.

3.1 Status of Recommendations

There were no recommendations presented in the Fourth FYR (Navy, 2020) that affected current and/or future protectiveness at these sites. However, six other findings identified during the fourth FYR process may have improved performance of the remedy, reduced costs, improved management of operation and maintenance, or accelerated site closeout. Table 3-2 lists these recommendations and provides the current status of the recommendations.

Table 3-2: Status of Recommendations Not Affecting Protectiveness from the Fourth FYR

Site ID	Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Completion Milestone Date	Affects Protectiveness (Yes/No)		Status of Recommendations and Follow-up Action from Last Five-Year Review
						Current	Future	
Site 302	The excess soil at Site 302 has not been tested for PCBs.	Test the excess soil for PCBs (and other potential contaminants based on generator knowledge) and then properly disposed of it (i.e., use a grading material or off site). Regrade and revegetate the areas with the excess soil, such that future site inspections can confirm no additional soil has been placed at the site. Conduct a follow-up inspection during the following growing season to ensure vegetation has taken hold.	Navy	Ecology	March 2022	No	No	Completed. The soil was characterized, removed and disposed of off-site at an approved treatment and disposal facility, in accordance with state and federal regulations. The remaining area has been re-seeded.
Site 302	1) In accordance with the 2013 update to the Sediment Management Standards (SMS) in WAC 173-204, protection of human health and higher trophic organisms must be considered when establishing sediment cleanup standards for bioaccumulative COCs (e.g., PCBs). Only benthic communities were previously considered when establishing/reviewing sediment cleanup standards.	Conduct a data gap investigation to: 1) determine if additional sampling (including sediment, surface water, and seep/groundwater discharge) along the western shoreline of Little Clam Bay is needed to establish concentrations/presence of PCBs; 2) if so, develop and conduct a monitoring program to assess Site 302 as a potential residual source of PCBs impacting Little Clam Bay from surface water runoff and seep/groundwater discharge;	Navy	Ecology	March 2022	No	No	Completed. A PCB Data Gaps Study (Liberty JV, 2022) included an evaluation of ARARs and an updated CSM was completed. The report concluded that the historical analytical results do not provide a low enough detection limit for comparison of PCB concentrations in surface water and sediment to currently applicable screening and regulatory criteria for protection of human health, and recommended additional sediment and water

Table 3 2: Status of Recommendations Not Affecting Protectiveness from the Fourth FYR (continued)

Site ID	Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Completion Milestone Date	Affects Protectiveness (Yes/No)		Status of Recommendations and Follow-up Action from Last Five-Year Review
						Current	Future	
	2) Historical PCB detection limits were above both historical and current Washington State and ambient water quality criteria for aquatic and human health. Therefore, the absence of PCBs above its cleanup standard in surface water has not been verified.	and 3) if these additional data verify applicable or relevant and appropriate requirement (ARAR) exceedances, re-evaluate impacts to human and ecological receptors (potentially including additional sampling) to assess protectiveness of the remedy. Conduct additional sampling ensuring the use of analytical methods able to achieve proper practical quantitation limit (PQL) and assess data by comparing to current Washington State and ambient water quality criteria and relevant sediment cleanup criteria.						sampling if this pathway could become complete in the future. Navy has determined additional sampling is not needed at this time because the remedy remains protective, and the pathway is incomplete.
Site 302	Two sections of fencing on the west boundary of Site 302 have been damaged by fallen trees and the gated entrance on the north side of Site 302 has no lock or LUC signage.	Determine the necessity of repairing the fence and adding a lock and LUC signage on the north entrance given its remote location and the fact the site is already within the patrolled fence line of NBK Manchester.	Navy	Ecology	June 2023	No	No	Completed. The Navy conducted the vegetation and tree clearing and fence repair from fallen trees on the western boundary. LUC signage and a lock were installed on the gated entrance in July 2020 and a chain was added in August 2023 making it so the gate cannot be pushed open and is secure.

Table 3 2: Status of Recommendations Not Affecting Protectiveness from the Fourth FYR (continued)

Site ID	Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Completion Milestone Date	Affects Protectiveness (Yes/No)		Status of Recommendations and Follow-up Action from Last Five-Year Review
						Current	Future	
Site 303 and Tank 50	There are vapor and groundwater monitoring wells located at Site 303 and Tank 50 that are inoperable, in poor condition, will be destroyed/damaged during the upcoming MILCON Project, and/or would not provide useful information, if needed.	Based on the results of the Well Rehabilitation and Decommissioning Study (Navy, 2017b), properly decommission select vapor and groundwater monitoring wells in accordance with WAC 173-160-460.	Navy	Ecology	July 2020	No	No	Completed. Based on the findings from the Well Rehabilitation and Decommissioning Study (U.S. Navy, 2017), well rehabilitation and decommissioning activities were conducted within the specified areas of NBK Manchester from October 2019 through March 2020 (Battelle, 2020).
303, 304, and Tank 50	Monitoring wells MW-1 south of Tank 24; MW-3 north of Tank 30; MW-1 and MW-2 at Site 304; and MW-1 at Tank 50 need minor maintenance/repairs to remain operable.	Perform minor maintenance/repairs on these five monitoring wells, which will be the monitoring network at NBK Manchester, if needed in the future.	Navy	Ecology	July 2020	No	No	Completed. Well rehabilitation measures have been completed as needed (Battelle, 2020).
303, 304, and Tank 50	During LUC inspections, it was found that: 1) an old stockpile of soil on a tarp surrounded by absorbent wattles is located in the laydown area north of Tank 29; 2) the LUC signage for Site 304 is located at the northern corner of Building 178, outside and north of the LUC boundary; and 3) there is no LUC signage at the primary entry way to Tank 50.	Properly characterize, transport, and dispose of (off site) the soil stockpile located north of Tank 29; move the LUC signage for Site 304 to the corner of Cedar Avenue and Olympic Drive E to be consistent with the actual LUC boundary; and add LUC signage on the northern access road to Tank 50 (i.e., the primary entry way to the site).	Navy	Ecology	2020 - 2022	No	No	Completed (Liberty JV, 2024). 1) The soil stockpile north of Tank 29 has been characterized and disposed of off-site and the affected area has been reseeded. 2) Per Ecology comment on the draft 2020 LUC inspections, there is no need to move the LUC signage, as it is located prior to and along the main entryway to Site 304. 3) Completed; LUC signage was installed at the primary entryway in July 2020.

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3.2 NBK Manchester Well Rehabilitation and Decommissioning Summary

Well rehabilitation and decommissioning activities were conducted within specified areas NBK Manchester from October 2019 through March 2020 The following scope of work was completed (Battelle, 2020):

- Rehabilitation of seven groundwater monitoring wells. Rehabilitation included a combination of new well identification (ID) labels, replacement of well caps and locks, replacement/restoration of well monuments/vaults, lowering the polyvinyl chloride (PVC) casing, and surveying the monitoring well locations and elevations. Monitoring well MW-4 at Site 304 was added to the rehabilitation list, as it was previously under a temporary storage unit. Additionally, monitoring well MW-1 north of Tank 30 was rehabilitated (instead of decommissioned, as proposed) due to inaccessibility by the decommissioning drill rig. All seven (7) monitoring wells can now be used for environmental monitoring in the future, if necessary.
- Decommissioning of 91 vapor and groundwater monitoring wells. A total of 89 soil vapor monitoring wells surrounding fuel tanks and two groundwater monitoring wells were decommissioned at NBK Manchester. The majority of the concrete encasements surrounding the vapor monitoring well monuments were removed and transported off site for disposal. These monitoring wells are no longer used/required for environmental monitoring or are located within the footprint of the Tank Farm Improvement Project (MILCON P-856).
- Site restoration. Final site restoration activities were completed by Chinook in March 2020 and primarily included removing surface topsoil at the former borehole locations and then adding dry structural backfill soil and tamping down each location via a jumping jack compactor. Each location was then finished with the structural backfill soil to slightly above grade. A total of 76 former borehole locations were restored via this procedure.

3.3 PFAS Investigations

3.3.1 Preliminary Assessment (PA) Report

A Preliminary Assessment (PA) report prepared in 2021 discusses potential sources of per- and polyfluoroalkyl substances (PFAS) at NBK Manchester (CH2M HILL, Inc. [CH2M], 2021). The objectives of the PFAS PA of NBK Manchester were:

- Identify and catalog potential or actual PFAS sources (see list provided herein).

- Eliminate from further consideration those areas where there is no evidence of a PFAS release or suspected release and document the rationale for their elimination.
- Identify areas requiring further PFAS investigation.
- Identify receptors and migration pathways (both on and off the installation).
- Determine whether an expedited response effort is warranted because of current complete exposure pathways (for example, on-Installation or off-Installation drinking water source within one mile downgradient of potential source area).
- Set priorities for a base-wide site inspection (SI)

The PA evaluated 11 areas and identified 8 areas as potential or confirmed PFAS release areas. The four sites included in this FYR were assessed for the potential to be a PFAS source area. The following is a summary of the conclusions from the PA for Sites 302, 303, and 304 and Tank 50.

Site 302 was used as a dump for ship bilge waste, transformer oil, and other petroleum waste from NBK Manchester operations and Regional Naval facilities in the Puget Sound from 1955 through 1976. Bilge waste disposed at this location may contain PFAS because of aqueous film forming foam (AFFF) use aboard ships during training or emergency response (Navy, 2014). An SI was recommended at Site 302 (CH2M, 2021).

Site 303 has consisted of eight concrete USTs used to store marine diesel fuel. Two significant fuel spills have been documented at Site 303 (see Section 2.2). There is no evidence to suggest AFFF was used in the management of these spills, nor is there any record of AFFF being stored or transferred in association with these tanks. No further action (NFA) was recommended for this area (CH2M, 2021).

Site 304 includes maintenance, administration, and fuel operations buildings, and it is the central transfer point for most of the petroleum products stored at NBK Manchester. Site 304 includes Building 12 (AFFF Drum Storage), which is the current storage location of AFFF drums and may have been the historical storage location of AFFF. Additionally, AFFF may have been transferred to deployment equipment at this building. The PA concluded there was no evidence to suggest AFFF or other PFAS-containing materials have been associated with industrial activities at Site 304; NFA is recommended for this area except for Building 12. An SI was recommended at Building 12 (CH2M, 2021).

Tank 50 was used to store JP-5, and firefighting simulations were conducted at least once per year at the JP-8 Truck Loading Facility (Building 185) due to its proximity to Tank 50. The firefighting simulations consisted of spraying AFFF along the perimeter of

the Truck Loading Rack. AFFF used during the trainings could have infiltrated the subsurface and entered the Vashon Recessional Outwash Deposits or Vashon Advance Outwash aquifer on the western portion of NBK Manchester. An SI was recommended at Building 185 (CH2M, 2021).

3.3.2 Site Inspection Report

The SI report presented the data and findings obtained from the PFAS investigation conducted at NBK Manchester from September 2022 through March 2023. Field activities included drilling and installation of monitoring wells, soil sampling, groundwater sampling, sediment and surface water sampling, and tidal influence monitoring. The objectives of the SI included the following:

- Determine whether PFAS are present in groundwater and soil at potential or confirmed terrestrial PFAS release areas or in surface water and sediment at the confirmed marine PFAS release area at concentrations warranting further investigation.
- Refine the understanding of the hydrogeologic characteristics at potential or confirmed PFAS release areas.

The following is a summary of the conclusions and recommendations from the SI Report for Site 302, Site 304 (Building 12 specifically), and Tank 50 (Building 185 specifically). The analytical data tables from the SI Report are included in Appendix C.

Site 302: Perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorononanoic acid (PFNA) were detected in soil but at concentrations below the screening levels. PFOS was detected in groundwater at a concentration only slightly above the screening level. The Human Health Risk Screening (HHRS), which was included in the SI Report, did not identify any PFAS as chemicals of potential concern (COPCs) in soil or groundwater at Site 302. Therefore, the SI concluded PFAS were not present at concentrations warranting further investigation, and no further investigation was recommended for Site 302.

Building 12: PFOA, perfluorobutanesulfonic acid (PFBS), and perfluorohexanesulfonic acid (PFHxS) were detected in soil at concentrations less than screening levels, but PFOS was detected in soil at a concentration exceeding the screening level. PFBS was detected in groundwater at concentrations less than the screening level, and PFOA, PFOS, PFHxS, and PFNA were detected in groundwater at concentrations greater than screening levels. The HHRS did not identify any PFAS as COPCs in soil; however, PFOA, PFOS, and PFHxS were identified as COPCs in groundwater indicating potential

unacceptable human health risks at Building 12. Based on the findings of the SI, an RI was recommended for Building 12.

The SI report recommended combining Building 12 with Building 85 and the Vehicle Wash Rack due to uncertainty in groundwater flow direction across the area. It was noted a combined RI for these areas would improve understanding of the groundwater flow directions and whether there is any connection between the PFAS detections.

Building 185: PFOA and PFOS were detected in soil but at concentrations below the screening levels. PFBS, PFHxS, and PFNA were detected in groundwater at concentrations but below the screening levels; PFOA and PFOS were detected in groundwater at concentrations exceeding their screening levels. Although the HHRS did not identify any PFAS as COPCs in soil or groundwater, there is uncertainty regarding impacts to groundwater by migration from a release at an upgradient site (Test Spray Area). Therefore, based on the findings of this investigation, an RI is recommended for Building 185 combined with the Test Spray Area.

Drinking water at NBK Manchester is currently supplied by the Manchester Water District (MWD), and the MWD supply wells are upgradient of NBK Manchester. As part of the Third Unregulated Contaminant Monitoring Rule, untreated drinking water was tested for PFAS at MWD wells (USEPA, 2017). Drinking water was also tested at the point on NBK Manchester where it ties-in to MWD and at two on-base buildings. PFAS were not detected in the drinking water samples (CH2M, 2023).

3.4 Site 302 Soil Characterization, 2020

During the initial LUC site inspection in 2016, the central portion of Site 302 was reportedly covered with large, older stockpiles of soil and debris covered with vegetation. It was later reported the soil stockpiles and debris originated from a culvert replacement project located upgradient and outside the site boundary from an area not historically used for industrial activity. This material was dumped in two large, irregular piles of heights up to 6 to 7 feet above the top of the soil cap, which is the surrounding ground surface. In 2019 to 2020, Kane Environmental, LLC (Kane) was contracted to complete a scope of work that included collection of soil samples from the soil stockpiles and the surrounding surficial soil cap soils, and submittal of these samples for laboratory analysis (Kane, 2020). Soil pile samples and soil cap samples were submitted to the Pace Analytical National Center for Testing and Innovation (Pace) laboratory location in Mt. Juliet, Tennessee, a Washington State Department of Ecology- and Department of Defense-accredited laboratory, for analysis to determine concentrations of the following constituents (see Section 4.2.1 and Appendix C):

- TPH as Diesel-Range Organics (DRO) and TPH as Residual-Range Organics (RRO) by Washington Method NWTPH-Dx; and
- PCBs by EPA Method 8082.

For soil pile and soil cap samples analyzed for DRO and RRO, there were no exceedances of the Washington State MTCA Method A Soil Cleanup Level (CUL) for Unrestricted Land Uses were identified in any of the samples analyzed. The MTCA Method A Soil CUL for DRO and RRO is 2,000 ppm.

For soil pile and soil cap samples analyzed for PCBs, there were no exceedances of the MTCA Method A Soil CUL for total PCBs (set at 1 ppm) in any of the samples analyzed. In addition, no exceedances of the MTCA Method B Cleanup Level (accounting for cancer risk) for PCB Aroclor 1260, set at 0.5 ppm, were identified in any of the samples analyzed.

The lack of any exceedances of these CULs in soil cap samples suggests that the soil cap remains an effective protective measure for preventing exposure to more contaminated soils present at this site at greater depths (Kane, 2020).

3.5 Site 302 PCB Data Gaps Study, 2022

As recommended in the Fourth Five-Year Review (Navy, 2020), a PCB data gaps study at Site 302 was conducted in 2021 to 2022 (Liberty JV, 2022). This investigation involved a review of historical PCB data collected from Site 302 and Little Clam Bay in soil, surface water, groundwater, fluvial and marine sediments, and tissue. The primary objectives of the Site 302 PCB data gaps study were as follows:

- Evaluate whether additional sampling and analysis of sediment, surface water, and seep/groundwater discharge is needed along the western shoreline of Little Clam Bay to evaluate the potential presence of PCBs above background levels; and
- If additional sampling at Site 302 for PCBs is recommended, outline an investigation program that would assess Site 302 as a potential residual source of PCBs impacting Little Clam Bay from surface water runoff and seep/groundwater discharge.

To meet the objectives of the data gaps study, an evaluation of ARARs and an updated CSM were completed.

The PCB data gaps study concluded the remedy at Site 302 remains protective of human health and the environment because: 1) PCB source soil has been removed or capped, and seven years of post-remedy monitoring results support that off-site

contamination from surface water run-off has been effectively diminished from pre-remedy conditions; 2) land use has not changed since the RODs (Navy, 1991 and 1992), nor is it expected to change; and 3) LUCs are maintained to prevent and control exposure to PCBs at Site 302. The PCB data gap study indicated that data are not adequate to evaluate human health risk from PCBs via bioaccumulation and consumption of water and shellfish.

3.6 Site 302 Soil Stockpile Disposal, 2023

As discussed in Section 3.4 above, soil had been stockpiled over the soil cap since LUC Inspections started in 2016. Ecology issued a Preliminary Notice to Rescind the NFA letter (Notice) to the Department of the Navy on October 12, 2022, regarding the ongoing LUC violations at Site 302 (PCB Site) specifically addressing the unauthorized soil and debris piles located on the site (Ecology, 2024). Therefore, the soil was sampled in January 2020 and characterized for site COCs (NBK Manchester, 2024).

Based on the findings of the sampling, NBK Manchester contracted the removal of the soil stockpiles. In January 2023 in advance of the contract award, additional soil sampling for disposal characterization and site surveying to mark excavation limits and estimate the volume of soil and debris for disposal was conducted (see Section 4.2.1 and Appendix C) (NBK Manchester, 2024).

In May 2023, soil removal field activities began. Stockpile removal required 196 dump truck loads to haul the material to North Mason Fiber where it was loaded into rail cars for delivery to Waste Management's Columbia Ridge Subtitle D landfill. In total, over 3,500 tons of material was transported to the Columbia Ridge landfill for disposal. Following stockpile removal, site grades were smoothed to match post cap grade and low-growing hydro-seeding was applied to finish off the site (NBK Manchester, 2024).

After review of the Manchester Site 302 Soil Removal Report (May 2024), Ecology accepted the steps taken at Site 302 and issued a letter stating they consider the matter of non-compliance of LUC requirements stated in the Notice as closed and would not be pursuing a rescindment of the current NFA for the PCB Site at this time (Ecology, 2024).

3.7 Site 302 Fence Repair Report

During the 2023 LUC inspection, fencing was noted to be collapsed along the western and northwestern boundary of the site due to several fallen trees. The Navy issued a contract to perform repair of the collapsed chain-link fencing. Approximately 60 linear feet of collapsed chain-link fencing was repaired in two separate sections along the western and northwestern LUC boundaries of Site 302. The wood debris from tree removal was left as directed by NAVFAC NW forester on the forest floor. Any excess

fencing material and debris from the fence repair was removed and disposed of offsite. The laydown area was restored to existing or better condition. The fence repairs were conducted on March 11, 2024 (EA Engineering, Science, and Technology, Inc., PBC, 2024).

During the fence repair activities, an approximately 80-foot section of additional downed fence was discovered along the northwestern portion of Site 302 fence line. NAVFAC NW will ensure to upright and secure the fence in this area.

3.8 Site 303 Tank Decommissioning, Ongoing

As part of Phase I P-856 MILCON, three USTs and appurtenances associated with those tanks were removed from Site 303. Those include Tanks 24, 25, and 26. These tanks stored marine diesel (Garco, 2022).

Each tank in this removal group was constructed of steel reinforced concrete. The tank size for the group was 125 feet in diameter and 25 feet high. Any remaining useable fuel was pumped from each tank prior to the starting the project. Soil samples were collected under and around each tank and analyzed for BTEX by method EPA 8021, TPH-gasoline range organics (GRO) by method NWTPH-Gx, and TPH-diesel range organics (DRO) by method NWTPH-Dx (see Section 4.2.2 and Appendix C) (Garco, 2022).

According to the Ecology Closure Notice, the following are the closure dates for each tank:

- Tank 24 – August 15, 2022
- Tank 25 – July 15, 2022
- Tank 26 – July 19, 2022

The NBK Manchester Environmental Manager indicated excavation field activities associated with the tank removal were authorized and performed under proper dig permits, confirming that excavated soil was properly characterized and disposed of off-site in accordance with state and federal regulations (Liberty JV, 2024).

According to the NBK Manchester Environmental Protection Specialist, Tank 27 will be removed as part of MILCON Phase II. In addition, NBK Manchester is currently in the process of planning the removal of the remaining tanks (Tanks 22, 28, 29, and 30).

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4.0 Five-Year Review Process

4.1 Community Notification, Involvement, and Interviews

The Navy's public or community notification and involvement activities related to NBK Manchester are described in the following subsections.

4.1.1 History of Community Involvement

Community involvement activities have established communication between the citizens living near NBK Manchester (in Manchester and Port Orchard, Washington), other interested organizations and agencies, the Navy, EPA, Ecology, and/or Suquamish Tribe. Community involvement activities included the following:

- Technical Review Meeting
- Community Relations Plan (CRP)
- Factsheet
- Local newspaper release
- Public meeting

A CRP was developed in September 1989 describing how the Navy was planning to involve the community in the remedial activities at Site 302 (Hall & Associates, 1989). The purpose of the CRP was to facilitate two-way communication between the surrounding community and the Navy and to encourage community involvement and understanding of ongoing environmental remedial activities at Site 302. The document includes the site background information, remedial investigations at the site, key community concerns, community relations activities, and schedule.

A factsheet and local newspaper release were the primary methods of informing the public of the proposed remedy for Site 302. The community members were given opportunities to ask questions or provide comments at the public meeting, by direct telephone calls to the Navy's contact person, or by submitting written comments or questions to the contact person. The public meeting was held on December 6, 1990, and discussed community comments and concerns on the proposed plan for cleanup of Site 302 (Navy, 1990).

4.1.2 Community Involvement during the Five-Year Review Period

The Kitsap County Board of Commissioners Resolution established the Manchester Community Advisory Council on April 13, 2009. The Manchester Community Advisory

Council meets monthly in Manchester, Washington. The committee provides a discussion forum for community interests and issues. The committee enhances communication between Manchester-area residents and Kitsap County government, and coordinates efforts of the many council and community residents currently working to improve the Manchester community. In the past, the Navy has presented at these community meetings, but not during the period of this FYR. The Manchester Community Advisory Council was invited to the Public Meeting for the Off-base Drinking Water Investigation in June 2023.

Public notices were requested to be published in local newspapers informing the community of the Navy's intent to conduct the fifth FYR for NBK Manchester. A notification was published in the *Kitsap Sun* from May 28 through 30, 2024. The proof of this public notice is provided as Appendix A. Other local newspapers where notices had been published in the past were no longer in business or only print periodically. The notification provided information on why the FYR was being conducted; what sites were included in the FYR; when the FYR would be completed; how the public could receive additional information; and established a 30-day public review period for the public to provide questions or comments on the FYR process for NBK Manchester.

Similar to the notification of intent to conduct the FYR, a notice of completion for the FYR will be published in the *Kitsap Sun.* The notification will include the protectiveness statement and website link to the completed FYR report.

4.1.3 Interviews during the Five-Year Review Period

As part of the FYR process, interviews were conducted with persons familiar with Sites 302, 303, and 304 and Tank 50 at NBK Manchester. Interview candidates were identified from a variety of organizations and groups, including NBK Manchester personnel, Suquamish Tribe, and a community member. A set of interview questions were developed and tailored to specific categories of interview candidates (i.e., either Navy/NBK Manchester personnel, regulatory agency, or community member). These interview questions and instructions were transmitted via email to NBK Manchester personnel, regulatory agency personnel, a tribal representative and a community member on May 23, 2024. The complete interview questionnaires are provided as Appendix B. Highlights of NBK Manchester personnel, regulatory agency, and community member interviews are summarized below.

Navy/NBK Manchester Personnel. Three NBK Manchester personnel were contacted for interviews as part of the fifth FYR for NBK Manchester. Two questionnaires were returned. The NBK Manchester respondents stated the remedies were adequate and functioning as intended with the exception of Site 302 where fence repairs are currently

needed. Also, the respondents stated the annual LUC inspections have been sufficiently thorough and frequent to ensure protection of human health and the environment. The respondents also indicated soils at Sites 302 and 303 have been tested and there is no indication of significant impact. Specifically, the respondent recommended reviewing soil sampling data from the past 5 years to consider reducing restrictions or eliminating restrictions at Site 303 because there is minimal or no measurable contamination site. Additionally, as USTs are removed, a large majority of soils in this site have been over excavated tested.

One NBK Manchester respondent suggested maintenance of the Site 302 soil cap should include ensuring the surrounding vegetation does not encroach on the cap. One NBK Manchester respondent indicated major accomplishments included Site 302 soil testing, along with removal of soil and vegetation and improved security. The respondent was not aware of any community concerns regarding the remedies at Sites 302, 303, 304 or Tank 50.

Stakeholders. Regulatory agency personnel declined to be interviewed. Personnel from the Suquamish Tribe did respond to the interview questionnaire. The respondent Indicated that the remedies implemented appear effective to date and the annual LUC inspections have been sufficiently thorough to ensure protection of human health and the environment. The Suquamish Tribe respondent thought the recommendations from the fourth FYR had been adequately implemented with the exception of fencing at Site 302 but understands that the fencing is being addressed.

Community Members. One community member, who is on the Manchester Community Advisory Committee, was sent the interview questionnaire, but failed to respond.

More details on specific comments and responses are provided in Appendix B.

4.2 Data Review

The following section discusses the results of any data collection efforts, including environmental monitoring or investigations, to ensure the protectiveness of the remedies (i.e., LUCs) at Sites 302, 303, and 304 and Tank 50.

4.2.1 Site 302

The environmental data associated with contaminants addressed by the selected remedy collected at Site 302 during this FYR period was related to soil characterization samples from the soil piles and surrounding surficial soils (Kane, 2020). As discussed in Section 3.4, there were no sample concentrations of DRO, RRO, or PCBs detected above their respective CUL. The lack of any exceedances of these CULs in soil cap

samples suggests that the soil cap remains an effective protective measure for preventing exposure to more contaminated soils present at this site at greater depths (Kane, 2020).

Prior to disposal of the soil stockpiles in 2023, the receiving landfill required testing for Resource Conservation and Recovery Act (RCRA) 8 metals plus priority pollutant metals copper/nickel/zinc in addition to the screening performed on Site 302 soil in 2020. The results of this sampling demonstrated the concentrations of RCRA 8 plus priority pollutant metals were low. No samples exceeded hazardous waste threshold for any of these constituents.

4.2.2 Site 303

During tank decommissioning of Tanks 24, 25, and 26, soil samples were collected to determine if contamination existed. Groundwater was not encountered at Site 303. The following provides the summary and conclusions from the tank decommissioning activities (Garco, 2022).

Tank 24 Results

Five soil borings were drilled to a depth of approximately 5 to 6 feet bgs inside the tank perimeter below the tank floor slab. One sample was collected from each boring. No petroleum values above MTCA Method A limits (unrestricted land use) were found at this site. One sample had low detections of TPH-GRO, ethyl benzene and xylenes, but all were below the MTCA Method A listing. NFA was recommended for Tank 24 (Garco, 2022).

Tank 25

During tank removal, gray soil was observed near the tank and an oil stain was observed on the sidewall of the tank. Four samples of the gray soil were collected and analyzed. TPH-DRO, TPH-GRO, and ethyl benzene were detected but were below their respective MTCA Method A limits (industrial use) (Garco, 2022).

In July 2022, five soil borings were drilled to a depth of approximately 5 to 7 feet bgs inside of the tank perimeter. TPH-DRO and TPH-GRO were detected above the MTCA Method A limits (unrestricted land use). Additionally, the Tank Closure Report indicated there were some physical indicators and old notations suggesting there was a leak or overfill at Tank 25 during the past activities. The soil under the tank is very dense silt/clay/sand and there is not a significant amount of water contacting the contamination. The area will be buried under a significant amount of soil with no contact with water; therefore, NFA was recommended for Tank 25 (Garco, 2022).

Tank 26

Five soil borings were drilled to a depth of approximately 5 to 6.5 feet bgs inside the tank perimeter. One sample was collected from each boring. No values were above MTCA-A limits (unrestricted land use) at this site. One sample had low detections of TPH-GRO and ethyl benzene, but all were below the MTCA Method A limit. NFA was recommended for Tank 25 (Garco, 2022).

4.2.3 Site 304

No environmental data associated with contaminants addressed by the selected remedy were collected from Site 304 during this FYR period; therefore, there is no data review.

4.2.4 Tank 50

No environmental data associated with contaminants addressed by the selected remedy were collected from Site 304 during this FYR period; therefore, there is no data review.

4.3 Site Inspection

The site inspections of Sites 302, 303, and 304 and Tank 50 at NBK Manchester for the FYR and the 2024 LUC inspections were conducted concurrently on June 5, 2024. LUC inspections have been conducted on an annual basis during this FYR period.

LUC inspections were conducted in accordance with the *Land Use Control Plan for Sites 302, 303, 304 and Tank 50, Naval Base Kitsap Manchester, Manchester, Washington* (Navy, 2016a) and included a field inspection, determination of the current land use, document review (e.g., administrative and institutional controls in place), and condition assessment of engineering controls such as fencing, gates, signage, monitoring wells, and soil covers. The LUC inspections provide a means to verify the required LUCs ensure protection of human health and the environment and assist in identifying recommendations for corrective/additional action(s) to ensure that the LUCs continue to be effective at NBK Manchester. Specific LUC requirements for Sites 302, 303, and 304 and Tank 50 were summarized in Table 2-2.

The results of the annual LUC inspections are documented with checklists, field notes, and/or photographs in the annual LUC Inspections Technical Memoranda, which are submitted to Ecology for their reference/awareness.

Based on the annual LUC inspections, there was no change in land use or ownership at any site and, most importantly, there were no observations or findings which required notification to Ecology or threatened the protection of human health and the

environment during this FYR period. The LUCs in place at Sites 302, 303, 304 and Tank 50 of NBK Manchester remain effective in the protection of human health and the environment. Table 4-1 presents a summary of findings and recommendations from the LUC inspections conducted from 2019 through 2024.

During the 2024 LUC inspections (and FYR site inspections), the LUC inspection checklists were used to guide the inspections at each site and, ultimately, assess the protectiveness of the remedies (i.e., LUCs) at Sites 302, 303, and 304 and Tank 50 of NBK Manchester. Table 4-1 presents a comprehensive list of observations/findings from the 2019 through 2024 LUC inspections and subsequent recommendations. The most salient findings from the 2024 LUC inspections are summarized below:

1. Site 302: During the fence repair activities (see Section 3.7), an approximately 80-foot section of additional downed fence was discovered along the northwestern portion of Site 302 fence line.
2. Site 303: LUC signage along the boundary road and southwest of Tank 22 was found on the ground during the LUC inspection. It was temporarily replaced on the pole during the site inspection.

The Navy plans to conduct vegetation clearing and fence repair, as needed, for item 1 above in FY 2025. NAVFAC Northwest will coordinate the implementation of these activities. The sign for item 2 was permanently replaced in July 2024.

Based on the results of the 2024 inspection, it is recommended that the LUC inspections continue on an annual basis. Continuing the LUC inspections on an annual basis will allow for a timely evaluation before and after completion of actions described in Table 4-1.

The completed 2024 LUC inspection checklists and monitoring well inspection checklists are provided in Appendix D.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
Site 302 – PCB Site								
✓	✓	✓	–	–	–	Primary gate/entrance to site is locked, requires NBK Manchester personnel for access, and has six "Restricted Area/Keep Out" signs posted along the southern fence line; however, there is no specific LUC signage.	Install specific LUC signage on the primary entrance to Site 302.	Completed; LUC signage was installed on the primary entrance in July 2020.
✓	✓	✓	✓	–	–	Prior to 2016, the central portion of the site is covered with large, older stockpiles of soil and debris, which were covered with vegetation.	Because detections of Aroclor 1260 in soil samples exceed the soil reuse (commercial fill and road base material) threshold set by Ecology (Ecology, 2016), the soil will be removed and disposed of off-site at an approved treatment and disposal facility.	Completed; the soil was removed and disposed of off-site at an approved treatment and disposal facility, in accordance with state and federal regulations. The remaining area has been re-seeded. The soil cover was intact and functioning as intended.
✓	✓	✓	✓	–	–	The gated entrance on the north side of the site is closed and in a remote area of NBK Manchester, not easily accessible by personnel. There is LUC signage and lock; however, the gate is not secured and can be pushed open.	Add chain and lock to secure gate and prevent it from being pushed open.	Completed; LUC signage and a lock were installed on the gated entrance in July 2020 and a chain was added in August 2023 making it so the gate cannot be pushed open and is secure.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024) (continued)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
✓	✓	✓	✓	✓	✓	During previous LUC inspections, approximately 60-80 linear feet of chain-link fencing on the northwestern side of the site was observed to be heavily overgrown with vegetation. The subject area was inaccessible; therefore, it was viewed from a distance during the 2021 – 2023 LUC inspections. The 2024 LUC inspection confirmed the incursion of heavy vegetation (blackberry bushes) along approximately 100 linear feet of chain-link fence along the northwest perimeter of the site. Though the fence appeared to be leaning slightly, it was intact, and the area is inaccessible.	Clear heavy vegetation and support the fence so it is completely upright.	The presence of heavy vegetation will continue to compromise the integrity of the fence, potentially leading to additional overgrowth and potential collapse. The Navy plans to conduct the vegetation and tree clearing and fence repair in FY 2025.
–	✓	✓	✓	✓	✓	During the 2020, 2021, 2022, and 2023 LUC inspections, approximately 50 to 60 linear feet of collapsed fencing was noted along the western boundary of the site due to fallen trees.	Reconstruct fence.	Completed; the Navy conducted the vegetation and tree clearing and fence repair March 2024.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024) (continued)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
Site 303 – D-Tunnel Tanks								
✓	✓	–	–	–	–	An unmarked stockpile of soil covered by black poly sheeting in the northwest corner of the construction laydown area southeast of Tank 24. Poly sheeting was ripped, exposing stockpile.	Confirm soil stockpile is authorized reusable material and is located in an approved staging area. Replace poly sheeting cover.	Completed; as confirmed with NBK Manchester environmental personnel, soil stockpile is authorized reusable material and is located in an approved staging area. Only clean, reusable aggregate material is approved for placement/staging in the construction laydown area southwest of Tank 24.
✓	–	–	–	–	–	Monitoring wells MW-1 south of Tank 24 and MW-3 north of Tank 30 need casing to be lowered to fit cap under lid and minor maintenance/repairs.	Lower casing and perform needed minor maintenance/repairs on monitoring wells MW-1 and MW-3.	Completed; casing was lowered and minor maintenance/repairs on monitoring wells MW-1 and MW-3 were completed during well rehabilitation activities in October/November 2019.
✓	✓	✓	✓	–	–	An old stockpile of soil on a tarp surrounded by a disintegrating absorbent boom had been observed in the laydown area north of Tank 29 since 2016.	Properly characterize, reuse on site, or transport and appropriately dispose of the soil off site.	Completed; the soil stockpile has been characterized and disposed of off-site.
–	✓	–	–	–	–	Soil stockpile under tarp in construction laydown area southwest of Tank 24. Pile of cut asphalt staged next to soil stockpile.	Confirm soil stockpile is authorized reusable material and is located in an approved staging area.	Completed; as confirmed with NBK Manchester environmental personnel, soil stockpile is authorized reusable material and is located in an approved staging area. Only clean, reusable aggregate material is approved for placement/staging in the construction laydown area southwest of Tank 24.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024) (continued)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
–	–	✓	–	–	–	Two stockpiles of landscape rock (red lava rock) and pieces of landscape fabric were observed in the northwest corner of the construction laydown area south of Tank 25. The material in these stockpiles originated from the landscaped areas at the main gate (outside of a LUC site) and is authorized reusable material in an approved staging area.	Keep piles covered and maintained until an on-site use can be found.	Completed; Navy personnel have reused the stockpiled material on-site at NBK Manchester.
–	–	–	✓	–	–	Soil disturbance was observed in several areas of Site 303 due to MILCON field activities associated with removal of selected existing tanks. Soil disturbance was observed in the vicinities of Tanks 24, 25, 26, and 30. In addition, soil disturbance was observed to the west of Tanks 28 and 29 in the form of a temporary MILCON access road trending north to south.	Confirm the soil disturbance was authorized.	Completed; the NBK Manchester Environmental Manager confirmed that the proper protocols, outlined in the Environmental and Safety Guide (ESG) (Naval Supply Systems Command [NAVSUP], 2020), were followed during excavation activities (e.g., dig permits). Construction activities are ongoing. If excavation of soil in areas within the LUC boundary but not covered under the current dig permits is necessary, additional dig permits may be required.
–	–	–	✓	–	–	A small soil stockpile covered by a tarp and secured by gravel bags was observed southeast of Tank 24.	Properly characterize, transport, and appropriately dispose of the soil off site.	Completed; the soil stockpile has been characterized and disposed of off-site.
–	–	–	✓	–	–	MILCON construction debris related to decommissioning of Tank 23 (outside of the Site 303 LUC boundary) was observed to be stockpiled at Tank 24.	Properly characterize, transport, and appropriately dispose of the debris off site.	Completed; the construction debris has been removed.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024) (continued)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
–	–	–	✓	✓	✓	LUC signage damaged due to MILCON field activities was observed southwest of Tank 22 and south of Tank 29.	Repair or replace LUC signage upon completion of MILCON activities in affected areas.	Completed; During the LUC site inspection, FASTSIGNS® of Silverdale was onsite and brought two new signs. The old sign southwest of Tank 22 was present but on the ground during the LUC site inspection, so the old sign was temporarily installed until one of the new signs could be installed, which was completed by the Navy RPM after the site inspection. The other new sign was installed during the LUC site inspection at Tank 29.
Site 304 – Industrial Area								
✓	–	–	–	–	–	Groundwater monitoring wells MW-1 and MW-2 were found; however, MW-3 and MW-5 are presumed to be buried under landscaping rocks. MW-4 was located in November 2019 and added to the well rehabilitation activities.	Locate all monitoring wells and assess for condition and integrity.	Completed; a well rehabilitation and decommissioning study, including a records review and site reconnaissance, was conducted from 2016 through 2017 (Navy, 2017).
✓	✓	–	–	–	–	The LUC signage for Site 304 is located at the northeastern corner of Building 178, outside and north of the LUC boundary.	Maintain the LUC signage in its current location.	Completed; per Ecology comment on the draft 2020 LUC inspections, there is no need to move the LUC signage, as it is located prior to and along the main entryway to Site 304.
✓	–	–	–	–	–	Monitoring wells MW-1 and MW-2 do not have identification and the expansion caps are broken. In addition, one monument ear is broken on MW-1.	Perform needed minor maintenance/repairs on monitoring wells MW-1 and MW-2.	Completed; casing was lowered and minor maintenance/repairs on monitoring wells MW-1 and MW-3 were completed during well rehabilitation activities in November 2019.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024) (continued)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
–	✔	–	–	–	–	Visual evidence of excavation under asphalt north of MW-1. Approximately 10 feet by 9 feet by 7 feet triangular dimension.	Confirm any excavated soil is stockpiled in an approved staging area, or that it has been properly disposed of. Confirm that proper protocols were followed during excavation activities (i.e., dig permits, etc.).	Completed; as confirmed with NBK Manchester Environmental Personnel, excavation was conducted to repair subsidence in the area, and all proper protocols were followed during activities.
–	–	✔	✔	–	–	A small cut in asphalt was observed off the southwest corner of Building 12, which was due to excavation to repair a small area of subsidence near the building. The asphalt cut was triangular with approximate dimensions of 10 feet by 9 feet by 7 feet resulting in an opening in the asphalt that had been filled with gravel	The cut in the asphalt should be repaired.	Completed; as noted in the 2020 LUC Technical Memorandum, and observed during the 2022 LUC inspections, the cut in the asphalt has been repaired.
–	–	✔	✔	–	–	Ongoing excavation observed to the northwest of the fuel pier and northeast of MW-4 to repair/replace a fire hydrant.	It was confirmed with the NBK Manchester Environmental Manager that the proper protocols, outlined in the ESG (NAVSUP, 2020), were followed during excavation activities (i.e., dig permits, etc.). Repair asphalt following hydrant repair.	Completed; as noted in the 2021 LUC Technical Memorandum, and observed during the 2022 LUC inspections, the excavation to the northwest of the fuel pier and northeast of MW-4 to repair/replace a fire hydrant was completed.
–	–	–	✔	–	–	Four breaks were observed along the chain-link fence that surrounds the northeast side of Site 304.	The chain-link fence was in the process of removal and a new fence farther east of Site 304 will be installed. New signage will be installed demarcating the boundary of Site 304.	Completed; the damaged fence has been removed.

Table 4-1: Summary of Site Inspection Findings and Recommendations to Optimize LUC Implementation (2019 through 2024) (continued)

2019	2020	2021	2022	2023	2024	Findings/Observations	Recommendations	Comment
–	–	–	✔	–	–	Recent soil disturbance activity was observed at the former location of Tank 14 (northwest corner of Site 304). The area appeared to be restored with backfill soil material and mulch as the surface completion.	The NBK Manchester Environmental Manager confirmed that the proper protocols, outlined in the ESG (NAVSUP, 2020), were followed during excavation activities (e.g., dig permits).	Completed; as observed during the 2022 LUC inspections, the excavation and surface completion at former Tank 14 were completed.
Tank 50 – UST Release Site								
✔	✔	–	–	–	–	There is LUC signage along the southwestern access road, downhill from Tank 50 and near the past environmental release; however, there is no LUC signage on the northern access road – the primary entryway to Tank 50.	Add LUC signage on the northern access road to Tank 50 (i.e., the primary entryway to the site). LUC signage at this location is noted in a well installation and sampling report (Hart Crowser, 1998).	Completed; LUC signage was installed at the primary entryway in July 2020.
✔	–	–	–	–	–	Monitoring well MW-1 has no exterior well identification and no lock on lid.	Perform needed minor maintenance/repairs on monitoring well MW-1.	Completed; the minor maintenance/repairs on MW-1 were completed during well rehabilitation activities in November 2019.
–	–	–	✔	–	–	Recent soil disturbance activity was observed to the south of Tank 50. The area appeared to be restored with backfill soil material and reseeded.	The NBK Manchester Environmental Manager confirmed that the proper protocols, outlined in the ESG, were followed during excavation activities (e.g., dig permits).	Completed; as observed during the 2022 LUC inspections, the soil disturbance to the south of Tank 50 appeared to be addressed (restored to match the surrounding area).

Note:

Green-shaded rows indicate that the finding/observation and subsequent recommendation have been addressed/completed.

Key:

✔ = The finding/observation was present during the LUC inspection year listed.

– = The finding/observation was not present during the LUC inspection year listed.

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5.0 Technical Assessment

In accordance with the Comprehensive Five-Year Review Guidance (EPA, 2001), the technical assessments for Sites 302, 303, and 304 and Tank 50 at NBK Manchester answer the following three questions:

- Question A: Is the remedy functioning as intended by the decision documents?
- Question B: Are the exposure assumptions, toxicity data, Cleanup Levels, and RAOs used at the time of the remedy still valid?
- Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

Table 5-1 summarizes the responses to Questions A, B, and C based on the technical assessment discussion provided in the following subsections for Sites 302, 303, and 304 and Tank 50.

Table 5-1: Technical Assessment Summary for Sites 302, 303, and 304 and Tank 50 at NBK Manchester

IR Site	**Question A:** Is the remedy functioning as intended by the decision documents?	**Question B:** Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?	**Question C:** Has any other information come to light that could call into question the protectiveness of the remedy?
Site 302	Yes	Yes	No
Site 303	Yes	Yes	No
Site 304	Yes	Yes	No
Tank 50	Yes	Yes	No

Abbreviations:
RAOs = remedial action objectives

5.1 Site 302

Question A

Per the ROD and ROD Amendment (Navy, 1991 and 1992), approximately 3,000 cubic yards of PCB- and petroleum hydrocarbon-impacted soil were excavated for off-site incineration. Excavated areas received a minimum of 1 foot of granular fill, followed by capping with 4 inches of topsoil over the entire site.

Based on post-closure monitoring results and an additional minimum of 1 foot of soil cover in certain areas, Ecology issued an NFA letter for Site 302, contingent upon land use remaining for industrial purposes and identifying LUC requirements to prevent exposure to residual soil contamination (Ecology, 2000).

The excess soil that was placed in the central portion of the site prior to 2016 was removed in 2023 and disposed of off-site at an approved treatment and disposal facility, in accordance with state and federal regulations. The remaining area has been re-seeded. The soil cap is intact and engineering controls that limit run-on or run-off are in good condition. The signage is in place and visible around the site. The fencing on the northwest boundary at Site 302 is covered in heavy vegetation (blackberry bushes) and needs to be supported (currently leaning but not down); however, the fence remains intact and the area is inaccessible. The LUC requirements for Site 302 remain effective in the protection of human health and the environment; therefore, the remedy (i.e., LUCs) is functioning as intended and **the answer to Question A is "yes."**

Question B

For Site 302, the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy are still valid; therefore, **the answer to Question B is "yes."** The soil cleanup level and RAOs were based on federal and state ARARs whereby residual PCB contamination of less than 10 mg/kg can be left in place as long as the contaminated soil is capped to prevent or minimize human exposure, infiltration of water, and erosion and deed restrictions are implemented to maintain cap and control site use (40 C.F.R. 761.61 and WAC 173-340-745). These ARARs have not changed since the ROD and ROD Amendment (Navy, 1991 and 1992) were signed and are in effect today; thus, the remedy remains valid. Further discussions regarding the continued validity of cleanup levels, exposure assumptions, and RAOs used at the time of the remedy are provided in Sections 5.5.1 and 5.5.2.

Question C

For Site 302, no other information has come to light that could call into question the protectiveness of the remedy (i.e., LUCs) during this FYR period; therefore, **the answer to Question C is "no"** (see Section 5.6).

The Navy recognizes PFAS as chemicals of emerging concern and has completed a PA and an SI at NBK Manchester. The PA recommended an SI at Site 302 (CH2M, 2021). During the SI, PFAS were detected in soil at concentrations below the screening levels; PFOS was detected in groundwater at a concentration slightly above the screening level. However, the HHRS did not identify any PFAS as COPCs in soil or groundwater at Site 302. The SI concluded that PFAS were not present at concentrations that warrant further investigation, and no further investigation was recommended for Site 302. Therefore, PFAS does not call into question the protectiveness of the remedy (i.e., LUCs).

Also, Site 302 is not located along the shoreline of NBK Manchester; therefore, there are no shoreline remedies (e.g., shoreline armoring) and climate change does not call into question the protectiveness of the remedy (i.e., LUCs).

5.2 Site 303

Question A

Ecology issued an NFA letter for Site 303, identifying LUC requirements to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). Based on the annual LUC inspections, there was no change in land use or ownership. However, extensive construction activities are currently being performed as part of Phase I P-856 MILCON; three USTs (Tanks 24, 25, and 26) and the associated equipment associated were removed from Site 303. The area around these tanks has been over excavated and sampled to confirm if contamination is present. The remaining USTs will be removed during future stages of the MILCON project. ASTs are currently being constructed where the USTs have been removed.

There were no observations or findings which required notification to Ecology or threatened the protection of human health and the environment during this FYR period. The LUC requirements for Site 303 remain effective in the protection of human health and the environment, preventing exposures; therefore, the remedy (i.e., LUCs) is functioning as intended and **the answer to Question A is "yes."**

Question B

For Site 303, the exposure assumptions, toxicity data, and cleanup levels used at the time of the remedy are still valid; therefore, **the answer to Question B is "yes."** A discussion of the changes in toxicity data and cleanup levels is provided in Section 5.5.

Question C

For Site 303, no other information has come to light that could call into question the protectiveness of the remedy (i.e., LUCs) during this FYR period; therefore, **the answer to Question C is "no"** (see Section 5.6). The Navy recognizes PFAS as chemicals of emerging concern and has completed a PA and an SI at NBK Manchester. The PA recommended NFA for Site 303 related to PFAS; therefore, PFAS does not call into question the protectiveness of the remedy (i.e., LUCs). Also, Site 303 is not located along the shoreline of NBK Manchester; therefore, there are no shoreline remedies (e.g., shoreline armoring) and climate change does not call into question the protectiveness of the remedy (i.e., LUCs).

5.3 Site 304

Question A

Ecology issued an NFA letter for Site 304, identifying LUC requirements to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). Based on the annual LUC inspections, there was no change in land use or ownership and, most importantly, there were no observations or findings which required notification to Ecology or threatened the protection of human health and the environment during this FYR period. The LUC requirements for Site 304 remain effective in the protection of human health and the environment, preventing exposures; therefore, the remedy (i.e., LUCs) is functioning as intended and **the answer to Question A is "yes."**

Question B

For Site 304, the exposure assumptions, toxicity data, and cleanup levels used at the time of the remedy are still valid; therefore, **the answer to Question B is "yes."** A discussion of the changes in toxicity data and cleanup levels is provided in Section 5.5.

Question C

For Site 304, no other information has come to light that could call into question the protectiveness of the remedy (i.e., LUCs) during this FYR period; therefore, **the answer to Question C is "no"** (see Section 5.6).

The Navy recognizes PFAS as chemicals of emerging concern and has completed a PA and an SI at NBK Manchester. The PA recommended an SI at Building 12, which is located within Site 304 (CH2M, 2021). The SI reported that PFOS was detected in soil at a concentration exceeding the screening level. PFOA, PFOS, PFHxS, and PFNA were detected in groundwater at concentrations greater than screening levels. However, the HHRS did not identify any PFAS as COPCs in soil; however, PFOA, PFOS, and PFHxS were identified as COPCs in groundwater indicating potential unacceptable human health risks at Building 12. Based on the findings of the SI, an RI was recommended for Building 12. Although PFAS are considered COPCs in groundwater, the LUCs prevent the use of groundwater, so the presence of PFAS does not call into question the protectiveness of the remedy (i.e., LUCs).

There are no shoreline remedies (e.g., shoreline armoring) implemented at Site 304; therefore, climate change does not call into question the protectiveness of the remedy (i.e., LUCs).

5.4 Tank 50

Question A

Ecology issued an NFA letter for Tank 50, identifying LUC requirements to guard against exposure to residual petroleum hydrocarbon-contaminated soil and groundwater (Ecology, 1998). Based on the annual LUC inspections, there was no change in land use or ownership and, most importantly, there were no observations or findings which required notification to Ecology or threatened the protection of human health and the environment during this FYR period. The LUC requirements for Tank 50 remain effective in the protection of human health and the environment, preventing exposures; therefore, the remedy (i.e., LUCs) is functioning as intended and **the answer to Question A is "yes."**

Question B

For Tank 50, the exposure assumptions, toxicity data, and cleanup levels used at the time of the remedy are still valid such that the remedy remain protective; therefore, **the answer to Question B is "yes."** A discussion of the changes in toxicity data and cleanup levels is provided in Section 5.5.

Question C

For Tank 50, no other information has come to light that could call into question the protectiveness of the remedy (i.e., LUCs) during this FYR period; therefore, **the answer to Question C is "no"** (see Section 5.6).

The Navy recognizes PFAS as chemicals of emerging concern and has completed a PA and an SI at NBK Manchester. The PA recommended an SI at Building 185, which is the refueling station located at Tank 50. The SI reported PFAS in soil but below the screening levels; PFOA and PFOS were detected in groundwater at concentrations exceeding their screening levels at Building 185. Although, the HHRS did not identify any PFAS as COPCs in soil or groundwater at Building 185, there is uncertainty regarding impacts to groundwater by migration from a release at an upgradient site (Test Spray Area); therefore, an RI is recommended for Building 185 combined with the Test Spray Area. However, the LUCs prevent the use of groundwater, so the presence of PFAS does not call into question the protectiveness of the remedy (i.e., LUCs).

Tank 50 is not located along the shoreline of NBK Manchester; therefore, there are no shoreline remedies (e.g., shoreline armoring) and climate change does not call into question the protectiveness of the remedy (i.e., LUCs).

5.5 Continued Validity of Cleanup Levels, Exposure Assumptions, and Remedial Action Objectives Used at the Time of the Remedy

This section reviews any changes to cleanup levels, exposure assumptions, and RAOs used at the time of remedy implementation to evaluate the protectiveness of the remedy. Based on the evaluations conducted as part of this FYR, identified changes that have occurred since the remedy implementation, as discussed below, do not affect the protectiveness of the remedies at Sites 302, 303, and 304 and Tank 50 of NBK Manchester.

5.5.1 Changes in Cleanup Levels

FYR guidance (EPA, 2001) indicates the question of interest in developing the FYR is not whether a cleanup level has changed in the intervening period, but whether the change calls into question the protectiveness of the remedy. If the change in the cleanup level would be more stringent, the next stage is to evaluate and compare the old and new cleanup levels and their associated risk. This comparison is done to assess whether the currently calculated risk associated with the cleanup level identified in the decision document is still within EPA's acceptable excess cancer risk range of 10-4 to 10-6, or below a hazard index of 1 for noncancer effects. If the old cleanup level is not considered protective, a new cleanup level may need to be adopted after the FYR. For this FYR, all cleanup levels identified in the decision documents (or equivalent) for Sites 302, 303, and 304 and Tank 50 were reviewed for changes that could affect the assessment of whether the remedy is protective. Cleanup levels selected as part of the remedy at each of the four sites were obtained from federal and state regulations. These regulations, as listed below, were reviewed for changes that could affect the protectiveness of the cleanup actions:

- EPA National Primary Drinking Water Regulations Maximum Contaminant Levels
- EPA National Recommended Water Quality Criteria per Section 304(a)(1) of the Clean Water Act
- Washington State MTCA Cleanup Regulations (Chapter 173-340 WAC)
- Washington State Marine Surface Water Quality Standards for Protection of Aquatic Life and Human Health (Chapter 173-201A WAC)
- Washington State Sediment Management Standards (Chapter 173-204 WAC)
- Sediment Cleanup User's Manual II (SCUM II), Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC (Ecology, 2017)

- Puget Sound Apparent Effects Thresholds (AETs) have been released by Ecology as interim guidelines for sediment quality evaluation. When adopted, these AETs will become ARARs.
- Aquatic life criteria promulgated under the Clean Water Act to protect marine organisms from chronic exposures to wastewater discharges
- The EPA's PCB Spill Cleanup Policy while not applicable to the PCB Site, may be appropriate. The EPA has stated 10 ppm as a cleanup goal for PCBs in soil, and 1 ppm for materials with considerable water contact, such as stream sediments.
- 40 Code of Federal Regulations (CFR) 761.61 PCB Remediation Waste [63 FR 35448, June 29, 1998, as amended at 64 FR 33761, June 24, 1999; 72 FR 57239, Oct. 9, 2007; 74 FR 30232, June 25, 2009]

Changes found that would call into question the protectiveness of the cleanup levels or cleanup actions are presented below for each site, as applicable. The result of changes to the regulations is, in some instances, the lowering of a cleanup level. In these instances, the revised standard must be evaluated to determine whether there is a negative effect on the protectiveness of the remedy. In other instances, the cleanup level remains unchanged or has increased. In these instances, no further discussion is provided because the protectiveness of the remedy is not affected. Tables are provided that compare standards selected as cleanup levels (or equivalent) to current standards. In addition, review of cleanup levels for those COCs remaining in soil and/or groundwater where LUCs are used to prevent exposure is also provided to evaluate the protectiveness of the remedy.

Site 302. As described in the ROD and ROD Amendment (Navy, 1991 and 1992), the selected remedy for Site 302 involved excavation of soil with PCB concentrations greater than 10 mg/kg and installation of a cover over residual soils with PCB concentrations greater than 1 mg/kg.

In addition, to assess and document the effectiveness of the selected remedy in preventing off-site contamination from surface water run-off, post-closure soil, sediment, and surface water monitoring was conducted in October 1993, March 1994, September 1994, March 1995, October 1998, April 1999, October 1999, and April 2000 (Hart Crowser, 2000a). Soil and surface water samples were primarily collected along the surface water run-off flow path and the perennial creek located around Site 302 and sediment and surface water samples were collected along the western shoreline of Little Clam Bay, where a portion of the surface water run-off from Site 302 may enter into Little Clam Bay.

Soil analytical results were compared to the ROD cleanup criteria, and, although cleanup levels were not identified for sediment and surface water in the ROD, sediment results were compared to the marine SQS, and surface water results were compared to aquatic life ambient water quality criteria. The results of the comparisons and impact to remedy protectiveness are summarized in the following subsections. COCs for the environmental media and associated standards selected as cleanup levels (or equivalent) as well as current standards for comparison are provided in Table 5-2.

Soil. As stated previously, the remedial action included excavation of soil with PCB concentrations greater than 10 mg/kg and installation of a cover over residual soils with PCB concentrations greater than 1 mg/kg; therefore, the cleanup criterion for Site 302 was essentially 1 mg/kg. Thus, potential for exposure to PCBs in soil was only associated with those areas containing 1 mg/kg or less of total PCBs. Treatment of soils containing total PCB concentrations greater than 10 mg/kg is based on the specification for PCB levels in 40 CFR 761. The containment cover over on-site soils having total PCB concentrations greater than 1 mg/kg is based on EPA-recommended cleanup criteria for PCB spills in 40 CFR 761.125. As shown in Table 5-2, soil cleanup levels for PCBs have not changed since the ROD and ROD Amendment (Navy, 1991 and 1992). The current soil cleanup level for bulk PCB remediation waste in high occupancy areas is ≤1 mg/kg without further conditions. High occupancy areas where bulk PCB remediation waste remains at concentrations >1 mg/kg and ≤10 mg/kg are covered, meeting the requirements of paragraphs (a)(7) and (a)(8) of 40 CFR 761.61.

Surface soil samples were collected during post-closure monitoring events at one location (i.e., SED-4, the only location without an accompanying surface water sampling location), which was located immediately north of Site 302. PCB concentrations detected in soil at SED-4 during post-closure monitoring events ranged from 0.022 to 19.0 mg/kg. The total PCB concentration in soil at SED-4 exceeded the cleanup criteria of 1 mg/kg at 19.0 mg/kg in September 1994. However, the total PCB concentration was 0.9 mg/kg during the next sampling event in March 1995 (Hart Crowser, 2000a), indicating that the remedy was effective in lowering residual total PCB concentrations in soil to below the cleanup criteria. As reported in the Final Post-Closure Monitoring Report (Hart Crowser, Inc., 2000a), after the remedy was completed, PCB concentrations decreased in soil and sediment or remained noticeably unchanged in surface water over time (i.e., non-detect). Therefore, the selected remedy for Site 302 has been effective in preventing off-site contamination from migrating into surface water run-off.

Sediment. Ecology's SQS for PCBs is 12 mg/kg (normalized for total organic carbon [TOC]), which has not changed since post-closure monitoring results were evaluated in 2000 (see Table 5-2). The marine SQS (WAC 173-204-320) listed in Table I of the 2013

SMS is 12 mg/kg normalized to TOC and is based on no adverse effects to the benthic community. As Ecology's SQS for PCBs has not changed over time and this level corresponds to a sediment PCB concentration that will result in no adverse effects, the remedy remains protective of the benthic community.

In accordance with the 2013 update to the SMS in WAC 173-204, protection of human health and higher trophic organisms must now be considered when establishing sediment cleanup standards for bioaccumulative COCs such as PCBs. The benthic marine SQS used for post-closure monitoring may not be protective of humans or higher trophic organisms where consumption of fish/shellfish is associated with a greater risk.

Nevertheless, given current site conditions (i.e., effectiveness of the remedy based on post-closure monitoring results, land use remains industrial, no current use of Little Clam Bay for fishing or shellfishing (see Section 5.5.2), and implementation of LUCs to prevent exposures) and the NFA letter issued by Ecology (2000), the remedy remains protective.

Surface Water. Although not evaluated in the ROD or ROD Amendment (Navy, 1991 and 1992), water quality criteria for aquatic life exposure to total PCBs and surface water criteria protective of human health are provided in Table 5-2 for reference. Water quality criteria for aquatic life exposure to total PCBs have not changed since post-closure monitoring results were evaluated in 2000 (see Table 5-2).

In 2016, EPA promulgated new state ambient water quality criteria protective of human consumption, derived in WAC 173-201A-240. The state PCB human health criterion for consumption of organisms was calculated to be 0.00017 µg/L using a chemical- specific risk level of 4 × 10-5. Because that calculation resulted in a higher (less protective) concentration than the current federal 40 C.F.R. 131.45 criterion, the federal 40 C.F.R. 131.45 criterion concentration of 0.000007 µg/L takes precedence over the state surface water criterion. EPA is currently in the process of proposing to amend the federal regulations to withdraw certain human health criteria applicable to waters in Washington State. If this amendment is approved, the state PCB surface water criterion of 0.00017 µg/L would become the governing criterion for PCBs (i.e., ARAR).

The post-closure monitoring results support the conclusion that the remedy was effective in preventing a continuing off-site source of contamination to surface water in Little Clam Bay (i.e., analytical detection limits remained the same, and no detections reported over time). However, the historical detection limits associated with the post-closure surface water samples are higher than concentrations considered to be protective of aquatic life (i.e., 0.03 µg/L marine chronic and 0.014 µg/L freshwater chronic), and the water quality criterion protective of human health (i.e., 0.000007 µg/L).

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Table 5-2: Soil, Sediment, and Surface Water Cleanup Criteria for Site 302

Soil/Sediment Analyte (mg/kg)[1]	ROD Soil Cleanup Level[2]	2000 Marine SQS[3]	Current Soil PCB Level[4,5,6]	Current Marine SQS[4,7]	Historical Data[14] 1993 - 2000	
					Minimum Concentration	Maximum Concentration
Total PCBs in Soil[11]	10/1.0	–	10/1.0	–	0.016	19.0
Total PCBs in Sediment (OC)[11]	–	12	–	12	1.0	12.9

Surface Water (ug/L) Analyte[1]	2000 EPA Water Quality Criteria[8]		Current EPA Water Quality Criteria[4,9]		Current Washington State Aquatic Life Criteria[4,10]		Current Washington State Human Health Criteria[4,10]	Human Health 40 CFR 131.45[4,12]	Human Health Fresh Water CWA §304[4,13]	Historical Data Detection Limit Range[14] 1993 - 2000	
	Marine Chronic	Freshwater Chronic	Marine Chronic	Freshwater Chronic	Marine Chronic	Freshwater Chronic	Marine/Freshwater	Marine/Freshwater	Marine/Freshwater	Minimum	Maximum
Total PCBs[11]	0.03	0.014	0.03	0.014	0.03	0.014	0.00017	0.000007	0.000064	0.02 U	0.05 U

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. Record of Decision (ROD) for PCB Site Fuel Department Naval Supply Center Puget Sound (Navy, 1991).
3. Sediment Management Standards: Chapter 173-204 WAC as recorded in 2000 for the Final Post-Closure Monitoring Report (Hart Crowser, 2000a).
4. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report.
   Blue cell indicates the current regulatory value is the same as the remediation goal designated in the decision document or historical report.
5. Soil PCB cleanup levels as documented in 40 CFR 761.61 PCB Remediation Waste [63 FR 35448, June 29, 1998, as amended at 64 FR 33761, June 24, 1999; 72 FR 57239, Oct. 9, 2007; 74 FR 30232, June 25, 2009; 88 FR 59687, Aug. 29, 2023].
6. MTCA Method A unrestricted and industrial soil CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
7. Chapter 173-204 WAC Sediment Management Standards, Last Update: 2/25/13.
8. EPA National Recommended Water Quality Criteria per Section 304(a)(1) of the Clean Water Act as provided in the Final Post-Closure Monitoring Report (Hart Crowser, 2000).
9. EPA National Recommended Water Quality Criteria per Section 304(a)(1) of the Clean Water Act as obtained from the Aquatic Life Criteria Table at https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table on June 7, 2024.
10. Table 240 in WAC 173-201A-240; effective 1/30/2020
11. Total PCBs is the sum of all congeners or all isomers or homologs or Aroclor analyses.
12. Human Health 40 CFR 131.45 CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
13. Human Health Fresh Water CWA §304 CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
14. Final Post-Closure Monitoring Report (Hart Crowser, 2000a).

Abbreviations:

µg/L = micrograms per liter
CFR = Code of Federal Regulations
CUL = cleanup level
CWA = Clean Water Act
EPA = Environmental Protection Agency
FYR = five-year review
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
PCBs = polychlorinated biphenyls
SQS = Sediment Quality Standards
ROD = Record of Decision
OC = organic carbon, expressed on a total organic carbon basis as described in WAC 173-204-320.

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Site 303. Diesel fuel spills occurred at Tank 30 in February 1990 and Tank 24 in March 1990. Most of the product from the spills was contained or recovered as a result of the existing drainage systems around the tanks and the addition of extra collection sumps and absorbent pads. Although most of the product from the spills was contained or recovered, monitoring samples were collected following cleanup activities to ensure that petroleum hydrocarbons were not migrating from the site to the marine environment, as required by the Ecology MTCA Cleanup Regulation, Chapter 173-340 WAC. Analytical results of samples collected from soil, groundwater, seeps, and sediment and surface water in the marsh area adjacent to Corliss Lane, south of Tank 24, indicated the presence of at least one of the following constituents, TPH-D, TPH-O, benzene, xylenes, and/or PAHs. Concentrations detected were evaluated using Ecology's Interim TPH Policy (Ecology, 1997) and compared to criteria provided in Chapters 173- 340 WAC, 173-201A WAC, and 173-204. Ecology issued an NFA for Site 303 in 2001 (Ecology, 2001), stating that although petroleum hydrocarbon contamination continues to exist in upland soils, the monitoring of Site 303 demonstrated there is a lack of impact to marine sediments and marine surface water that would warrant sediment or groundwater remedial actions. Chemicals detected in the environmental media and associated standards used for comparison are summarized in Tables 5-3 through 5-5. Discussions regarding comparisons of current cleanup standards to those used to determine NFA and protectiveness determinations are provided in the following subsections.

Tank 24 Soil and Sediment. Based on the risk calculations for the direct contact exposure pathway using MTCA Method B industrial equation (Chapter 173-340-745[3]) following risk assessment procedures presented in Ecology's Interim TPH Policy (Ecology, 1997), petroleum hydrocarbons present in Tank 24 area soils did not pose a significant risk to human health via the direct contact pathway. The potential for petroleum hydrocarbon-containing soils present in soil near Tank 24 to impact shallow groundwater quality via dissolution also was evaluated during initial monitoring investigations using the Raoult's law screen procedure described in the Interim Policy (Ecology, 1997). The predicted groundwater concentrations from soil samples S-5 and S-10 did not exceed the MTCA Method A cleanup level of 1 mg/L for TPH. These results indicated that residual petroleum hydrocarbon in soil did not pose a significant risk for impacting groundwater quality via dissolution.

Remediation of petroleum hydrocarbon-contaminated sites is addressed under the MTCA Chapter 70.105D, and its implementing regulations, Chapter 173-340 WAC and detailed in the Guidance for Remediation of Petroleum Contaminated Sites (Ecology, 2016). Current MTCA regulations for assessing and remediating petroleum hydrocarbon contaminated sites differ from the methods provided in Ecology's Interim TPH Policy

(Ecology, 1997) and, therefore, a direct comparison of old and current cleanup levels cannot be made.

For direct contact to soil, the current MTCA Method A soil cleanup level for TPH-D is 2,000 mg/kg under unrestricted land use, which is much greater than the historical maximum TPH-D concentration detected in soil (i.e., at SB-1, 60 mg/kg). As the historical maximum TPH-D concentration is significantly less than the current MTCA Method A soil cleanup level of 2,000 mg/kg, the remedy (i.e., LUCs) remains protective even under the more conservative unrestricted land use scenario.

For potential soil to groundwater migration, the MTCA Method A groundwater cleanup level of 1 mg/L (drinking water standard) was used during the historical investigations to compare to the predicted soil to groundwater TPH-D concentrations. The current MTCA Method A cleanup level for TPH-D (drinking water standard) is 0.50 mg/L. Based on a comparison of the current MTCA Method A cleanup level to the predicted soil to groundwater concentrations presented in the Draft Site Assessment Report (Hart Crowser, 1998a), none of the predicted groundwater concentrations exceed the current MTCA Method A cleanup level (drinking water standard). Thus, the remedy (i.e., LUCs) remains protective based on fate and transport modeling. An empirical assessment for TPH-D in groundwater, based on measured TPH concentrations in groundwater is discussed below.

Although Site 303 is a fuel storage facility and land use is restricted to industrial purposes, the grassy area may be home to terrestrial wildlife. Therefore, protection of wildlife, including plants, which was not included in the historical data evaluation, has been provided in this FYR to address MTCA regulations in WAC 173-340-900. For soil, historical TPH-D concentrations present within 6 feet of the ground surface are less than the MTCA unrestricted land use terrestrial ecological soil concentration of 460 mg/kg; thus, the remedy (i.e., LUCs) remains protective.

Table 5-3: Sediment Cleanup Levels for Tank 24 at Site 303

Analyte[1]	Draft Derived Freshwater Sediment Quality Values[2]	Current MTCA TPH value[3,4]	SMS Freshwater Sediments[3,4]		Historical Data[5]	
			SCO	CSL	Minimum Concentration	Maximum Concentration
Soil (Tank 24)						
TPH-Diesel (mg/kg)	–	2,000	–	–	20 U	60
TPH-Oil (mg/kg)	–	2,000	–	–	50 U	50 U
Marsh Sediment						
TPH-Diesel (mg/kg)	–	–	340	510	26	4200
TPH-Oil (mg/kg)	–	–	3,600	4,400	150	1300
Benzene (mg/kg)	–	–	–	–	0.45 U	1.5 U
Xylenes (mg/kg)	–	–	–	–	0.9 U	3.1 U
Naphthalene (mg/kg)	37	–	–	–	0.03 U	0.1 U
Acenaphthylene (mg/kg)	1.9	–	–	–	0.026 U	0.091 U
Acenaphthene (mg/kg)	3.5	–	–	–	0.023 U	0.077 U
Fluorene (mg/kg)	3.6	–	–	–	0.018 U	0.061 U
Phenanthrene (mg/kg)	5.7	–	–	–	0.016 U	0.055 U
Anthracene (mg/kg)	2.1	–	–	–	0.019 U	0.063 U
Total Low Molecular Weight PAHs (mg/kg)	27	–	–	–	0.07U	0.22 U
Fluoranthene (mg/kg)	11	–	–	–	0.013 U	0.05 U
Pyrene (mg/kg)	9.6	–	–	–	0.014 U	0.048 U
Benzo(a)Anthracene (mg/kg)	5	–	–	–	0.011 U	0.036 U
Chrysene (mg/kg)	7.4	–	–	–	0.014 U	0.048 U
Total Benzofluoranthenes (mg/kg)	11	–	–	–	0.019 U	0.065 U
Benzo(a)Pyrene (mg/kg)	7	–	–	–	0.01 U	0.035 U
Indeno(1,2,3-Cd)Pyrene (mg/kg)	0.73	–	–	–	0.018 U	0.061 U
Dibenzo(a,h)Anthracene (mg/kg)	0.23	–	–	–	0.014 U	0.049 U
Benzo(g,h,i)Perylene (mg/kg)	1.2	–	–	–	0.016 U	0.054 U

Table 5-3: Sediment Cleanup Levels for Tank 24 at Site 303 (continued)

Analyte[1]	Draft Derived Freshwater Sediment Quality Values[2]	Current MTCA TPH value[3,4]	SMS Freshwater Sediments[3,4]		Historical Data[5]	
			SCO	CSL	Minimum Concentration	Maximum Concentration
Total High Molecular Weight PAHs (mg/kg)	36	–	–	–	0.07 U	0.22 U
TPH (mg/kg)	–	–	–	–	0.13 U	0.45 U
Total PAHs (mg/kg)	60	–	17	30	–	–

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. As obtained from Draft Site Assessment Report, Corliss Lane Marsh (Hart Crowser, 1998a).
3. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report
   Blue cell indicates the current regulatory value is the same as the remediation goal designated in the decision document or historical report
4. Chapter 173-204 WAC Sediment Management Standards, Last Update: 2/25/13
5. Historical data obtained from Draft Site Assessment Report, Corliss Lane Marsh (Hart Crowser, 1998a) and Groundwater and Sediment Characterization Report Sites 303 and 304 FISC Fuel Department (Hart Crowser, 2000b).

Abbreviations

µg/L = micrograms per liter
CSL = cleanup screening level
FYR = five-year review
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
PAH = polycyclic aromatic hydrocarbons
SCO = Sediment Cleanup Objective
SMS = Sediment Management Standards
SQS = Sediment Quality Standards
TPH = total petroleum hydrocarbons

Table 5-4: Groundwater Summary Data and Comparison to Cleanup Criteria for Tank 24 at Site 303

Analyte[1]	MTCA Method A[2]	Current MTCA Method A[3,4]	Historical Data[5]	
			Minimum Concentration	Maximum Concentration
Groundwater (MW-1 south of Tank 24)				
TPH-Diesel (mg/L)	1	0.5	0.76	0.76
TPH-Oil (mg/L)	1	0.5	0.75 U	0.75 U
Benzene (ug/L)	5	5	1.2	1.2
2-Methylnaphthalene (ug/L)[6]	–	160	0.86	0.86
Acenaphthene (ug/L)	–	–	0.05	0.05
Fluorene (ug/L)	–	–	0.08	0.08
Temporary Well Point Samples (Tank 24)				
TPH-Diesel (mg/L)	1	0.5	0.43	13
TPH-Oil (mg/L)	1	0.5	0.75 U	1.19
Benzene (ug/L)	5	5	1 U	1 U

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. As obtained from Draft Site Assessment Report, Corliss Lane Marsh (Hart Crowser, 1998a).
3. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report
   Blue cell indicates the current regulatory value is the same as the remediation goal designated in the decision document or historical report
4. MTCA Method A groundwater CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
5. As obtained from Draft Site Assessment Report, Corliss Lane Marsh (Hart Crowser, 1998a).
6. Cleanup level based on a total value for naphthalene, 1-methyl naphthalene and 2-methyl naphthalene (Table 720-1 in WAC 173-340-900).

Abbreviations:

µg/L = micrograms per liter
CUL = cleanup level
Ecology = Washington State Department of Ecology
FYR = five-year review
mg/L = milligrams per liter
MTCA = Model Toxics Control Act
PAH = polycyclic aromatic hydrocarbons
TPH = total petroleum hydrocarbons
OC = organic carbon, expressed on a total organic carbon basis as described in WAC 173-204-320.
MW = Monitoring Well

Table 5-5: Groundwater and Seep Summary Data and Comparison to Cleanup Criteria for Tank 30 at Site 303

Analyte[1]	MTCA Surface Water Method B[2]	Current MTCA B Chapter 173- 201A WAC (consumption of organism only)[3,4]	Historical Data[1]	
			Minimum Concentration	Maximum Concentration
Groundwater (Tank 30, Clam Bay Area)				
Benzene (ug/L)	43	1.6	0.5 U	0.5 U
Ethylbenzene (ug/L)	6910	270	1 U	1 U
Toluene (ug/L)	48500	410	1 U	1 U
Xylenes (ug/L)	16000	–	1 U	1 U
TPH-Gasoline (mg/L)	1	–	0.25 U	0.25 U
TPH-PHC as Gasoline (mg/L)	1	–	0.25 U	0.25 U
TPH-Diesel (mg/L)	10	–	0.25 U	0.25 U
TPH-PHC as Diesel (mg/L)	10	–	1.48	7.54
TPH-Heavy Fuel Oil (mg/L)	10	–	0.5 U	0.5 U
TPH-Jet Fuel as Jet A (mg/L)	10	–	0.25 U	0.25 U
TPH-Kerosene (mg/L)	10	–	0.25 U	0.25 U
TPH-Lube Oil (mg/L)	10	–	0.5 U	0.5 U
TPH-Mineral Spirits (mg/L)	10	–	0.25 U	0.25 U
Seep (Tank 30, Clam Bay Area)				
Benzene (ug/L)	43	1.6	0.5 U	0.5 U
Ethylbenzene (ug/L)	6910	270	1 U	1 U
Toluene (ug/L)	48500	410	1 U	1 U
Xylenes (ug/L)	16000	–	1 U	1 U
TPH-Gasoline (mg/L)	1	–	0.25 U	0.25 U
TPH-PHC as Gasoline (mg/L)	1	–	0.25 U	0.25 U
TPH-Diesel (mg/L)	10	–	0.25 U	0.25 U
TPH-PHC as Diesel (mg/L)	10	–	0.3 J	0.764

Table 5-5: Groundwater and Seep Summary Data and Comparison to Cleanup Criteria for Tank 30 at Site 303 (continued)

Analyte[1]	MTCA Surface Water Method B[2]	Current MTCA B Chapter 173- 201A WAC (consumption of organism only)[3,4]	Historical Data[1]	
			Minimum Concentration	Maximum Concentration
TPH-Heavy Fuel Oil (mg/L)	10	–	0.5 U	0.5 U
TPH-Jet Fuel as Jet A (mg/L)	10	–	0.25 U	0.25 U
TPH-Kerosene (mg/L)	10	–	0.25 U	0.25 U
TPH-Lube Oil (mg/L)	10	–	0.5 U	0.5 U
TPH-Mineral Spirits (mg/L)	10	–	0.25 U	0.25 U

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. Analytical data and MTCA Surface Water Method B criteria as presented in Groundwater and Sediment Characterization Report Sites 303 and 304 FISC Fuel Department (Hart Crowser, 2000b)
3. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report
4. Chapter 173-201A WAC Water Quality Standards for Surface Waters of the State of Washington, Table 240 Last Update: 12/28/23.

Abbreviations:

µg/L = micrograms per liter
CUL = cleanup level
FYR = five-year review
mg/L = milligrams per liter
MTCA = Model Toxics Control Act
PAH = polycyclic aromatic hydrocarbons
TPH = total petroleum hydrocarbons

TPH-D was the only constituent detected in sediment samples collected from the marshy lowland area located approximately 75 feet south of the southern property line of NBK Manchester, on the east side of Corliss Lane. The marsh area consists of a small pond and a swamp spread out along an approximately 100-foot-wide by 200-foot-long area. Potential ecological risks from residual petroleum hydrocarbon contamination in the marsh area are difficult to evaluate because TPH standards were not available at the time of the investigation. As there were no state or federal risk-based standards for TPH in sediment, an indicator approach was used to assess potential ecological risks. In an indicator approach, the toxicity of the entire range of chemical constituents is evaluated based on the toxicity of one or more constituent chemicals. In this case, the PAH testing results were used to evaluate the potential toxicity of residual petroleum hydrocarbons. Historical PAH results were compared to freshwater sediment quality values presented in Ecology (1997; shown in Table 5-3). No PAHs were detected and

the detection limits for PAHs were generally at least an order of magnitude below the sediment quality values. The sediment quality values were never adopted into the SMS, so these values were only used for comparison purposes during the historical data evaluation. Current SMS include standards for TPH and total PAH (see Table 5-3). The maximum historical TPH-D sediment concentration of 4,200 mg/kg exceeds the current TPH-D SMS cleanup screening level of 510 mg/kg. However, PAHs were non-detect; therefore, the current Total PAH SMS cleanup screening level of 30 mg/kg is not exceeded. In addition, petroleum-related constituents are subject to biodegradation; as such, the concentration of TPH-D has likely decreased over time. Overall, LUCs continue to be appropriate and remain protective of human health and the environment.

Tank 24 Groundwater. The MTCA Method A cleanup level of 1 mg/L for TPH was used in the historical investigation data evaluation to assess groundwater contamination near Tank 24. At that time, the only detected TPH-D concentration of 0.76 mg/L was less than the MTCA Method A cleanup level. The current MTCA Method A cleanup goal has been lowered to 0.50 mg/L and now includes the stipulation that the groundwater cleanup level for any carcinogenic components of the petroleum (such as benzene and PAHs) and any noncarcinogenic components (such as ethylbenzene, toluene, xylenes and naphthalenes), if present at the site, must also be met. The historical TPH-D concentration of 0.76 mg/L exceeds the current MTCA Method A cleanup level of 0.50 mg/L; however, TPH-D was not detected in other samples and concentrations have most likely decreased since this sample was collected. Benzene and 2-methylnaphthalene also were detected, but at concentrations less than the current MTCA Method A cleanup levels. MTCA Method A cleanup levels have not been established for the other two noncarcinogenic PAHs detected in the groundwater sample from monitoring well MW-1. Since LUCs at Site 303 prohibit installation of drinking water wells and use of the groundwater (except for monitoring and/or remediation), the decrease in the MTCA Method A standard does not affect the protectiveness of the remedy and the current remedy remains protective of human health and the environment.

Tank 30 Groundwater and Seep. Because site groundwater discharges into the adjacent marine surface water body and is not likely a current or potential source of drinking water, historical groundwater and seep data collected during the Tank 30 investigation were compared to MTCA Method B surface water criteria (including Washington State surface water quality standards – Chapter 173-201A WAC) rather than drinking water criteria because shallow groundwater beneath the site is fairly saline and would not likely be used as a domestic water supply due to its close proximity to a marine surface water body. Surface water criteria for TPH during the historical investigation were obtained from Ecology's Water Quality Policy Number 9 "Guidelines

for Oil and Grease Discharges." Table 5-5 contains a summary of the historical and current criteria.

There are no current MTCA surface water numeric cleanup levels in groundwater for TPH and the *Guidance for Remediation of Petroleum Contaminated Sites* (Ecology, 2016) states:

> *"No numeric standards exist for petroleum products. 40 C.F.R. Part 110 prohibits discharges of oil that are harmful to the public health, welfare or the environment and defines harmful discharges to include discharges that "…Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines." WAC 173-201A-260(2)(b) states: "Aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste..."*

Since historical groundwater and seep samples were non-detect for BTEX and TPH and detection limits were below historical and current MTCA Method B values (see Table 5-5), the remedy (i.e., LUCs) remains protective as concentrations are below both the historical and current values. The LUCs prohibit installation of drinking water wells and use of the groundwater (except for monitoring and/or remediation); thus, the decrease in the MTCA Method B standards does not affect the protectiveness of the remedy and the current remedy remains protective of human health and the environment.

Site 304. A groundwater and sediment investigation was conducted in 1999 and 2000 to determine if releases of residual levels of petroleum hydrocarbons in soil were adversely impacting the adjacent marine environment. Because site groundwater discharges into the adjacent marine surface water body and is not likely a current or potential source of drinking water, groundwater quality data are compared to Method B surface water criteria (including Washington State surface water quality standards – Chapter 173-201A WAC). Sediment quality results were compared to the Ecology SMS (Chapter 173-204 WAC) and to the Marine SQS criteria. Standards used for comparison are summarized in Tables 5-6 and 5-7. Discussions regarding comparisons of current cleanup standards to those used to determine NFA and protectiveness determinations are provided in the following subsections.

Table 5-6: Groundwater and Seep Summary Data and Comparison to Cleanup Criteria for Site 304

Analyte[1]	Historical MTCA Surface Water Method B[2]	Current MTCA B Chapter 173- 201A WAC (consumption of organism only)[3,4]	Historical Data[2]	
			Minimum Concentration	Maximum Concentration
Groundwater				
Benzene (ug/L)	43	1.6	0.5 U	0.5 U
Ethylbenzene (ug/L)	6910	270	1 U	1 U
Toluene (ug/L)	48500	410	1 U	1 U
Xylenes (ug/L)	16000	–	1 U	1 U
TPH-Gasoline (mg/L)[5]	1	–	0.25 U	0.25 U
TPH-PHC as Gasoline (mg/L)[5]	1	–	0.25 U	0.91
TPH-Diesel (mg/L)[5]	10	–	0.25 U	0.25 U
TPH-PHC as Diesel (mg/L)[5]	10	–	0.5 U	1.9
TPH-Heavy Fuel Oil (mg/L)[5]	10	–	0.25 U	0.25 U
TPH-Jet Fuel as Jet A (mg/L)[5]	10	–	0.25 U	0.25 U
TPH-Kerosene (mg/L)[5]	10	–	0.25 U	0.25 U
TPH-Lube Oil (mg/L)[5]	10	–	0.5 U	0.5 U
TPH-Mineral Spirits (mg/L)[5]	10	–	0.25 U	0.25 U
Seep				
Benzene (ug/L)	43	1.6	0.5 U	0.5 U
Ethylbenzene (ug/L)	6910	270	1 U	1 U
Toluene (ug/L)	48500	410	1 U	1 U
Xylenes (ug/L)	16000	–	1 U	1 U
TPH-Gasoline (mg/L)[5]	1	–	0.25 U	0.25 U
TPH-Diesel (mg/L)[5]	10	–	0.26	0.26

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. Analytical data and MTCA Surface Water Method B criteria as presented in the Groundwater and Sediment Characterization Report Sites 303 and 304 FISC Fuel Department (Hart Crowser, 2000b).
3. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report
4. Chapter 173-201A WAC Water Quality Standards for Surface Waters of the State of Washington, Table 240 Last Update: 12/28/23.

5. Surface water criteria for petroleum hydrocarbons are based on Ecology's Water Quality Policy Number 9 "Guidelines for Oil and Grease Discharges" as presented in the Groundwater and Sediment Characterization Report Sites 303 and 304 FISC Fuel Department (Hart Crowser, 2000b).

Abbreviations:

µg/L = micrograms per liter
CUL = cleanup level
Ecology = Washington State Department of Ecology
FYR = five-year review
mg/L = milligrams per liter
MTCA = Model Toxics Control Act
TPH = total petroleum hydrocarbons

Table 5-7: Summary of Sediment Data and Cleanup Levels for Site 304

Analyte[1]	Historical Marine SQS Criteria[2]	Current Marine SQS[3,4]	Historical Data[2]	
			Minimum Concentration	Maximum Concentration
Arsenic (mg/kg)	57	57	1.6	21.1
Cadmium (mg/kg)	5.1	5.1	0.03	0.42
Chromium (mg/kg)	260	260	7.3	27.8
Copper (mg/kg)	390	390	7.63	124
Lead (mg/kg)	450	450	5.32	63.6
Zinc (mg/kg)	410	410	21.5	165
Acenaphthene (mg/kgOC)	16	16	0.25 J	7.47
Acenaphthylene (mg/kgOC)	66	66	0.15 J	2.64
Anthracene (mg/kgOC)	220	220	0.96 J	109.2
Fluorene (mg/kgOC)	23	23	0.30 J	17.24
Naphthalene (mg/kgOC)	99	99	0.10 J	2.99
Phenanthrene (mg/kgOC)	100	100	2.00 J	212.64
Total Low Molecular Weight PAHs (mg/kgOC)	370	370	3.4	352.2
Benzo(a)anthracene (mg/kgOC)	110	110	2.48	396.55
Benzo(a)pyrene (mg/kgOC)	99	99	1.98	264.37
Total Benzofluoranthenes (mg/kgOC)	230	230	3.76	436.78
Benzo(g,h,i)perylene (mg/kgOC)	31	31	0.99 J	109.2
Chrysene (mg/kgOC)	110	110	3.22	396.55
Dibenz(a,h)anthracene (mg/kgOC)	12	12	0.25 J	37.36
Fluoranthene (mg/kgOC)	160	160	5.94	747.13
Indeno(1,2,3-cd)pyrene (mg/kgOC)	34	34	1.19	149.43
Pyrene (mg/kgOC)	1000	1000	4.9	747.13
Total Heavy Molecular Weight PAHs (mg/kgOC)	960	960	28.5	3721.3
Dibenzofuran (mg/kgOC)	15	15	0.15 J	4.83
2,4-Dimethylphenol (ug/kg)	29	29	6 U	6 U
2-Methylphenol (ug/kg)	63	63	6 U	7
4-Methylphenol (ug/kg)	670	670	23	3400
Pentachlorophenol (ug/kg)	360	360	61 U	61 U
Phenol (ug/kg)	420	420	22	1100
Total PCBs (mg/kgOC)	12	12	–	–

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. Analytical data and sediment cleanup criteria as presented in Groundwater and Sediment Characterization Report Sites 303 and 304 FISC Fuel Department (Hart Crowser, 2000b).
3. Blue cell indicates the current regulatory value is the same as the remediation goal designated in the decision document or historical report
4. Chapter 173-204 WAC Marine Sediment Quality Standards Table I, Last Update: 2/25/13.

Abbreviations:

FYR = five-year review
mg/kg = milligrams per kilogram
PAH = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
SQS = Sediment Quality Standards
OC = organic carbon, expressed on a total organic carbon basis as described in WAC 173-204-320.

Groundwater and Seep. Groundwater and seep samples were analyzed for BTEX and various TPH fractions during historical investigations. TPH-D was the only constituent detected. TPH-D concentrations detected were compared to Ecology's Water Quality Policy Number 9 "Guidelines for Oil and Grease Discharges." There are no current MTCA surface water numeric cleanup levels in groundwater for TPH and the Guidance for Remediation of Petroleum Contaminated Sites (Ecology, 2016) states:

> *"No numeric standards exist for petroleum products. 40 C.F.R. Part 110 prohibits discharges of oil that are harmful to the public health, welfare or the environment and defines harmful discharges to include discharges that "…Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines." WAC 173-201A-260(2)(b) states: "Aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste..."*

For comparison purposes, the current groundwater MTCA Method A cleanup level is used to compare against the historical TPH-D concentrations. The historical TPH-D concentrations detected in groundwater are lower than the current MTCA Method A cleanup level of 0.50 mg/L, which is lower than the MTCA surface water Method B criterion of 10 mg/L used in the historical data evaluation (see Table 5-6). Therefore, the decrease in the MTCA Method A standard does not affect the protectiveness of the remedy and the remedy (i.e., LUCs) remains protective.

Sediment. Results of the historical data evaluation indicated that, in general, sediment constituent concentrations were less than the SQS criteria. Exceedances of SQS criteria were limited to two samples: high molecular weight PAHs in sample HC-SED-07 and phenols in sample HC-SED-02. As shown in Table 5-7, current sediment quality criteria have not changed since the NFA letter (Ecology, 2001); therefore, there are no new exceedances of SQS criteria and the remedy (i.e., LUCs) remains protective.

Tank 50. During the 1997 and 1998 SIs, concentrations of petroleum hydrocarbon-related chemicals detected in soil and groundwater were compared to Ecology's MTCA Method A cleanup levels as provided in WAC 173-340-740 (Ecology, 1996). Tables 5-8 and 5-9 compare current soil and groundwater cleanup levels, respectively, with the 1996 values documented in the 1997 and 1998 site reports (Hart Crowser, 1997, 1998b, and 1998c). Comparisons of 1996 and current MTCA Method A cleanup levels identified some differences, but these differences do not affect the protectiveness of the remedy as long as LUCs restricting land use and groundwater use are maintained, as discussed below.

Soil. As shown in Table 5-8, the current MTCA Method A level for lead is the only soil cleanup level that has not changed since 1996. Soil cleanup levels for BTEX have all decreased, whereas the soil cleanup level for TPH-diesel has increased since 1996. Naphthalene did not have a cleanup level for soil in 1996, but now has a cleanup level. The current procedure for comparing TPH-gasoline in soil to the soil criterion now depends on whether benzene also is present in soil. The carcinogenic polycyclic aromatic hydrocarbons (cPAH) soil criterion is an order of magnitude less than the 1996 level, but the current approach now incorporates the toxicity equivalency methodology if other cPAHs are present.

Table 5-8: Soil Cleanup Levels for Tank 50

Analyte[1]	MTCA Method A Soil Cleanup Level Value (mg/kg)		Method B for Direct Contact (mg/kg)[3,5]	Historical Data (mg/kg)[10]	
	1996 Level[2]	Current Level[3,4]		Maximum Concentration Detected	Soil Depth, ft bgs (Sample Location)
Lead	250	250	–	9.2	20 - 23.5 (HC-3)
TPH-Gasoline[6]	100	30/100	–	1600	26 – 32 (HC-2)
TPH-Diesel	200	2,000	–	1100	16 – 20 (HC-3)
Benzene	0.5	0.03	18	0.056	26 – 32 (HC-2)
Ethylbenzene	20	6	8,000	0.63	26 – 32 (HC-2)
Toluene	40	7	6,400	0.12	26 – 32 (HC-2)
Xylenes	20	9	16,000	2	26 – 32 (HC-2)
Naphthalene	–	5	1,600	3.2	26 – 32 (HC-2)
Benzo(a)Pyrene[7]	See cPAH	0.1	0.19	0.099 J	26 – 32 (HC-2)
Total cPAH[7,11]	1	0.1	0.19	0.4 / 0.1	26 – 32 (HC-2)
TPH-Kerosene/Jet A[8,9]	200	2,000	–	990	10 – 11.5 (MW-2)

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. MTCA Method A levels as reported in Ecology, 1996. Method A levels based on protection of groundwater pathway (i.e., soil leaching to groundwater) unless otherwise indicated.
3. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report
   Blue cell indicates the current regulatory value is the same as the remediation goal designated in the decision document or historical report
   Green cell indicates the current regulatory value is greater than the remediation goal designated in the decision document or historical report
4. MTCA Method A CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
5. MTCA Method B CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
6. The soil criterion is 100 mg/kg for gasoline mixtures without benzene. For all other gasoline mixtures the criterion is 30 mg/kg.
7. The current Cleanup Levels and Risk Calculation table does not list CULs for PAHs other than benzo(a)pyrene. cPAHs should be evaluated using their TEF as compared to benzo(a)pyrene (Ecology 2015). The TEFs are used to calculate benzo(a)pyrene equivalents for each cPAH, and the total benzo(a)pyrene equivalent value should be compared to the benzo(a)pyrene CUL
8. Total Petroleum Hydrocarbons (other). Historical cleanup level based on protection of ground water (Ecology, 1996).
9. Current TPH-Kerosene/Jet cleanup level derived from diesel range organic level from the February 2024 Cleanup Levels and Risk Calculation Master Table.
10. Historical data obtained from Hart Crowser, 1997 and 1998b.
11. 1996 MTCA Method A displays sum of detected carcinogenic PAHs: benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(k)fluoranthene, benzo(a)anthracene, and benzo(b)fluoranthene.

Abbreviations:

cPAH = carcinogenic polycyclic aromatic hydrocarbons
CUL = cleanup level
Ecology = Washington State Department of Ecology
FYR = five-year review
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
PAH = polycyclic aromatic hydrocarbons
TPH = total petroleum hydrocarbons

Table 5-9: Groundwater Cleanup Levels for Tank 50

Analyte[1]	MTCA Method A Groundwater Cleanup Level (µg/L)	Historical Data (µg/L)[9]		
	1996 Level[2]	Current Level[4]	Concentration Detected in Geoprobe HC-9	Maximum Concentration Detected in Monitoring Wells
Benzene	5	5	0.5 U	1 U
Ethylbenzene	30	700	0.92	1 U
Toluene	40	1,000	1.7	1 U
Xylene	20	1,000	1.8	1 U
TPH-Gasoline[5]	1,000	800 / 1,000	810	–
TPH-Diesel[6,7]	1,000	500	1,600	260
TPH-Jet Propellant-8/Kerosene[6,7]	1,000	500	–	340
Naphthalene[8]	–	160	–	3.9
2-Methylnaphthalene[8]	–	160	–	4.1

Notes:

1. Samples were not collected for these analytes in these areas during this FYR period.
2. MTCA Method A levels as reported in Ecology, 1996. Method A levels based on protection of groundwater pathway (i.e. soil leaching to groundwater) unless otherwise indicated.
3. Gold cell indicates the current regulatory value is less than the remediation goal designated in the decision document or historical report
   Blue cell indicates the current regulatory value is the same as the remediation goal designated in the decision document or historical report
   Green cell indicates the current regulatory value is greater than the remediation goal designated in the decision document or historical report
4. MTCA Method A CULs obtained from the February 2024 Cleanup Levels and Risk Calculation Master Table.
5. The cleanup level is 800 µg/L if benzene is also present; 1,000 µg/L if benzene not detected (Table 720-1 in WAC 173-340- 900).
6. Historical cleanup level based on prevention of adverse aesthetic characteristics for total petroleum hydrocarbons.
7. Current TPH-JP-8/Kerosene cleanup level derived from diesel range organic level from the February 2024 Cleanup Levels and Risk Calculation Master Table.
8. Cleanup level based on a total value for naphthalene, 1-methyl naphthalene and 2-methyl naphthalene (Table 720-1 in WAC 173-340-900).
9. Historical data obtained from Hart Crowser, 1997 and 1998b.

Abbreviations:

µg/L = micrograms per liter
CUL = cleanup level
Ecology = Washington State Department of Ecology
FYR = five-year review
MTCA = Model Toxics Control Act
TPH = total petroleum hydrocarbons

Maximum concentrations of TPH-G, TPH-D, and TPH-kerosene were the only chemicals detected in soil that exceeded the 1996 MTCA Method A cleanup levels. Comparison of the historical concentrations to current MTCA Method A cleanup levels indicate maximum concentrations of TPH-G and benzene exceed the current MTCA Method A cleanup levels. Regardless, if residual concentrations of contaminants exist in soil above the current MTCA cleanup levels, LUCs are in place to prevent exposure to soil. Therefore, the decrease in these MTCA cleanup levels does not affect the protectiveness of the remedy (i.e., LUCs), and the cleanup levels remain protective of human health.

Groundwater. As shown in Table 5-9, the MTCA Method A cleanup level for benzene is the only groundwater cleanup level that has not changed since 1996. Groundwater cleanup levels for toluene, ethylbenzene, and xylenes have all increased since 1996. The current procedure for comparing TPH-G to the groundwater criterion now depends on whether benzene also is present in groundwater. Naphthalene and 2-methylnaphthalene did not have cleanup levels in 1996, but now have cleanup levels.

TPH-D was the only chemical detected in groundwater that exceeded the 1996 MTCA Method A cleanup level, which also exceeds the current MTCA Method A cleanup level. Groundwater concentrations of other chemicals do not exceed either their historical or current MTCA Method A cleanup levels. LUCs are in place to prevent exposure to groundwater; therefore, the lowering of the MTCA Method A cleanup level for TPH-D does not affect the protectiveness of the remedy (i.e., LUC), and the remedy remains protective of human health.

5.5.2 Review of Exposure Assumptions

Exposure assumptions were reviewed as part of the requirement to review cleanup levels to assess protectiveness of the remedy. There are potentially two areas where changes could have occurred since the signing of the ROD (Navy, 1991 and 1992) and NFA letters (Ecology, 1998, 2000, and 2001): 1) toxicity values for select chemicals, and 2) assumptions regarding human activity (i.e., exposure assumptions). Changes to toxicity and exposure parameter input values are captured in the comparison of historical and current cleanup levels. The following subsection describe how these changes to toxicity and exposure parameters potentially affect the protectiveness of the remedy.

Site 302. Through the FYR process, it was found that potential exposure pathways for human health through consumption of fish/shellfish may be complete based on potential tribal use of Little Clam Bay. In 2016, Ecology adopted revisions to the Water Quality Standards for Surface Waters of Washington State Chapter WAC 173-201A which used

a fish consumption rate (FCR) of 175 grams per day (g/day) to develop the standards better depicting the consumption rate for a tribal exposure scenario. MTCA Cleanup Regulations (WAC 173-340-730) are still based on the lower consumption rate of 54 g/day.

FCR is a key parameter in estimating sediment-related human health risks that should be evaluated on a site-specific basis when developing the reasonable maximum exposure (RME) scenario. WAC 173-204- 561(2)(b)(i) specifies human health risks should be based on an RME scenario that reflects tribal consumption of fish and shellfish (Ecology, 2019). For purposes of sediment cleanup under the SMS rule, a site-specific FCR should be established in consultation with affected tribes (Ecology, 2019). Tribal populations enjoy treaty fishing rights and harvesting and consuming fish/shellfish plays a significant role in their cultures. PCBs, dioxins, mercury, and other persistent chemicals can accumulate in fish tissue and harm the health of people who consume fish. The fish ingestion rates summarized in the RODs (Navy, 1991 and 1992) ranged from 11 g/day to 195 g/day, much lower than the consumption rate of the Suquamish Tribe. The Suquamish Tribe conducted a fish ingestion study for tribal members (Suquamish, 2000). In consultation with the Tribe and stakeholders, the 95th percentile Suquamish adult shellfish consumption rate was determined to be 615.4 g/day (Suquamish, 2000; Ecology, 2013). Use of a higher site-specific consumption rate better reflects the Suquamish population potentially at risk if organisms are consumed. The shorelines of Little Clam Bay proximal to Site 302 are not currently used by tribal populations for fish/shellfish angling; however, the Tribe has treaty-reserved rights and expects to be able to exercise these rights in the future.

Given current site conditions (i.e., effectiveness of the remedy based on post-closure monitoring results, land use remains industrial, no current use of Little Clam Bay for fishing or shellfishing, and implementation of LUCs to prevent exposures) and the NFA letter issued by Ecology (2000), it is assumed that the remedy remains protective. Ecology believes additional sediment and surface water sampling at Site 302 and/or along the western shoreline of Little Clam Bay as described in the PCB data gap study (Liberty JV, 2022) could be used to confirm protectiveness of human health.

Site 303, Site 304, and Tank 50. There have been no new exposure pathways or changes to exposure assumptions identified for Site 303, Site 304, and Tank 50 during this FYR period.

Review of Ecological Exposure Assumptions

Ecological health risk assessment assumptions were also reviewed as part of the requirement to assess protectiveness of the remedy. A summarized ecological evaluation is provided in Section 5.5.1, wherein historical TPH-D concentrations in soil

(within the top 6 feet) were compared to ecological unrestricted land use soil concentration in Table 749-2 of WAC 173-340-900. The historical maximum TPH-D concentration in soil is less than the current MTCA ecological soil criterion and, therefore, the remedy (i.e., LUCs) remains protective.

As recognized in Section 5.5.1, protection of higher trophic organisms is now considered when establishing sediment cleanup standards for bioaccumulative COCs (e.g., PCBs) per the 2013 update to the SMS (WAC 173-204). The benthic marine SQS used for post-closure monitoring at Site 302 may not be protective of higher trophic organisms where consumption of fish/shellfish is associated with a greater risk. Given current site conditions (i.e., effectiveness of the remedy based on post-closure monitoring results, land use remains industrial, no current use of Little Clam Bay for fishing or shellfishing, and implementation of LUCs to prevent exposures) and the NFA letter issued by Ecology (2000), it is assumed that the remedy remains protective.

5.6 Any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy

5.6.1 Chemicals of Emerging Concern

The Navy recognizes PFAS as chemicals of emerging concern. These substances may be present in the soil and/or groundwater at Navy sites as a result of historical firefighting activities using AFFF. AFFF was used for plane crashes, equipment testing, and training, as well as in other operations such as plating shops and hangars where AFFF was used in the fire suppression system. As discussed in Section 3.3, the Navy has completed a PA and an SI at NBK Manchester, as part of the Navy-wide program to assess its installations for areas where PFAS releases occurred or are suspected to have occurred. Based on the findings of the SI Report, the Navy plans to conduct an RI for Building 12 (within Site 304) and Building 185 (within Tank 50 area). However, LUCs restrict use of soil and groundwater at the four sites; therefore, the protectiveness of the remedy is not affected as there is no current exposure to PFAS in these media.

5.6.2 Climate Change

Climate change research indicates any shoreline remedies (e.g., shoreline armoring) may be vulnerable to climate change impacts, including sea level rise and weather pattern changes, not apparent during remedy selection. These aspects of climate change increase the possibility of flooding/inundation of the shoreline areas and can increase the energy and, therefore, erosive force of storm events. Additionally, flooding caused by climate change can impact erosion of soil caps. The integrity of the Site 302

soil cap remains intact and run-on, and run-off is limited by the cap design. There are no shoreline remedies implemented at Sites 302, 303, and 304 and Tank 50 of NBK Manchester; therefore, climate change does not call into question the protectiveness of the remedy (i.e., LUCs).

6.0 Issues/Recommendations

6.1 Issues and Recommendations

This section presents the issues and recommendations identified as a result of this FYR process. Table 6-1 summarizes these issues (and subsequent recommendations) that affect current and/or future protectiveness of the remedy. Based on the technical assessment conducted as part of this FYR, there are no issues (and subsequent recommendations) that affect current or future protectiveness of the remedies in-place at Sites 302, 303, and 304 and Tank 50 at NBK Manchester (see Table 6-1).

Table 6-1: Issues and Recommendations for Sites 302, 303, and 304 and Tank 50 at NBK Manchester

Issues/Recommendations
Sites without Issues/Recommendations Identified in the Five-Year Review:
Sites 302, 303, and 304 and Tank 50 did not have any issues/recommendations during this FYR period.

6.2 Other Findings

This section presents other findings identified during this FYR process that may improve performance of the remedy, reduce costs, improve management of operation and maintenance, or accelerate site closeout, but do not affect current and/or future protectiveness of the remedy. Table 6-2 summarizes these other findings and subsequent recommendations.

Table 6-2: Other Findings and Recommendations Not Affecting Protectiveness

Site: 302	**Issue Category:** Operations and Maintenance			
	Issue: A section of fencing on the northwest boundary of Site 302 was covered in overgrown blackberry weeds and the fence was leaning over but remains intact and the area is inaccessible.			
	Recommendation: Remove the overgrowth and support the fence so that it is standing upright.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	No	Other: Navy	EPA/State	FY 2025

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7.0 Protectiveness Statement

This section presents the protectiveness determinations and statements as a result of this fifth FYR for Sites 302, 303, and 304, Tank 50 and Sitewide at NBK Manchester.

Table 7-1: Protectiveness Statements for Sites 302, 303, and 304 and Tank 50

Protectiveness Statement(s)	
Site: Site 302	**Protectiveness Determination**: Short-term Protective
Protectiveness Statement: The remedy at Site 302 remains protective of human health and the environment because: 1) PCB source soil has been removed or capped, and seven years of post-remedy monitoring results support that off-site contamination from surface water run-off has been effectively diminished from pre-remedy conditions; 2) land use has not changed since the RODs (Navy, 1991 and 1992), nor is it expected to change; and 3) LUCs are maintained to prevent and control exposure to PCBs at Site 302. Additionally, NBK Manchester has put an excavation/dig permit process in place. However, based the concerns regarding the sediments at Little Clam Bay, the land use concerns with the fencing repair to be conducted in the northwest corner, and the potential PFAS concerns in groundwater although the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered Short-term protective.	
Site: Site 303	**Protectiveness Determination**: Short-term Protective
Protectiveness Statement: Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." This determination was based primarily on the current and future land use at the site (i.e., industrial/fuel farm). LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). The remedy (i.e., LUCs) at Site 303 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections. Additionally, UST Tanks 24, 25, and 26 have been removed and the area was over excavated (per NBK Manchester personnel). The remaining USTs (22 and 27-30) will be removed during future stages of the MILCON project. ASTs are currently being constructed in place of the USTs. However, due to the presence of PFAS in identified at Building 85, which is adjacent to Site 303, during the Site Inspection and because the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered Short-term protective.	
Site: Site 304	**Protectiveness Determination**: Short-term Protective
Protectiveness Statement: Ecology issued an NFA letter in 2001 stating "contaminants found during investigation of this property were either properly remediated or do not pose a risk to human health or the environment." This determination was based primarily on the current and future land use at the site (i.e., industrial/fuel farm). LUC requirements are identified in the NFA letter to guard against exposure to residual petroleum hydrocarbon-contaminated soil (Ecology, 2001). Additionally, NBK Manchester has put an excavation/dig permit process in place. The remedy (i.e., LUCs) at Site 304 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections. However, due to the presence of PFAS in groundwater identified during the Site Inspection and because the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered Short-term protective.	
Site: Tank 50	**Protectiveness Determination**: Short-term Protective
Protectiveness Statement: Ecology issued a NFA letter in 1998 stating "Based upon the information in the reports listed above and institutional controls placed at the facility, Ecology has determined that the release of TPHs into the soil and groundwater near Tank 50 no longer appears to pose a threat to human health or the environment." The LUC requirements are referred to in the NFA letter and are to guard against exposure to residual petroleum	

hydrocarbon-contaminated soil and groundwater (Ecology, 1998). Additionally, NBK Manchester has put an excavation/dig permit process in place. The remedy (i.e., LUCs) at Tank 50 is protective of human health and the environment, preventing exposures, as documented through the annual LUC inspections. However, due to the uncertainty of the presence of PFAS identified during the Site Inspection and because the LUCs on site are reducing the risk for PFAS exposure, the remedy is considered Short-term protective.

Table 7-2: Sitewide Protectiveness Statement for NBK Manchester

Protectiveness Statement(s)	
Site: Sitewide	**Protectiveness Determination**: Protective
Protectiveness Statement: Remedy construction is complete at Sites 302, 303, and 304 and Tank 50 of NBK Manchester. The selected remedy (i.e., LUCs) at Sites 302, 303, and 304 and Tank 50 is protective of human health and the environment, preventing exposures to residual contamination in soil and/or groundwater, as documented through the annual LUC inspections.	

8.0 Next Review

The next FYR report for Sites 302, 303, and 304 and Tank 50 at NBK Manchester is required five years from the completion date of this review, which will be 19 December 2029.

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Appendix A:
Public Notice and Affidavit of Publication

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Kitsap Sun
PART OF THE USA TODAY NETWORK

PO Box 52173, Phoenix, AZ. 85072-2173

AFFIDAVIT OF PUBLICATION

WSP USA
15862 SW 72nd Ave, Suite 150
Portland OR 97224

STATE OF WISCONSIN, COUNTY OF BROWN.

I, being first duly sworn on oath, deposes and says: That I am now, and at all times embraced in the publication herein mentioned was the principal clerk of the printers and publishers of KITSAP SUN; that said newspaper has been approved as a legal newspaper by the order of the Superior Court of the County of Kitsap, in which County it is published and is now and has been for more than 6 months prior to the date of the publication hereinafter referred to, published in the English language continually as a daily newspaper in Bremerton, Kitsap County, Washington, a weekly newspaper in Kitsap County, Washington and is now and during all of the said time, was printed in an office maintained in the aforesaid place of publication of said newspaper; that the following is a true text of an advertisement as it was published in regular issues (and not in supplement form) of said newspaper on the following date(s), to wit: And on

05/28/2024, 05/29/2024, 05/30/2024

such newspaper was regularly distributed to its subscribers during all of said period.
Subscribed and sworn to before on 05/30/2024

Legal Clerk

Notary, State of WI, County of Brown

10-25-26

My commission expires

Publication Cost:	$999.56	
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THIS IS NOT AN INVOICE!

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RYAN SPELLER
Notary Public
State of Wisconsin

U.S. NAVY ANNOUNCES NOTICE TO CONDUCT THE FIFTH CERCLA FIVE-YEAR REVIEW OF ENVIRONMENTAL CLEANUP ACTIONS FOR SITES 302, 303, 304 AND TANK 50 AT NAVAL BASE KITSAP - MANCHESTER, PORT ORCHARD, WASHINGTON.

This notice is to inform the public that the United States Department of the Navy (Navy) will conduct the fifth five-year review of previously implemented environmental cleanup actions at Sites 302, 303, 304 and Tank 50 at Naval Base Kitsap (NBK) - Manchester, in Port Orchard, Washington. Pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and National Oil and Hazardous Substance Pollution Contingency Plan (40 Code of Federal Regulation Part 300), a five-year review is required for NBK - Manchester because the selected remedial actions resulted in hazardous substances, pollutants, or contaminants remaining on a site above levels that allow for unlimited use and unrestricted exposure. The purpose of this five-year review is to ensure that the remedial actions selected in the decision documents for Sites 302, 303, 304, and Tank 50 are functioning as planned and remain protective of human health and the environment. This will be the fifth five-year review completed for the sites. The previous five-year reviews were completed in September 2004, January 2010, January 2015, and March 2020. A five-year review is also intended to identify possible deficiencies and recommend any necessary corrective actions.

This fifth five-year review will examine the actions, monitoring, and issues over the last 5 years and provide recommendations and protectiveness determinations for the next 5 years for the NBK - Manchester sites that have undergone environmental investigation and/or remediation to address the potential impacts of contamination to human health and the environment. Specifically, this five-year review will include Site 302 PCB Site, Site 303 D-Tunnel Tanks, Site 304 Industrial Area, and Tank 50 Release Site.

The Navy welcomes written comments from the community during the five-year review process; comments will be accepted until July 4, 2024. Comments received from community members will be acknowledged and addressed in the fifth five-year review report along with the more formal interview responses received from members of the public and other stakeholders. A Notice of Completion for the fifth five-year review at NBK - Manchester is anticipated to be published in early 2025.

For more information or to provide comments, please contact:
Public Affairs Officer
Naval Facilities Engineering Systems Command Northwest
(360) 340-5592
navfacnwpao@us.navy.mil
May 28, 29, 30 2024
LBKS0107014

Appendix B:
Interview Record

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2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

TYPE 1 INTERVIEW – U.S. NAVY or Contractor	
Individual Contacted: Michael Hardiman	
Title: Engineering, Environmental and Fuel Quality Supervisor	
Organization: Naval Base Kitsap – Manchester Fuel Depot	
Telephone: 360-476-5737	**Email: michael.o.hardiman.civ@us.navy.mil**
Contact Made By: Daniel Duran (WSP)	**Date: 12 JULY 2024**

Questionnaire

1. Please describe your degree of familiarity with Sites 302, 303, and 304 and Tank 50 at Naval Base Kitsap (NBK) - Manchester; implementation of the remedies at these four sites; inspection, operation, and maintenance activities that have taken place since implementation of the remedies; and recommendations made during the fourth five-year review (FYR) finalized in 2020.

Response: As facility engineering and base environmental supervisor at this site I am very familiar with these sites including remedies, inspections and maintenance activities on these site. I have participated in the previous two 5-Year Reviews for the Manchester sites.

2. What is your overall impression of remedy operations at Sites 302, 303, and 304 and Tank 50 since the fourth FYR?

Response: My overall impression is that the remedies at these sites are functioning as intended.

3. To the best of your knowledge, have the annual LUC inspections been sufficiently thorough and frequent to ensure protection of human health and the environment? Please indicate the basis for your assessment.

Response: Yes. I have coordinated with the contractors performing these inspections every year for the past 8 years. I have provided assistance to them as needed during these inspections, accompanying them on certain portions of inspections and receiving in and out brief for these inspections each year.

2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

TYPE 1 INTERVIEW – U.S. NAVY or Contractor
Individual Contacted: Michael Hardiman
Title: Engineering, Environmental and Fuel Quality Supervisor
Organization: Naval Base Kitsap – Manchester Fuel Depot
4. To the best of your knowledge, have the recommendations made during the fourth FYR been adequately implemented/incorporated into the remedies for Sites 302, 303, and 304 and Tank 50? Please indicate the basis for your assessment. **Response: My department was responsible for implementing responses to the following two recommendations from the 2020 5 Year review:** - **SITE 302: *"Test the excess soil for PCBs (and other potential contaminants based on generator knowledge) and then properly disposed of it (i.e., use a grading material or off site). Regrade and revegetate the areas with the excess soil, such that future site inspections can confirm that no additional soil has been placed at the site. Conduct a follow-up inspection during the following growing season to ensure that vegetation has taken hold."*** **Site 302 soil was characterized in 2020 and 2023 and was hauled off for landfill disposal in May/June 2023. Soil classed as non-hazardous. Mass of soil hauled off was approximately 3,500 tons. Following soil removal the site was regraded to post 1998 capping contours and hydroseeded. The site was inspected by my department in May 2024 and the grass has sufficiently taken hold. Report detailing soil removal actions taken at Site 302 dated May 20, 2024 provided to NAVFAC NW and regulatory stakeholders.** - **SITE 303: *"Properly characterize, transport, and dispose of (off site) the soil stockpile located north of Tank 29."*** **The noted stockpile at Tank 29 was characterized and shipped offsite for landfill disposal in January 2023. Soil classed as non-hazardous. Mass of soil hauled off was approximately 16 tons.**
5. What is your overall impression of addressing the recommendations from the fourth FYR? **Response: As stated, we performed the above actions from the Fourth FYR recommendations. I am aware that the NAVFAC NW Installation Restoration (IR) group closed all the old vapor monitoring wells at Site 303 and Tank 50 in 2020/2021. Also aware that the mainteance was performed on site monitoring wells and a Land Use Control (LUC) sign was placed at Tank 50 as recommended. I'm not tracking the other recommendations.**

2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

TYPE 1 INTERVIEW – U.S. NAVY or Contractor
Individual Contacted: Michael Hardiman
Title: Engineering, Environmental and Fuel Quality Supervisor
Organization: Naval Base Kitsap – Manchester Fuel Depot
6. What do you understand as a major accomplishment for Sites 302, 303, and 304 and Tank 50 since the fourth FYR? **Response: The stockpiles placed at Site 302 were tested as non-hazardous but were removed nonetheless. Likewise with the stockpile at Tank 29 in Site 303. Decommissioning of the vapor monitoring wells at Site 303 and Tank 50 in accordance with state well regulations eliminates potential pathways for transport of surface contaminants to the subsurface.**
7. Do you feel the remedies for Sites 302, 303, and 304 and Tank 50 continue to be effective? Please indicate the basis for your assessment. **Response: Yes. From indications provided by the annual LUC inspections. Also from July 2021 through approximately May 2022 four 50,000-barrel underground storage tanks (Tanks 23, 24, 25, 26) were excavated and demolished in the footprint of Site 303. The area of these tanks and the surrounding heavy civil construction make up approximately half of the area of Site 303. Base of the tanks were approximately 35 feet below ground surface requiring deep excavations. No significant petroleum contamination was encountered during tank closure activities requiring further action. This was confirmed by UST Site Assessment testing which screened soil along tank excavation sidewalls and collected and analyzed multiple samples below the floor slabs of each tank. Samples at only one tank in Site 303 had detections of petroleum hydrocarbons above MTCA Method A levels; Tank 25. Soil samples collected during tank closure activities at the other three Site 303 tanks were either non-detect for diesel/gas/BTEX or below MTCA Method A levels. Tank 27, also within Site 303, is scheduled for demolition in 2025. A closure site assessment will be performed during tank closure.**

2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

TYPE 1 INTERVIEW – U.S. NAVY or Contractor
Individual Contacted: Michael Hardiman
Title: Engineering, Environmental and Fuel Quality Supervisor
Organization: Naval Base Kitsap – Manchester Fuel Depot
8. To your knowledge, since the No Further Action determinations from Ecology, have there been any new scientific findings that relate to potential site risks which might call into question the protectiveness of the remedies? **Response: No.**
9. Since 2020, have there been any complaints, violations, or other incidents related to NBK - Manchester environmental issues that require a response by your office? If so, please provide details of the events and results of the responses. **Response: No.**
10. Are you aware of any community concerns regarding the remedies for Sites 302, 303, and 304 and Tank 50? If so, please provide details. **Response: No.**
11. Do you have any other comments, concerns, or suggestions regarding the effectiveness of the remedies implemented at NBK - Manchester to protect human health and the environment? **Response: I have suggested to the NAVFAC NW IR group that they provide for maintenance of the Site 302 soil cap following the stockpile removal actions in 2023, regrading and hydroseeding. Site 302 is surrounded on three sides by dense forest which will encroach on the soil cap over time. Maintenance should consist of periodic mowing and ensuring the grass cover is maintained. Manchester Fuel Depot pays into a Navy Regional contract that provides landscaping services. It is suggested that the NAVFAC NW IR group establish services for Site 302 under this contract.**

2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

Individual Contacted: Robert Riley	
Title: Environmental Protection Specialist	
Organization: NBK Manchester	
Telephone: (360) 476-2664	**Email: Robert.l.riley1.civ@us.navy.mil**
Contact Made By: Daniel Duran	**Date: 05/23/2024**

1. Please describe your degree of familiarity with Sites 302, 303, and 304 and Tank 50 at Naval Base Kitsap (NBK) - Manchester; implementation of the remedies at these four sites; inspection, operation, and maintenance activities that have taken place since implementation of the remedies; and recommendations made during the fourth five-year review (FYR) finalized in 2020.

Response:
Familiar with the sites. I've recently read the 2020 5 year review and brushed up on historical releases and disposals in these areas. Site 302 had PCB's and ships bilge waste deposited there in the past. It has been capped, fenced off and has LUC's in place. Recently unauthorized soil was removed. Removed soil piles were tested as well as top cap. Restoration report has been forwarded to EPA. Site 303 has had some historic spills. This area has been tested numerous times since then and contaminants are largely not detected and majority of UST's have been removed and over excavated. AST's are currently being constructed in this location. MFD has a dig restrictions/permit process that is strictly followed. Site 304 is where there was a swale that was utilized for disposal in the past.

2. What is your overall impression of remedy operations at Sites 302, 303, and 304 and Tank 50 since the fourth FYR?

Response:
Land Use controls inspections and 5 year review is more than adequate. Recommend reviewing soil sampling data from past 5 years and reduce restrictions or eliminate restrictions at site 303. There is minimal or no measurable contamination at this site and large majority of soils in this site have been tested and removed. Tanks 23,24,25 and 26 have been removed completely. Phase II of the Milcon is set to start in October 2024 and tank 27 will be removed.

3. To the best of your knowledge, have the annual LUC inspections been sufficiently thorough and frequent to ensure protection of human health and the environment? Please indicate the basis for your assessment.

2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

Individual Contacted: Robert Riley

Title: Environmental Protection Specialist

Organization: NBK Manchester

Response:

Yes. These sites are on an industrial fuel facility and there is no plan for the land usage to change to residential or recreation. Signage has been more than sufficient, as the site is no longer showing levels of contamination that would cause a health or environmental concern.

4. To the best of your knowledge, have the recommendations made during the fourth FYR been adequately implemented/incorporated into the remedies for Sites 302, 303, and 304 and Tank 50? Please indicate the basis for your assessment.

Response:
Yes, Site 302 piles have been tested as well as the top 6 inches of the cap. Piles have been removed and site restored to pre-existing condition after cap installation. Reference site restoration report provided in May 2024. Monitoring wells have been installed. LUC controls have been strictly adhered to. Site 302 fencing has not been adequately repaired to date as well as regular vegetation control.

5. What is your overall impression of addressing the recommendations from the fourth FYR?

Response:
Recommendations that have been addressed have been more than adequate.

6. What do you understand as a major accomplishment for Sites 302, 303, and 304 and Tank 50 since the fourth FYR?

Response:
Site 302 soil testing, removal of soil, revegetation, monitoring wells and better securing of the area. NTR for 303 and 304.

7. Do you feel the remedies for Sites 302, 303, and 304 and Tank 50 continue to be effective? Please indicate the basis for your assessment.

Response:
Given the latest soil sampling test results, I would argue that the remedies are more than sufficient. MFD will continue to monitor these sites and strictly follow our dig permit process.

2024 CERCLA Fifth Five-Year Review Interview Record
Naval Base Kitsap - Manchester, Port Orchard, Washington

Individual Contacted: Robert Riley

Title: Environmental Protection Specialist

Organization: NBK Manchester

8. To your knowledge, since the No Further Action determinations from Ecology, have there been any new scientific findings that relate to potential site risks which might call into question the protectiveness of the remedies?

Response:
None, whatsoever.

9. Since 2020, have there been any complaints, violations, or other incidents related to NBK - Manchester environmental issues that require a response by your office? If so, please provide details of the events and results of the responses.

Response:
None to my knowledge.

10. Are you aware of any community concerns regarding the remedies for Sites 302, 303, and 304 and Tank 50? If so, please provide details.

Response:
None.

11. Do you have any other comments, concerns, or suggestions regarding the effectiveness of the remedies implemented at NBK - Manchester to protect human health and the environment?

Response:
Please review tank closeout reports provided on 5/22/24 and email regarding MILCON project phases and design project for remaining underground storage tank closures. It is my opinion that this and prior soil sampling results should be sufficient information to de-list site 303, eliminate signage, remove LUC's and discontinue inspections.

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Appendix C:
Summary of Data Tables

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Table H-7
Building 12 Groundwater Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-B12-MW01		MFD-B12-MW02	MFD-B12-MW03
Sample ID	MFD-B12-GW01-1022	MFD-B12-GW01P-1022	MFD-B12-GW02-1022	MFD-B12-GW03-1022
Sample Date	10/25/2022	10/25/2022	10/25/2022	10/25/2022
Chemical Name				
PFAS (NG/L)				
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	2.28 U	2.39 U	2.37 U	2.39 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2.28 U	2.39 U	2.37 U	2.39 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	2.28 U	2.39 U	2.37 U	2.39 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	2.28 U	2.39 U	2.37 U	2.39 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2.28 U	2.39 U	2.37 U	2.39 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2.28 U	2.39 U	2.37 U	2.39 U
Perfluorobutanesulfonic acid (PFBS)	2.28 U	2.39 U	57.6	186
Perfluorodecanoic Acid (PFDA)	2.28 U	2.39 U	2.37 U	2.39 U
Perfluorododecanoic Acid (PFDoA)	2.28 U	2.39 U	2.37 U	2.39 U
Perfluoroheptanoic acid (PFHpA)	70.8	68.9	890	128
Perfluorohexanesulfonic acid (PFHxS)	3.57 J	3.33 J	652	179
Perfluorohexanoic Acid (PFHxA)	150	145	1790	396
Perfluorononanoic acid (PFNA)	2.28 U	2.39 U	20.8	3.61 J
Perfluorooctane sulfonic acid (PFOS)	55.2	55.7	686	38
Perfluorooctanoic acid (PFOA)	89.2	83.7	10300	1690
Perfluorotetradecanoic Acid (PFTeDA)	2.28 U	2.39 U	2.37 U	2.39 U
Perfluorotridecanoic Acid (PFTrDA)	2.28 U	2.39 U	2.37 U	2.39 U
Perfluoroundecanoic Acid (PFUnA)	2.28 U	2.39 U	2.37 U	2.39 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-8
Building 12 Surface Soil Analytical Results
PFAS SI Report
NBK Manchester, Kitsap Cointy, Washington

Station ID	MFD-B12-MW01	MFD-B12-MW02	MFD-B12-MW03	
Sample ID	MFD-B12-SS01-0001	MFD-B12-SS02-0001	MFD-B12-SS03-0001	MFD-B12-SS03P-0001
Sample Depth	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/5/2022	10/4/2022	10/3/2022	10/3/2022
Chemical Name				
PFAS (NG/G)				
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.5 U	0.5 U	0.5 U	0.5 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.5 U	0.5 U	0.5 U	0.5 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	0.5 U	0.5 U	0.5 U	0.5 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.5 U	0.5 U	0.5 U	0.5 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.5 U	0.5 U	0.5 U	0.5 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorobutanesulfonic acid (PFBS)	0.5 U	0.242 J	0.257 J	0.358 J
Perfluorodecanoic Acid (PFDA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorododecanoic Acid (PFDoA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluoroheptanoic acid (PFHpA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorohexanesulfonic acid (PFHxS)	0.5 U	0.684 J	2.44	2.88
Perfluorohexanoic Acid (PFHxA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorononanoic acid (PFNA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorooctane sulfonic acid (PFOS)	0.729 J	15.6	7.99	7.93
Perfluorooctanoic acid (PFOA)	0.5 U	0.5 U	0.524 J	0.517 J
Perfluorotetradecanoic Acid (PFTeDA)	0.5 UJ	0.5 U	0.5 U	0.5 U
Perfluorotridecanoic Acid (PFTrDA)	0.5 U	0.5 U	0.5 U	0.5 U
Perfluoroundecanoic Acid (PFUnA)	0.5 U	0.5 U	0.5 U	0.5 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-9
Building 12 Subsurface Soil Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-B12-MW01		MFD-B12-MW02		MFD-B12-MW03	
Sample ID	MFD-B12-SB01-0304	MFD-B12-SB01P-0304	MFD-B12-SB02-0506	MFD-B12-SB03-0506	MFD-B12-SB03P-0506	
Sample Depth	3 - 4	3 - 4	5 - 6	5 - 6	5 - 6	
Sample Date	10/5/2022	10/5/2022	10/4/2022	10/3/2022	10/3/2022	
Chemical Name						
PFAS (NG/G)						
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluorobutanesulfonic acid (PFBS)	0.5 U	0.501 U	0.5 U	0.222 J	0.202 J	
Perfluorodecanoic Acid (PFDA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluorododecanoic Acid (PFDoA)	0.5 U	0.501 U	0.5 U	0.281 J	0.29 J	
Perfluoroheptanoic acid (PFHpA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluorohexanesulfonic acid (PFHxS)	0.5 U	0.501 U	0.338 J	0.883 J	0.928 J	
Perfluorohexanoic Acid (PFHxA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluorononanoic acid (PFNA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluorooctane sulfonic acid (PFOS)	3.05	2.77	3.2	5.41	5.39	
Perfluorooctanoic acid (PFOA)	0.352 J	0.335 J	0.655 J	0.632 J	0.825 J	
Perfluorotetradecanoic Acid (PFTeDA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluorotridecanoic Acid (PFTrDA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	
Perfluoroundecanoic Acid (PFUnA)	0.5 U	0.501 U	0.5 U	0.5 U	0.499 U	

Notes:
NA = Not analyzed
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-13
Building 185 Groundwater Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-B185-MW01		MFD-B185-MW02	MFD-B185-MW03
Sample ID	MFD-B185-GW01-1022	MFD-B185-GW01P-1022	MFD-B185-GW02-1022	MFD-B185-GW03-1022
Sample Date	10/26/2022	10/26/2022	10/26/2022	10/26/2022
Chemical Name				
PFAS (NG/L)				
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	2.3 U	2.29 U	2.51 U	2.51 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2.3 U	2.29 U	2.51 U	2.51 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	2.3 U	2.29 U	2.51 U	2.51 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	2.3 U	2.29 U	2.51 U	2.51 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2.3 U	2.29 U	2.51 U	2.51 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2.3 U	2.29 U	2.51 U	2.51 U
Perfluorobutanesulfonic acid (PFBS)	1.06 J	2.29 U	2.51 U	2.02 J
Perfluorodecanoic Acid (PFDA)	2.3 U	2.29 U	2.51 U	2.51 U
Perfluorododecanoic Acid (PFDoA)	2.3 U	2.29 U	2.51 U	2.51 U
Perfluoroheptanoic acid (PFHpA)	11.4	12.6	2.51 U	19.8
Perfluorohexanesulfonic acid (PFHxS)	7.03	6.51	6.57	17.3
Perfluorohexanoic Acid (PFHxA)	18	18.2	2.51 U	18.6
Perfluorononanoic acid (PFNA)	4.13 J	3.69 J	2.51 U	3.3 J
Perfluorooctane sulfonic acid (PFOS)	13.6	14.4	6.43	22.7
Perfluorooctanoic acid (PFOA)	39.7	40.4	8.57	36.9
Perfluorotetradecanoic Acid (PFTeDA)	2.3 U	2.29 U	2.51 U	2.51 U
Perfluorotridecanoic Acid (PFTrDA)	2.3 U	2.29 U	2.51 U	2.51 U
Perfluoroundecanoic Acid (PFUnA)	2.3 U	2.29 U	2.51 U	2.51 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-14
Building 185 Surface Soil Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-B185-MW01		MFD-B185-MW02	MFD-B185-MW03
Sample ID	MFD-B185-SS01-0001	MFD-B185-SS01P-0001	MFD-B185-SS02-0001	MFD-B185-SS03-0001
Sample Depth	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	9/26/2022	9/26/2022	9/26/2022	9/23/2022
Chemical Name				
PFAS (NG/G)				
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.5 U	0.499 U	0.5 U	0.501 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.5 U	0.499 U	0.5 U	0.501 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	0.5 U	0.499 U	0.5 U	0.501 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.5 U	0.499 U	0.5 U	0.501 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.5 U	0.499 U	0.5 U	0.501 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluorobutanesulfonic acid (PFBS)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluorodecanoic Acid (PFDA)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluorododecanoic Acid (PFDoA)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluoroheptanoic acid (PFHpA)	0.5 U	0.499 U	0.5 U	0.431 J
Perfluorohexanesulfonic acid (PFHxS)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluorohexanoic Acid (PFHxA)	0.5 U	0.499 U	0.5 U	0.443 J
Perfluorononanoic acid (PFNA)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluorooctane sulfonic acid (PFOS)	2.47	2.19	3.89	1.4
Perfluorooctanoic acid (PFOA)	0.5 U	0.499 U	0.5 U	0.422 J
Perfluorotetradecanoic Acid (PFTeDA)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluorotridecanoic Acid (PFTrDA)	0.5 U	0.499 U	0.5 U	0.501 U
Perfluoroundecanoic Acid (PFUnA)	0.5 U	0.499 U	0.5 U	0.501 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-15
Building 185 Subsurface Soil Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-B185-MW01		MFD-B185-MW02		MFD-B185-MW03			
Sample ID	MFD-B185-SB01-0304		MFD-B185-SB02-0203		MFD-B185-SB03-1213		MFD-B185-SB03P-1213	
Sample Depth	3 - 4		2 - 3		12 - 13		12 - 13	
Sample Date	9/26/2022		9/26/2022		9/23/2022		9/23/2022	
Chemical Name								
PFAS (NG/G)								
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.5	U	0.501	U	0.501	U	0.5	U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.5	U	0.501	U	0.501	U	0.5	U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	0.5	U	0.501	U	0.501	U	0.5	U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.5	U	0.501	U	0.501	U	0.5	U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.5	U	0.501	U	0.501	U	0.5	U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorobutanesulfonic acid (PFBS)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorodecanoic Acid (PFDA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorododecanoic Acid (PFDoA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluoroheptanoic acid (PFHpA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorohexanesulfonic acid (PFHxS)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorohexanoic Acid (PFHxA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorononanoic acid (PFNA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorooctane sulfonic acid (PFOS)	0.478	J	0.212	J	0.501	U	0.5	U
Perfluorooctanoic acid (PFOA)	0.5	U	0.446	J	0.501	U	0.5	U
Perfluorotetradecanoic Acid (PFTeDA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluorotridecanoic Acid (PFTrDA)	0.5	U	0.501	U	0.501	U	0.5	U
Perfluoroundecanoic Acid (PFUnA)	0.5	U	0.501	U	0.501	U	0.5	U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-16
Site 302 Groundwater Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-S302-MW01		MFD-S302-MW02	MFD-S302-MW03
Sample ID	MFD-S302-GW01-1122	MFD-S302-GW01P-1122	MFD-S302-GW02-1122	MFD-S302-GW03-1122
Sample Date	11/2/2022	11/2/2022	11/2/2022	11/2/2022
Chemical Name				
PFAS (NG/L)				
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	2.43 U	2.26 U	2.29 U	2.45 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2.43 U	2.26 U	2.29 U	2.45 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	2.43 U	2.26 U	2.29 U	2.45 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	2.43 U	2.26 U	2.29 U	2.45 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2.43 U	2.26 U	2.29 U	2.45 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorobutanesulfonic acid (PFBS)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorodecanoic Acid (PFDA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorododecanoic Acid (PFDoA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluoroheptanoic acid (PFHpA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorohexanesulfonic acid (PFHxS)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorohexanoic Acid (PFHxA)	1.05 J	1.55 J	2.29 U	2.45 U
Perfluorononanoic acid (PFNA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorooctane sulfonic acid (PFOS)	2.78 J	2.26 U	2.29 U	4.13 J
Perfluorooctanoic acid (PFOA)	2.43 U	2.36 U	2.29 U	4.18 U
Perfluorotetradecanoic Acid (PFTeDA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluorotridecanoic Acid (PFTrDA)	2.43 U	2.26 U	2.29 U	2.45 U
Perfluoroundecanoic Acid (PFUnA)	2.43 U	2.26 U	2.29 U	2.45 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-17
Site 302 Surface Soil Analytical Results
PFAS SI Report
NBK Manchester, Kitsap County, Washington

Station ID	MFD-S302-SS04		MFD-S302-SS05		MFD-S302-SS06	MFD-S302-SS07
Sample ID	MFD-S302-SS04-0001	MFD-S302-SS04P-0001	MFD-S302-SS05-0001	MFD-S302-SS05P-0001	MFD-S302-SS06-0001	MFD-S302-SS07-0001
Sample Depth	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1	0 - 1
Sample Date	10/21/2022	10/21/2022	10/21/2022	10/21/2022	10/21/2022	10/21/2022
Chemical Name						
PFAS (NG/G)						
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorobutanesulfonic acid (PFBS)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorodecanoic Acid (PFDA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.487 J
Perfluorododecanoic Acid (PFDoA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.184 J
Perfluoroheptanoic acid (PFHpA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorohexanesulfonic acid (PFHxS)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorohexanoic Acid (PFHxA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorononanoic acid (PFNA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.17 J
Perfluorooctane sulfonic acid (PFOS)	0.362 J	0.37 J	0.439 J	0.311 J	0.294 J	6.78
Perfluorooctanoic acid (PFOA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.475 J
Perfluorotetradecanoic Acid (PFTeDA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluorotridecanoic Acid (PFTrDA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Perfluoroundecanoic Acid (PFUnA)	0.501 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

Table H-18
Site 302 Subsurface Soil Analytical Results
PFAS SI Report
BNK Manchster, Kitsap County, Washington

Station ID	MFD-S302-MW01					MFD-S302-MW02			MFD-S302-MW03	
Sample ID	MFD-S302-SB01-1.52.5	MFD-S302-SB01P-1.52.5	MFD-S302-SB01-28.529.5	MFD-S302-SB01-4950	MFD-S302-SB01-5556	MFD-S302-SB02-2223	MFD-S302-SB02P-2223	MFD-S302-SB02-7879	MFD-S302-SB03-1314	MFD-S302-SB03-5859
Sample Depth	1.5 - 2.5	1.5 - 2.5	28.5 - 29.5	49 - 50	55 - 56	22 - 23	22 - 23	78 - 79	13 - 14	58 - 59
Sample Date	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/19/2022	10/13/2022	10/13/2022	10/13/2022	10/14/2022	10/14/2022
Chemical Name										
PFAS (NG/G)										
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.501 U	0.499 UJ	0.5 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorobutanesulfonic acid (PFBS)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorodecanoic Acid (PFDA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorododecanoic Acid (PFDoA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluoroheptanoic acid (PFHpA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorohexanesulfonic acid (PFHxS)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorohexanoic Acid (PFHxA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorononanoic acid (PFNA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorooctane sulfonic acid (PFOS)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorooctanoic acid (PFOA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.342 J	0.431 J	0.501 U	0.499 U	0.5 U
Perfluorotetradecanoic Acid (PFTeDA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluorotridecanoic Acid (PFTrDA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U
Perfluoroundecanoic Acid (PFUnA)	0.499 U	0.5 U	0.499 U	0.5 U	0.5 U	0.5 U	0.5 U	0.501 U	0.499 U	0.5 U

Notes:
J = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.
Detected analyte

Excerpt from:
CH2M. 2023. Site Inspection Report for Per- and Polyfluoroalkyl Substances, Naval Base Kitsap Manchester, Kitsap County, Washington. December.

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TABLE 1
Summary of Diesel and Residual Range Organics and Polychlorinated Biphenyls in Soil
Site 302 Soil Characterization
Naval Base Kitsap-Manchester
Kane Environmental Project No. 75010

Sample ID	Sample Depth (feet)	Sample Date	Sample Location Latitude* (decimal °)	Sample Location Longitude* (decimal °)	Diesel Range Organics mg/kg	Residual Range Organics mg/kg	PCB 1016 mg/kg	PCB 1221 mg/kg	PCB 1232 mg/kg	PCB 1242 mg/kg	PCB 1248 mg/kg	PCB 1254 mg/kg	PCB 1260 mg/kg	PCB 1262 mg/kg	PCB 1268 mg/kg	Total PCBs mg/kg
Soil Pile (TP) Samples																
TP-1	0-4	1/21/2020	47.56308	-122.55173	< 46.3	**92.6** J	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	< 0.00985	**0.0991**	**0.0991**
TP-2	0-4.5	1/21/2020	47.56313	-122.55181	< 11.1	**34.7** J	< 0.00941	< 0.00941	< 0.00941	< 0.00941	< 0.00941	< 0.00941	**0.00609** J P	< 0.00941	< 0.00941	**0.00609** J P
TP-3	0-3.5	1/21/2020	47.56318	-122.55169	< 11.2	**38.0** J	< 0.00953	< 0.00953	< 0.00953	< 0.00953	< 0.00953	< 0.00953	**0.0118** J P	< 0.00953	< 0.00953	**0.0118** J P
TP-X (TP-3 Field Duplicate)	0-4	1/21/2020	47.56318	-122.55169	< 46.6	< 117	< 0.00991	< 0.00991	< 0.00991	< 0.00991	< 0.00991	< 0.00991	**0.0149** J	< 0.00991	< 0.00991	**0.0149** J
TP-4	0-4	1/21/2020	47.56327	-122.55162	**9.62**	**15.3**	< 0.00974	< 0.00974	< 0.00974	< 0.00974	< 0.00974	< 0.00974	< 0.00974	< 0.00974	**0.0369**	**0.0369**
TP-5	0-5	1/21/2020	47.56333	-122.55148	**14.7**	**45.8**	< 0.00986	< 0.00986	< 0.00986	< 0.00986	< 0.00986	< 0.00986	< 0.00986	< 0.00986	**0.0593**	**0.0593**
TP-6	0-5.5	1/21/2020	47.56325	-122.55138	**9.54**	**22.1**	< 0.00989	< 0.00989	< 0.00989	< 0.00989	< 0.00989	< 0.00989	< 0.00989	< 0.00989	**0.0351**	**0.0351**
TP-7	0-4	1/21/2020	47.56316	-122.55123	**4.05** J	**16.9**	< 0.00972	< 0.00972	< 0.00972	< 0.00972	< 0.00972	< 0.00972	< 0.00972	< 0.00972	< 0.00972	nd
TP-8	0-4	1/21/2020	47.56306	-122.55111	**3.78** J	**10.6** J	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	**0.0272**	**0.0272**
TP-9	0-3.5	1/21/2020	47.56318	-122.55107	< 11.5	**32.9** J	< 0.00978	< 0.00978	< 0.00978	< 0.00978	< 0.00978	< 0.00978	< 0.00978	< 0.00978	**0.0219**	**0.0219**
TP-10	0-4	1/21/2020	47.56327	-122.55109	**8.11** J	**29.2** J	< 0.00962	< 0.00962	< 0.00962	< 0.00962	< 0.00962	< 0.00962	< 0.00962	< 0.00962	**0.0301**	**0.0301**
TP-11	0-4.5	1/21/2020	47.56329	-122.55119	**6.24**	**22.7**	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	< 0.0103	**0.0390**	< 0.0103	< 0.0103	**0.0390**
TP-12	0-5.5	1/21/2020	47.56342	-122.55106	**5.40**	**15.4**	< 0.00982	< 0.00982	< 0.00982	< 0.00982	< 0.00982	< 0.00982	< 0.00982	< 0.00982	< 0.00982	nd
TP-13	0-5	1/21/2020	47.56350	-122.55126	**6.39**	**17.2**	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	**0.00605** J	< 0.0102	< 0.0102	**0.00605** J
TP-14	0-5	1/21/2020	47.56354	-122.55145	**3.44** J	**11.8**	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	< 0.00979	**0.0259**	< 0.00979	< 0.00979	**0.0259**
TP-15	0-4	1/22/2020	47.56339	-122.55136	< 2.50	**10.2** J	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	nd
TP-16	0-4.25	1/22/2020	47.56347	-122.55158	**9.39**	**26.2**	< 0.00981	< 0.00981	< 0.00981	< 0.00981	< 0.00981	< 0.00981	**0.0360**	< 0.00981	< 0.00981	**0.0360**
TP-17	0-4	1/22/2020	47.56334	-122.55175	**9.62**	**33.9**	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	**0.0381**	< 0.0100	< 0.0100	**0.0381**
TP-18	0-1.5	1/22/2020	47.56301	-122.55122	**4.32** J	**10.3** J	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	< 0.0106	nd
Soil Cap (SC) Samples																
SC-1	0-0.5	1/23/2020	47.56309	-122.55165	< 11.9	**42.3** J	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	**0.203**	< 0.0101	< 0.0101	**0.203**
SC-2	0-0.5	1/23/2020	47.56305	-122.55133	**1.93** J	**7.17** J	< 0.00999	< 0.00999	< 0.00999	< 0.00999	< 0.00999	< 0.00999	**0.0321**	< 0.00999	< 0.00999	**0.0321**
SC-3	0-0.5	1/23/2020	47.56305	-122.55117	**5.11**	**21.7**	< 0.0105	< 0.0105	< 0.0105	< 0.0105	< 0.0105	< 0.0105	**0.0187** J	< 0.0105	< 0.0105	**0.0187** J
SC-4	0-0.5	1/23/2020	47.56305	-122.55142	< 217	**841** J	< 0.00923	< 0.00923	< 0.00923	< 0.00923	< 0.00923	< 0.00923	**0.0979** JH	< 0.00923	< 0.00923	**0.0979** JH
SC-5	0-0.5	1/23/2020	47.56301	-122.55155	< 247	**652** J	< 0.0105	< 0.0105	< 0.0105	< 0.0105	< 0.0105	< 0.0105	**0.113** JH	< 0.0105	< 0.0105	**0.113** JH
SC-6	0-0.5	1/23/2020	47.56311	-122.55157	**9.32** J	**53.7** J	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	**0.120**	< 0.0102	< 0.0102	**0.120**
SC-7	0-0.5	1/23/2020	47.56314	-122.55149	**1.86** J	**5.92** J	< 0.00993	< 0.00993	< 0.00993	< 0.00993	< 0.00993	< 0.00993	**0.0110** J P	< 0.00993	< 0.00993	**0.0110** J P
SC-8	0-0.5	1/23/2020	47.56311	-122.55140	< 233	**591** J	< 0.00989	< 0.00989	< 0.00989	< 0.00989	< 0.00989	< 0.00989	**0.0597**	< 0.00989	< 0.00989	**0.0597**
SC-9	0-0.5	1/23/2020	47.56310	-122.55132	< 12.7	**39.5** J	< 0.0108	< 0.0108	< 0.0108	< 0.0108	< 0.0108	< 0.0108	**0.0502**	< 0.0108	< 0.0108	**0.0502**
SC-10	0-0.5	1/23/2020	47.56314	-122.55119	**2.89** J	**9.47** J	< 0.0104	< 0.0104	< 0.0104	< 0.0104	< 0.0104	< 0.0104	**0.0242**	< 0.0104	< 0.0104	**0.0242**
SC-11	0-0.5	1/23/2020	47.56316	-122.55159	**3.37** J	**11.9**	< 0.00999	< 0.00999	< 0.00999	< 0.00999	< 0.00999	< 0.00999	**0.0344**	< 0.00999	< 0.00999	**0.0344**
SC-12	0-0.5	1/23/2020	47.56310	-122.55132	< 24.0	**44.8** J	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	**0.0123** J	< 0.0102	< 0.0102	**0.0123** J
SC-13	0-0.5	1/23/2020	47.56314	-122.55119	< 23.2	**44.4** J	< 0.00987	< 0.00987	< 0.00987	< 0.00987	< 0.00987	< 0.00987	**0.0489**	< 0.00987	< 0.00987	**0.0489**
SC-14	0-0.5	1/23/2020	47.56312	-122.55159	**1.83** J	**4.70** J	< 0.00993	< 0.00993	< 0.00993	< 0.00993	< 0.00993	< 0.00993	**0.216** JD	< 0.00993	< 0.00993	**0.216** JD
SC-X (SC-14 Field Duplicate)	0-0.5	1/23/2020	47.56312	-122.55159	**3.47** J	**10.6** J	< 0.0104	< 0.0104	< 0.0104	< 0.0104	< 0.0104	< 0.0104	**0.0775** JD	< 0.0104	< 0.0104	**0.0775** JD
SC-15	0-0.5	1/23/2020	47.56321	-122.55159	**4.16** J	**19.9**	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	< 0.0102	**0.0268**	< 0.0102	< 0.0102	**0.0268**
SC-16	0-0.5	1/23/2020	47.56320	-122.55166	**3.64** J	**11.1** J	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	< 0.0101	**0.0350** JH	< 0.0101	< 0.0101	**0.0350** JH
SC-17	0-0.5	1/23/2020	47.56316	-122.55166	**4.14** J	**10.4** J	< 0.0105	< 0.0105	< 0.0105	< 0.0105	< 0.0105	< 0.0105	**0.0266**	< 0.0105	< 0.0105	**0.0266**
SC-18	0-0.5	1/23/2020	47.56328	-122.55181	< 11.3	**25.1** J	< 0.00960	< 0.00960	< 0.00960	< 0.00960	< 0.00960	< 0.00960	**0.0351**	< 0.00960	< 0.00960	**0.0351**
MTCA Method A or B Cleanup Level					*2,000*		*(5.6)*	*NV*	*NV*	*NV*	*NV*	*(0.5)*	*(0.5)*	*NV*	*NV*	*1.0*

Notes:
All concentrations reported on a dry weight basis.
mg/kg = milligrams per kilogram [equivalent to parts per million (ppm)]
Bold values represent detected concentrations of constituents below their MTCA Method A or B Cleanup Level. Method B Cleanup Levels shown in parentheses.
NV = No cleanup value established for this constituent under Model Toxics Control Act (MTCA) Method A or Method B Criteria.
nd = No PCBs detected in this sample. See individual PCBs results for reporting limits.
J = The following analyte was detected below the laboratory limit of quantitation (reporting limit), but above the method detection limit. According to the laboratory report, the identification of the analyte is acceptable, the reported value is an estimated concentration.
JH = The data validation report indicates a high surrogate recovery for this analyte in this sample. According to the data validation report, the value provided is an estimated concentration, with a potential high bias.
P = The relative percent difference between the results for the two columns used to obtain this result is greater than 40%. According to the laboratory report and the data validation report, the value provided is an estimated concentration.
JD = The relative percent difference between the results for the field sample and the field duplicate were greater than control limits specified in data validation report. Therefore, according to the data validation report, the value provided is an estimated concentration.
* = latitude and longitude expressed relative to the WGS84 datum.

Excerpt from:
Kane Environmental, LLC. 2020. Soil Characterization Report. Naval Base Kitsap-Manchester Site 302. April.

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Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-1
Lab Sample ID: 580-121932-1
Date Collected: 01/06/23 09:45
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		2.1		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Copper	**14**		1.7		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Barium	**31**		0.35		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Nickel	**28**		0.69		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Cadmium	ND		0.69		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Zinc	**32**		2.8		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Chromium	**36**	**F1**	0.90		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Lead	**4.2**		1.0		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Selenium	ND		3.5		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Silver	ND		1.7		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Nickel	**28**		0.69		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Copper	**14**		1.7		mg/Kg		01/11/23 10:36	01/11/23 18:26	1
Zinc	**32**		2.8		mg/Kg		01/11/23 10:36	01/11/23 18:26	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-2
Lab Sample ID: 580-121932-2
Date Collected: 01/06/23 09:47
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.9**		2.2		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Copper	**24**		1.8		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Barium	**44**		0.36		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Nickel	**15**		0.72		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Cadmium	ND		0.72		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Zinc	**46**		2.9		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Chromium	**15**		0.94		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Lead	**17**		1.1		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Selenium	ND		3.6		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Silver	ND		1.8		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Nickel	**15**		0.72		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Copper	**24**		1.8		mg/Kg		01/11/23 10:36	01/11/23 18:53	1
Zinc	**46**		2.9		mg/Kg		01/11/23 10:36	01/11/23 18:53	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-3
Lab Sample ID: 580-121932-3
Date Collected: 01/06/23 09:49
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.4**		2.0		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Copper	**21**		1.7		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Barium	**74**		0.34		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Nickel	**13**		0.68		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Cadmium	ND		0.68		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Zinc	**52**		2.7		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Chromium	**15**		0.88		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Lead	**21**		1.0		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Selenium	ND		3.4		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Silver	ND		1.7		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Nickel	**13**		0.68		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Copper	**21**		1.7		mg/Kg		01/11/23 10:36	01/11/23 18:56	1
Zinc	**52**		2.7		mg/Kg		01/11/23 10:36	01/11/23 18:56	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-4
Lab Sample ID: 580-121932-4
Date Collected: 01/06/23 09:51
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.3**		1.9		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Copper	**30**		1.5		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Barium	**64**		0.31		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Nickel	**15**		0.62		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Cadmium	ND		0.62		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Zinc	**60**		2.5		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Chromium	**19**		0.80		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Lead	**19**		0.93		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Selenium	ND		3.1		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Silver	ND		1.5		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Nickel	**15**		0.62		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Copper	**30**		1.5		mg/Kg		01/11/23 10:36	01/11/23 18:59	1
Zinc	**60**		2.5		mg/Kg		01/11/23 10:36	01/11/23 18:59	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-5
Lab Sample ID: 580-121932-5
Date Collected: 01/06/23 09:53
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.4**		1.9		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Copper	**16**		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Barium	**47**		0.32		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Nickel	**13**		0.63		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Cadmium	ND		0.63		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Zinc	**38**		2.5		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Chromium	**14**		0.82		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Lead	**13**		0.95		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Selenium	ND		3.2		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Silver	ND		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Nickel	**13**		0.63		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Copper	**16**		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:02	1
Zinc	**38**		2.5		mg/Kg		01/11/23 10:36	01/11/23 19:02	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-6
Lab Sample ID: 580-121932-6
Date Collected: 01/06/23 09:55
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.9		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Copper	**12**		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Barium	**36**		0.31		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Nickel	**24**		0.62		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Cadmium	ND		0.62		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Zinc	**31**		2.5		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Chromium	**20**		0.81		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Lead	**4.2**		0.93		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Selenium	ND		3.1		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Silver	ND		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Nickel	**24**		0.62		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Copper	**12**		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:05	1
Zinc	**31**		2.5		mg/Kg		01/11/23 10:36	01/11/23 19:05	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-7
Lab Sample ID: 580-121932-7
Date Collected: 01/06/23 09:57
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.9**		2.4		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Copper	**19**		2.0		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Barium	**43**		0.40		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Nickel	**16**		0.81		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Cadmium	ND		0.81		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Zinc	**43**		3.2		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Chromium	**17**		1.1		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Lead	**12**		1.2		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Selenium	ND		4.0		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Silver	ND		2.0		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Nickel	**16**		0.81		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Copper	**19**		2.0		mg/Kg		01/11/23 10:36	01/11/23 19:09	1
Zinc	**43**		3.2		mg/Kg		01/11/23 10:36	01/11/23 19:09	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-8
Lab Sample ID: 580-121932-8
Date Collected: 01/06/23 09:59
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.1**		2.0		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Copper	**19**		1.7		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Barium	**55**		0.33		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Nickel	**14**		0.66		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Cadmium	ND		0.66		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Zinc	**49**		2.7		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Chromium	**15**		0.86		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Lead	**11**		1.0		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Selenium	ND		3.3		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Silver	ND		1.7		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Nickel	**14**		0.66		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Copper	**19**		1.7		mg/Kg		01/11/23 10:36	01/11/23 19:12	1
Zinc	**49**		2.7		mg/Kg		01/11/23 10:36	01/11/23 19:12	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-9
Lab Sample ID: 580-121932-9
Date Collected: 01/06/23 10:01
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.4**		1.9		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Copper	**17**		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Barium	**54**		0.32		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Nickel	**17**		0.64		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Cadmium	ND		0.64		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Zinc	**43**		2.5		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Chromium	**18**		0.83		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Lead	**10**		0.96		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Selenium	ND		3.2		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Silver	ND		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Nickel	**17**		0.64		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Copper	**17**		1.6		mg/Kg		01/11/23 10:36	01/11/23 19:15	1
Zinc	**43**		2.5		mg/Kg		01/11/23 10:36	01/11/23 19:15	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Client Sample Results

Client: Clean Harbors Environmental Services Inc
Job ID: 580-121932-1
Project/Site: 23F1856 Manchester

Client Sample ID: Site 302-10
Lab Sample ID: 580-121932-10
Date Collected: 01/06/23 10:03
Matrix: Solid
Date Received: 01/06/23 11:37

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.4**		1.7		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Copper	**17**		1.4		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Barium	**35**		0.28		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Nickel	**19**		0.56		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Cadmium	ND		0.56		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Zinc	**35**		2.2		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Chromium	**18**		0.72		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Lead	**9.6**		0.83		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Selenium	ND		2.8		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Silver	ND		1.4		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Nickel	**19**		0.56		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Copper	**17**		1.4		mg/Kg		01/11/23 10:36	01/11/23 19:18	1
Zinc	**35**		2.2		mg/Kg		01/11/23 10:36	01/11/23 19:18	1

Excerpt from:
Naval Base Kitsap Manchester. 2024. Site 302 Soil Removal Action. May 20.

Tank 24 Soil Sampling Results

Excerpt from: Garco Construction. 2022. Submittal 02 65 00-04, SD11, Tank Closure Report 3.15. For Construction Activities At: P-856 Manchester Tank Farm Improvements, Manchester Fleet Logistics Center Puget Sound, Manchester, WA. Prepared under Contract N44255221C1006. Prepared for Naval Facilities Engineering Systems Command (NAVFAC). October 13.

T-24
Final

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 19, 2022

Robert Simons, Project Manager
CMSI
12512 Little Rock Rd SW
Olympia, WA 98512

Dear Mr Simons:

Included are the results from the testing of material submitted on August 15, 2022 from the Manchester T-24, F&BI 208217 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CMS0819R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 15, 2022 by Friedman & Bruya, Inc. from the CMSI Manchester T-24, F&BI 208217 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	CMSI
208217 -01	1
208217 -02	2
208217 -03	3
208217 -04	4
208217 -05	5

All quality control requirements were acceptable.

1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/19/22
Date Received: 08/15/22
Project: Manchester T-24, F&BI 208217
Date Extracted: 08/16/22
Date Analyzed: 08/16/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
1 208217-01	<0.02	<0.02	<0.02	<0.06	<5	96
2 208217-02	<0.02	<0.02	<0.02	<0.06	<5	96
3 208217-03	<0.02	<0.02	<0.02	<0.06	<5	96
4 208217-04	<0.02	<0.02	0.089	0.22	61	101
5 208217-05	<0.02	<0.02	<0.02	<0.06	<5	89
Method Blank 02-1733 MB2	<0.02	<0.02	<0.02	<0.06	<5	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/19/22
Date Received: 08/15/22
Project: Manchester T-24, F&BI 208217
Date Extracted: 08/16/22
Date Analyzed: 08/16/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
1 208217-01	<50	<250	100
2 208217-02	<50	<250	96
3 208217-03	<50	<250	109
4 208217-04	<50	<250	104
5 208217-05	<50	<250	103
Method Blank 02-1997 MB	<50	<250	108

3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/19/22
Date Received: 08/15/22
Project: Manchester T-24, F&BI 208217

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 208201-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	90	69-120
Toluene	mg/kg (ppm)	0.5	90	70-117
Ethylbenzene	mg/kg (ppm)	0.5	88	65-123
Xylenes	mg/kg (ppm)	1.5	93	66-120
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/19/22
Date Received: 08/15/22
Project: Manchester T-24, F&BI 208217

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 208222-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	104	112	63-146	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	79-144

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

208 ~~217~~

8/15/22 ~~VSA32~~ VSA2

Page # ____ of ____

Report To Robert Simons

Company Environmental Spclts

Address 12512 Littlerock Rd SW

City, State, ZIP Olympia, WA 98512

Phone 253-243-1141 Email RSCMSi@hotmail.com

SAMPLERS (signature)	
[signature]	
PROJECT NAME Manchester T-24	PO #
REMARKS Soil Borings Bottom Samples Project specific RLs? - Yes / No	INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH ____
- Rush charges authorized by: ____

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other ____
- (Default:) Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
1	01 A-6	8-15-22	9:20	soil	3 (5 oz + Bio) 1 DX	X	X	X									-3.5 Gray Silty Gravel
2	02	〃	9:40	〃	〃	〃	〃	〃									-3.5 Gray Silty Gravel
3	03	〃	10:18	〃	〃	〃	〃	〃									-3.5 Brown Silty Gravel
4	04	〃	10:40	〃	〃	〃	〃	〃									-4 Gray Silty Gravel
5	05	〃	11:20	〃	〃	〃	〃	〃									-4 Gravel Gray/Brown/Gray

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: *[signature]*	Robert F. Simons	ES	8-15-22	2:00
Received by: *[signature]*	Nhan Phan	FBI	8-15-22	1400
Relinquished by:		Samples received at 24°C		
Received by:				

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Tank 25 Soil Sampling Results

Excerpt from: Garco Construction. 2022. Submittal 02 65 00-04, SD11, Tank Closure Report 3.15. For Construction Activities At: P-856 Manchester Tank Farm Improvements, Manchester Fleet Logistics Center Puget Sound, Manchester, WA. Prepared under Contract N44255221C1006. Prepared for Naval Facilities Engineering Systems Command (NAVFAC). October 13.

T-25
eH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

Gray Suspect stockpile characterization

T-25
5-25-22

June 6, 2022

Bob Simons, Project Manager
CMSI
12512 Little Rock Rd SW
Olympia, WA 98512

Dear Mr Simons:

Included are the results from the testing of material submitted on June 1, 2022 from the Manchester T-25, F&BI 206009 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CMS0606R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on June 1, 2022 by Friedman & Bruya, Inc. from the CMSI Manchester T-25, F&BI 206009 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	CMSI
206009 -01	1
206009 -02	2
206009 -03	3
206009 -04	4

The NWTPH-Gx and 8021B samples were taken from a four ounce jar. The data were flagged accordingly.

All other quality control requirements were acceptable.

1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/06/22
Date Received: 06/01/22
Project: Manchester T-25, F&BI 206009
Date Extracted: 06/02/22
Date Analyzed: 06/02/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-132)
1 pc 206009-01	<0.02	<0.02	<0.02	<0.06	<5	112
2 pc 206009-02	<0.02	<0.02	0.036	<0.06	15	125
3 pc 206009-03	<0.02	<0.02	<0.02	<0.06	20	126
4 pc 206009-04	<0.02	<0.02	<0.02	<0.06	<5	114
Method Blank 02-1139 MB2	<0.02	<0.02	<0.02	<0.06	<5	98

2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/06/22
Date Received: 06/01/22
Project: Manchester T-25, F&BI 206009
Date Extracted: 06/01/22
Date Analyzed: 06/01/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
1 206009-01	<50	<250	105
2 206009-02	200	<250	104
3 206009-03	540	<250	114
4 206009-04	<50	<250	114
Method Blank 02-1326 MB	<50	<250	99

3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/06/22
Date Received: 06/01/22
Project: Manchester T-25, F&BI 206009

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 205490-02 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	94	69-120
Toluene	mg/kg (ppm)	0.5	96	70-117
Ethylbenzene	mg/kg (ppm)	0.5	96	65-123
Xylenes	mg/kg (ppm)	1.5	100	66-120
Gasoline	mg/kg (ppm)	20	105	71-131

4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/06/22
Date Received: 06/01/22
Project: Manchester T-25, F&BI 206009

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 206001-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	3,400	70 b	112 b	73-135	46 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

NP 206009

SAMPLE CHAIN OF CUSTODY

06/01/22

CT2

Page # 1 of 1

Report To

Company: CMSI-Environmental Specialties, 12512 Littlerock Rd SW, Olympia, WA 98512

Address

City, State, ZIP

Phone 253-683-1144 Email rscms@hotmail.com

SAMPLERS (signature): Robert F. Simons

PROJECT NAME: Manchester T-25

PO #

REMARKS: Gray sticky silt SW - next to structure

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
1	01	5-25-22	12:55	soil	1 for 402	X	X	X									Gray sandy clay
2	02	〃	12:58	〃	〃	〃	〃	〃									〃 SP
3	03	〃	1:00	〃	〃	〃	〃	〃									〃 15-20
4	04	〃	1:03	〃	〃	〃	〃	〃									〃 -18
													Samples received at 14 °C				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Robert F. Simons	Robert F. Simons	ES	5-30-22	2:00
Received by: [illegible]	Khan Pham	FEBI	6/1/22	1010
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

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T-25
SA-FM1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 21, 2022

Bob Simons, Project Manager
CMSI
12512 Little Rock Rd SW
Olympia, WA 98512

Dear Mr Simons:

Included are the results from the testing of material submitted on July 15, 2022 from the Manchester Fuel Depot Tank 25, F&BI 207246 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CMS0721R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 15, 2022 by Friedman & Bruya, Inc. from the CMSI Manchester Fuel Depot Tank 25, F&BI 207246 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	CMSI
207246 -01	1
207246 -02	2
207246 -03	3
207246 -04	4
207246 -05	5

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/21/22
Date Received: 07/15/22
Project: Manchester Fuel Depot Tank 25, F&BI 207246
Date Extracted: 07/19/22
Date Analyzed: 07/19/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
1 207246-01	<0.02	<0.02	0.47	1.0	260	85
2 207246-02	<0.02	<0.02	0.65	3.6	300	120
3 207246-03	<0.02	<0.02	<0.02	<0.06	<5	93
4 207246-04	<0.02	<0.02	<0.02	<0.06	<5	93
5 207246-05	<0.02	<0.02	<0.02	0.41	47	96
Method Blank 02-1628MB	<0.02	<0.02	<0.02	<0.06	<5	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/21/22
Date Received: 07/15/22
Project: Manchester Fuel Depot Tank 25, F&BI 207246
Date Extracted: 07/15/22
Date Analyzed: 07/18/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
1 207246-01	9,900	<250	114
2 207246-02	1,200	<250	106
3 207246-03	1,700	<250	103
4 207246-04	<50	<250	103
5 207246-05	1,200	<250	104
Method Blank 02-1690 MB	<50	<250	97

3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/21/22
Date Received: 07/15/22
Project: Manchester Fuel Depot Tank 25, F&BI 207246

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 207241-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	91	69-120
Toluene	mg/kg (ppm)	0.5	91	70-117
Ethylbenzene	mg/kg (ppm)	0.5	91	65-123
Xylenes	mg/kg (ppm)	1.5	92	66-120
Gasoline	mg/kg (ppm)	20	115	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/21/22
Date Received: 07/15/22
Project: Manchester Fuel Depot Tank 25, F&BI 207246

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 207245-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	3,600	105 b	79 b	73-135	28 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	114	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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207246 WM

SAMPLE CHAIN OF CUSTODY 7/15/22

VSB2

Page # ____ of ____

Report To Robert Simons

Company EnviroSpecifts

Address 2512 Littlerock Rd SW

City, State, ZIP Olympia, WA 98512

Phone 253-683-1144 Email vscimsr@...

SAMPLERS (signature) Robert F. Simons

PROJECT NAME Manchester Fuel Depot Tank 25

PO#

REMARKS Bottom sampling SA

INVOICE TO

Project specific RLs? - Yes / No

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes Through Concrete BTM in soil
1	01 A-G	7/14/22	11:12	soil	3 BTEX 4 Diesel	X	X	X									BTM Boring sample
2	02	7/14/22	11:35			X	X	X									BTM Boring sample
3	03					X	X	X									BTM Boring sample
4	04		1:05			X	X	X									BTM Boring sample
5	05		1:20			X	X	X									BTM Boring sample
																	X per BS 7/18/22
																	ME

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Robert F. Simons	Robert F. Simons	ES	7-15-22	12:20
Received by: W. Madden	W. Madden	F+BI	7-15-22	12:20
Relinquished by:		Samples received at 23 °C		
Received by:				

SAMPLE CHAIN OF CUSTODY 7/15/22 VSB2

207246 WM

207246

Report To Robert Simons

Company EnviroSpclts

Address 2512 Littlerock Rd SW

City, State, ZIP Olympia, WA 98512

Phone 253-683-1144 Email vscimsia@hotmail.com

SAMPLERS (signature) Robert F. Simons

PROJECT NAME Manchester Fuel Depot Tank 25

PO#

REMARKS Bottom sampling SA

INVOICE TO

Project specific RLs? - Yes / No

Page # ___ of ___

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH ___
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other ___
- Default: Dispose after 30 days

Sample ID (Notes)	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082				Notes (Through Concrete BTM in soil)
1	01 A-G	7/14/22	11:12	soil	3 Gas 4 Diesel											BTM Boring sample
2	02	7/14/22	11:35													BTM Boring sample
3	03															BTM Boring sample
4	04		1:05													BTM Boring Sample
5	05		1:20													BTM Boring Sample
1															-7	1.5' abandoned ...
2															-4	-2' ... clay
3															5.5	5.5
4															-7	-7 clay sand
5															-7	-7 Coarse sand sand clay

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Robert F. Simons	Robert F. Simons	ES	7-15-22	12:20
Received by: W. Madden	W. Madden	F+B	7-15-22	12:20
Relinquished by:				
Received by:		Samples received at 23 °C		

Tank 26 Soil Sampling Results

Excerpt from: Garco Construction. 2022. Submittal 02 65 00-04, SD11, Tank Closure Report 3.15. For Construction Activities At: P-856 Manchester Tank Farm Improvements, Manchester Fleet Logistics Center Puget Sound, Manchester, WA. Prepared under Contract N44255221C1006. Prepared for Naval Facilities Engineering Systems Command (NAVFAC). October 13.

T-26
Fnl

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 29, 2022

Bob Simons, Project Manager
CMSI
12512 Little Rock Rd SW
Olympia, WA 98512

Dear Mr Simons:

Included are the results from the testing of material submitted on July 22, 2022 from the Manchester T-26 Soil Borings-Tank BTM, F&BI 207372 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
CMS0729R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 22, 2022 by Friedman & Bruya, Inc. from the CMSI Manchester T-26 Soil Borings-Tank BTM, F&BI 207372 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	CMSI
207372 -01	1
207372 -02	2
207372 -03	3
207372 -04	4
207372 -05	5

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/29/22
Date Received: 07/22/22
Project: Manchester T-26 Soil Borings-Tank BTM, F&BI 207372
Date Extracted: 07/25/22
Date Analyzed: 07/26/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE, TOLUENE, ETHYLBENZENE,
XYLENES AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-132)
1 207372-01	<0.02	<0.02	0.064	<0.06	47	104
2 207372-02	<0.02	<0.02	<0.02	<0.06	<5	105
3 207372-03	<0.02	<0.02	<0.02	<0.06	<5	103
4 207372-04	<0.02	<0.02	<0.02	<0.06	<5	100
5 207372-05	<0.02	<0.02	<0.02	<0.06	<5	99
Method Blank 02-1705 MB	<0.02	<0.02	<0.02	<0.06	<5	94

2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/29/22
Date Received: 07/22/22
Project: Manchester T-26 Soil Borings-Tank BTM, F&BI 207372
Date Extracted: 07/25/22
Date Analyzed: 07/25/22

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recoverv) (Limit 48-168)
1 207372-01	<50	<250	101
2 207372-02	<50	<250	97
3 207372-03	<50	<250	98
4 207372-04	<50	<250	96
5 207372-05	<50	<250	96
Method Blank 02-1833 MB	<50	<250	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/29/22
Date Received: 07/22/22
Project: Manchester T-26 Soil Borings-Tank BTM, F&BI 207372

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 207374-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	98	69-120
Toluene	mg/kg (ppm)	0.5	98	70-117
Ethylbenzene	mg/kg (ppm)	0.5	94	65-123
Xylenes	mg/kg (ppm)	1.5	93	66-120
Gasoline	mg/kg (ppm)	20	115	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/29/22
Date Received: 07/22/22
Project: Manchester T-26 Soil Borings-Tank BTM, F&BI 207372

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 207372-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	126	128	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	128	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY 7/22/22 VSB3

207322

Report To Robert Simmons

Company Enviro Spcl'ts

Address 12512 Littlerock Rd SW

City, State, ZIP Olympia, WA

Phone 253-1831144 Email rscmsi@hotmail

SAMPLERS (signature) Robert F. Simmons

PROJECT NAME Manchester T-26 Soil Borings-Tank UTM

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 1 of 1

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- ☑ Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
1	01 A-G	7-19-22	11:55	soil	3 4oz 1 4oz	X	X	X									1.5' sample SB Gray Clay
2	02		12:15														8' sample SB Gray sand
3	03		12:35														5' sample SB Gray Clay
4	04		1:10														5.5' sample SB Gray clay
5	05		1:25														SB Gray Clay

Friedman & Bruya, Inc.
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Robert F. Simmons	Robert F. Simmons	Enviro Spcl'ts	7-22-22	11:50
Received by:	W. Madden	W. Madden	F+BI	7-22-22	11:50
Relinquished by:					
Received by:			Samples received at 10 °C		

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Appendix D:
Site Inspection Checklists

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NBK Manchester
Site 302 - PCB Site
Naval Facilities Engineering Command Northwest

LAND USE CONTROLS (LUCs) INSPECTION CHECKLIST

DATE(S) (MM|DD|YY):
06/05/2024

INSPECTOR(S):	COMPANY:
C.Foster, S.Fetters	Liberty JV

LUCs

- *ENSURE THAT SITE SIGNAGE IS READABLE AND ADEQUATE.*
- ENSURE THAT LAND USE REMAINS FOR INDUSTRIAL PURPOSES.
- ENSURE THAT THERE HAS BEEN NO UNAUTHORIZED SOIL EXCAVATION OR DISTURBANCE.
- ENSURE THAT THERE HAS BEEN NO UNAUTHORIZED PLACEMENT OF EXCESS SOIL FROM ANOTHER LOCATION.
- ENSURE INTEGRITY OF THE SOIL COVER VEGETATION, SO THAT ANY EXCAVATION OR IMPROPER DISPOSAL IS APPARENT.
- ENSURE THAT ANY SOIL EXCAVATED FROM THE SITE IS PROPERLY CHARACTERIZED AND DISPOSED OFF-SITE AND THAT ON-SITE WORKERS ARE PROTECTED DURING SUCH ACTIVITIES.
- ENSURE THAT SITE FENCING IS INTACT AND THAT GATES ARE SECURED AND LOCKED.

NOTE: LUCs THAT ARE ITALICIZED ARE REQUIRED LUCs FROM THE NFA LETTER.

LUCs INSPECTION ACTIONS

HAS SITE OR ADJACENT LAND USE CHANGED SINCE LAST INSPECTION? ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER_____

FINDINGS: Industrial land use

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF SOIL EXCAVATION OR DISTURBANCE? IF SO, DETERMINE IF SITE APPROVAL PROCESS HAS BEEN FOLLOWED. ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER_____

FINDINGS:

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF THE UNAUTHORIZED PLACEMENT OF EXCESS SOIL FROM ANOTHER LOCATION? ☐ YES ■ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ■ INTERVIEW W/ R. Riley ☐ SECURITY CHECK ☐ OTHER_____

FINDINGS: No stockpiles observed on-site

HAS THE INTEGRITY OF THE VEGETATIVE COVER AT THE SITE BEEN MAINTAINED? ■ YES ☐ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER_____

FINDINGS: increased vegetation since 2023

HAS ACCESS CONTROL BEEN MAINTAINED? ■ YES ☐ NO, EXPLAIN_____

SECURITY POC: N/A

IS SIGNAGE READABLE AND ADEQUATE? ■ YES ☐ NO ☐ NA

IS FENCING INTACT AND SECURE? ■ YES ☐ NO ☐ NA

ARE BOTH THE NORTH AND SOUTH GATES SECURED AND LOCKED ■ YES ☐ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER_____

FINDINGS:

PAGE 1 OF 2

NBK Manchester
Site 302 - PCB Site
Naval Facilities Engineering Command Northwest

LUCs INSPECTION CHECKLIST (CONTINUED)

WERE PICTURES TAKEN? ☒ YES ☐ NO

PHOTO IDs See Appendix E

ADDITIONAL NOTES:

During the 2024 inspection, new fencing was observed on the west side of the site. The Remedial Project Manager informed Liberty JV that this work was conducted in response to previous recommendations to repair fencing. Some maintenance to remove vegetation from fencing was observed on the northwest portion of the boundary fencing. Fencing on the north and northeast sides of the site requires additional vegetation maintenance to keep the defined boundary intact. Approximately 60 feet of fence on the north portion, and 30 feet of fence on the northeast portion requires maintenance to remove vegetation overgrowth.

No existing or new stockpiles, or excavations were observed on the site.

Well inspections are not included as a part of this inspection; however, three monitoring wells related to PFAS investigation were observed on the site.

I CERTIFY THAT THE CONDITIONS OF THE AREA ON THE INSPECTION DATES(S) WERE AS REPORTED ABOVE.

INSPECTOR SIGNATURE: Foster, Chelsea (USCF715440) Digitally signed by Foster, Chelsea (USCF715440) Date: 2024.06.06 14:19:28 -07'00'

DATE: 06/05/2024

NBK Manchester
Site 303 - D-Tunnel Tanks
Naval Facilities Engineering Command Northwest

LAND USE CONTROLS (LUCs) INSPECTION CHECKLIST

DATE(S) (MM|DD|YY):
6/5/2024

INSPECTOR(S):	COMPANY:
C. Foster, S. Fetters	Liberty JV

LUCs

- *ENSURE THAT LAND USE REMAINS FOR INDUSTRIAL PURPOSES. COORDINATE WITH ECOLOGY PRIOR TO CHANGE IN PROPERTY OWNERSHIP OR LAND USE CONCERNING THE NEED FOR REMEDIAL ACTIONS.*
- *ENSURE THAT WARNINGS ARE POSTED FOR WORKERS TO GUARD AGAINST EXPOSURE TO RESIDUAL PETROLEUM CONTAMINATED SOIL.*
- *IDENTIFY REMAINING AREAS OF CONCERN ON FACILITY MAPS AND SPECIFY IN FACILITY EXCAVATION PERMIT INSTRUCTION.*
- ENSURE NO PRODUCTION WELLS ARE INSTALLED AND GROUNDWATER IS NOT USED EXCEPT FOR MONITORING AND/OR REMEDIATION.
- PROTECT EXISTING VAPOR MONITORING WELLS UNTIL FORMALLY ABANDONED.
- ENSURE THAT THERE HAS BEEN NO UNAUTHORIZED SOIL EXCAVATION OR DISTURBANCE.
- CONFINE AUTHORIZED REUSABLE MATERIAL* TO APPROVED STAGING AREA.
- ENSURE THAT ANY SOIL EXCAVATED FROM THE SITE IS PROPERLY CHARACTERIZED AND DISPOSED OFF-SITE AND THAT ON-SITE WORKERS ARE PROTECTED DURING SUCH ACTIVITIES.

NOTE: LUCs THAT ARE ITALICIZED ARE REQUIRED LUCs FROM THE NFA LETTER.
*THOSE MATERIALS FOR WHICH ONSITE PLACEMENT HAS BEEN COORDINATED WITH THE ECOLOGY SITE MANAGER AND THAT HAVE BEEN CHARACTERIZED IN COLLABORATION WITH THE ECOLOGY SITE MANAGER.

LUC INSPECTION ACTION

HAS SITE OR ADJACENT LAND USE CHANGED SINCE LAST INSPECTION? ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: Industrial land use

DO FACILITY MAPS IDENTIFY REMAINING AREAS OF CONCERN? ■ YES ☐ NO

DESCRIBE: Contractor Environmental & Safety Guide

DOES THE FACILITY EXCAVATION PERMIT INSTRUCTION SPECIFY REMAINING AREAS OF CONCERN? ■ YES ☐ NO

DESCRIBE: Contractor Environmental & Safety Guide

IS THERE VISUAL EVIDENCE OF UNAUTHORIZED ON-SITE WELL INSTALLATION OR GROUNDWATER USE? ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____
☐ WELL INSPECTIONS

FINDINGS:
☐ SEE WELL INSPECTION LOGS
☐ OTHER _____

ARE ALL MONITORING WELLS IN GOOD CONDITION AND ACCESSIBLE? (REFER TO COMPLETED MONITORING WELL INSPECTION CHECKLISTS) ■ YES ☐ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____
■ WELL INSPECTIONS

FINDINGS:
■ SEE WELL INSPECTION LOGS
☐ OTHER _____

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF SOIL EXCAVATION OR DISTURBANCE? IF SO, DETERMINE IF SITE APPROVAL PROCESS HAS BEEN FOLLOWED. ■ YES ☐ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: Active construction activities

NBK Manchester
Site 303 - D-Tunnel Tanks
Naval Facilities Engineering Command Northwest

LUCs INSPECTION CHECKLIST (CONTINUED)

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF THE UNAUTHORIZED PLACEMENT EXCESS SOIL, FILL, OR SEDIMENT FROM ANOTHER LOCATION? ☐ YES ☒ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ☒ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: _____

HAS ACCESS CONTROL BEEN MAINTAINED? ☒ YES ☐ NO, EXPLAIN _____

SECURITY POC: _____

IS SIGNAGE READABLE AND ADEQUATE? ☒ YES ☐ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ☒ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: _____

WERE PICTURES TAKEN? ☒ YES ☐ NO

PHOTO IDs See Appendix E

ADDITIONAL NOTES:

Active earthwork and construction activities related to tank decommissioning and replacement are occurring throughout the southern portion of the site. Signage has been repaired or replaced and is intact across the site. All monitoring wells were able to be located during this inspection event.

I CERTIFY THAT THE CONDITIONS OF THE AREA ON THE INSPECTION DATES(S) WERE AS REPORTED ABOVE.

INSPECTOR SIGNATURE: Foster, Chelsea (USCF715440) Digitally signed by Foster, Chelsea (USCF715440) Date: 2024.06.06 14:19:38 -07'00'

DATE: 06/05/2024

PAGE 2 OF 2

NBK Manchester
Site 304 - Industrial Area
Naval Facilities Engineering Command Northwest

LAND USE CONTROLS (LUCs) INSPECTION CHECKLIST

DATE(S) (MM|DD|YY):
06/05/2024

INSPECTOR(S):	COMPANY:
C. Foster, S. Fetters	Liberty JV

LUCs

- *ENSURE THAT LAND USE REMAINS FOR INDUSTRIAL PURPOSES. COORDINATE WITH ECOLOGY PRIOR TO CHANGE IN PROPERTY OWNERSHIP OR LAND USE CONCERNING THE NEED FOR REMEDIAL ACTIONS.*
- *ENSURE THAT WARNINGS ARE POSTED FOR WORKERS TO GUARD AGAINST EXPOSURE TO RESIDUAL PETROLEUM CONTAMINATED SOIL.*
- *IDENTIFY REMAINING AREAS OF CONCERN ON FACILITY MAPS AND SPECIFY IN FACILITY EXCAVATION PERMIT INSTRUCTION.*
- ENSURE NO PRODUCTION WELLS ARE INSTALLED AND GROUNDWATER IS NOT USED EXCEPT FOR MONITORING AND/OR REMEDIATION.
- PROTECT EXISTING MONITORING WELLS UNTIL FORMALLY ABANDONED.
- ENSURE THAT THERE HAS BEEN NO UNAUTHORIZED SOIL EXCAVATION OR DISTURBANCE.
- ENSURE THAT ANY SOIL EXCAVATED FROM THE SITE IS PROPERLY CHARACTERIZED AND DISPOSED OFF-SITE AND THAT ON-SITE WORKERS ARE PROTECTED DURING SUCH ACTIVITIES.

NOTE: LUCs THAT ARE ITALICIZED ARE REQUIRED LUCs FROM THE NFA LETTER.

LUC INSPECTION ACTIONS

HAS SITE OR ADJACENT LAND USE CHANGED SINCE LAST INSPECTION? ☐ YES ☒ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
☒ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____

FINDINGS:
Industrial land use

DO FACILITY MAPS IDENTIFY REMAINING AREAS OF CONCERN? ☒ YES ☐ NO

DESCRIBE:
Contractor Environmental & Safety Gui

DOES THE FACILITY EXCAVATION PERMIT INSTRUCTION SPECIFY REMAINING AREAS OF CONCERN? ☒ YES ☐ NO

DESCRIBE:
Contractor Environmental & Safety Gui

IS THERE VISUAL EVIDENCE OF UNAUTHORIZED ON-SITE WELL INSTALLATION OR GROUNDWATER USE? ☐ YES ☒ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
☒ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____
☐ WELL INSPECTIONS

FINDINGS:
☐ SEE WELL INSPECTION LOGS
☐ OTHER _____

ARE ALL MONITORING WELLS IN GOOD CONDITION AND ACCESSIBLE? (REFER TO COMPLETED MONITORING WELL INSPECTION CHECKLISTS) ☒ YES ☐ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
☒ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____
☒ WELL INSPECTIONS

FINDINGS:
☒ SEE WELL INSPECTION LOGS
☐ OTHER _____

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF SOIL EXCAVATION OR DISTURBANCE? IF SO, DETERMINE IF SITE APPROVAL PROCESS HAS BEEN FOLLOWED. ☐ YES ☒ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
☒ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____

FINDINGS:

PAGE 1 OF 2

NBK Manchester
Site 304 - Industrial Area
Naval Facilities Engineering Command Northwest

LUCs INSPECTION CHECKLIST (CONTINUED)

HAS ACCESS CONTROL BEEN MAINTAINED? ■ YES ☐ NO, EXPLAIN _____

SECURITY POC: _____

IS SIGNAGE READABLE AND ADEQUATE? ■ YES ☐ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: _____

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs See Appendix E

ADDITIONAL NOTES:

The previously observed trenching adjacent to building B217 has since been backfilled and re-vegetated.

Monitoring well MW-4 remains covered by a pallet, as stated on the well inspection form.

The area in the northeast portion of the site is no longer used as a construction laydown area; it was in-use for parking at the time of the inspections. The area north of the site previously used for construction laydown was observed to be cleared of equipment and construction materials, partially re-vegetated, and a silt fence was installed.

I CERTIFY THAT THE CONDITIONS OF THE AREA ON THE INSPECTION DATES(S) WERE AS REPORTED ABOVE.

INSPECTOR SIGNATURE: Foster, Chelsea (USCF715440) Digitally signed by Foster, Chelsea (USCF715440) Date: 2024.06.06 14:19:58 -07'00'

DATE: 06/05/2024

NBK Manchester
Tank 50 Release Site
Naval Facilities Engineering Command Northwest

LAND USE CONTROLS (LUCs) INSPECTION CHECKLIST

DATE(S) (MM|DD|YY):
06/05/2024

INSPECTOR(S):	COMPANY:
C. Foster, S. Fetters	Liberty JV

LUCs

- *ENSURE THAT WARNINGS ARE POSTED FOR WORKERS TO GUARD AGAINST EXPOSURE TO RESIDUAL PETROLEUM CONTAMINATED SOIL.*
- *IDENTIFY REMAINING AREAS OF CONCERN ON FACILITY MAPS AND SPECIFY IN FACILITY EXCAVATION PERMIT INSTRUCTION.*
- ENSURE THAT LAND USE REMAINS FOR INDUSTRIAL PURPOSES. COORDINATE WITH ECOLOGY PRIOR TO CHANGE IN PROPERTY OWNERSHIP OR LAND USE CONCERNING THE NEED FOR REMEDIAL ACTIONS.
- ENSURE NO PRODUCTION WELLS ARE INSTALLED AND GROUNDWATER IS NOT USED EXCEPT FOR MONITORING AND/OR REMEDIATION.
- PROTECT EXISTING MONITORING WELLS UNTIL FORMALLY ABANDONED.
- ENSURE THAT THERE HAS BEEN NO UNAUTHORIZED SOIL EXCAVATION OR DISTURBANCE.
- ENSURE THAT ANY SOIL EXCAVATED FROM THE SITE IS PROPERLY CHARACTERIZED AND DISPOSED OFF-SITE AND THAT ON-SITE WORKERS ARE PROTECTED DURING SUCH ACTIVITIES.

NOTE: LUCs THAT ARE ITALICIZED ARE REQUIRED LUCs FROM THE NFA LETTER.

LUC INSPECTION ACTION

HAS SITE OR ADJACENT LAND USE CHANGED SINCE LAST INSPECTION? ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: Industrial land use

DO FACILITY MAPS IDENTIFY REMAINING AREAS OF CONCERN? ■ YES ☐ NO

DESCRIBE: Contractor Environmental & Safety Guide

DOES THE FACILITY EXCAVATION PERMIT INSTRUCTION SPECIFY REMAINING AREAS OF CONCERN? ■ YES ☐ NO

DESCRIBE: Contractor Environmental & Safety Guide

IS THERE VISUAL EVIDENCE OF UNAUTHORIZED ON-SITE WELL INSTALLATION OR GROUNDWATER USE? ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____
☐ WELL INSPECTIONS

FINDINGS:
☐ SEE WELL INSPECTION LOGS
☐ OTHER _____

ARE ALL MONITORING WELLS IN GOOD CONDITION AND ACCESSIBLE? (REFER TO COMPLETED MONITORING WELL INSPECTION CHECKLISTS) ■ YES ☐ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____
■ WELL INSPECTIONS

FINDINGS:
■ SEE WELL INSPECTION LOGS
☐ OTHER _____

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF SOIL EXCAVATION OR DISTURBANCE? IF SO, DETERMINE IF SITE APPROVAL PROCESS HAS BEEN FOLLOWED. ☐ YES ■ NO

INSPECTION PERFORMED? (CHECK ALL THAT APPLY)
■ SITE WALK ☐ INTERVIEW W/_____
☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: _____

NBK Manchester
Tank 50 Release Site
Naval Facilities Engineering Command Northwest

LUCs INSPECTION CHECKLIST (CONTINUED)

IS THERE VISUAL OR ADMINISTRATIVE EVIDENCE OF THE UNAUTHORIZED PLACEMENT EXCESS SOIL, FILL, OR SEDIMENT FROM ANOTHER LOCATION? ☐ YES ■ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: _____

HAS ACCESS CONTROL BEEN MAINTAINED? ■ YES ☐ NO, EXPLAIN _____

SECURITY POC: _____

IS SIGNAGE READABLE AND ADEQUATE? ■ YES ☐ NO ☐ NA

INSPECTION PERFORMED? (CHECK ALL THAT APPLY) ■ SITE WALK ☐ INTERVIEW W/_____ ☐ SECURITY CHECK ☐ OTHER _____

FINDINGS: _____

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs See AppendixE

ADDITIONAL NOTES:

The addition of a construction office trailer with fencing surrounding the structure was noted during the 2024 inspection.

I CERTIFY THAT THE CONDITIONS OF THE AREA ON THE INSPECTION DATES(S) WERE AS REPORTED ABOVE.

INSPECTOR SIGNATURE: Foster, Chelsea (USCF715440) Digitally signed by Foster, Chelsea (USCF715440) Date: 2024.06.06 14:20:14 -07'00'

DATE: 06/05/2024

PAGE 2 OF 2

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	13:24	Sunny, 68 degrees fahrenheit

INSPECTOR:	COMPANY:
C. Foster	Liberty JV

SITE:	DESCRIPTION:
303	D-Tunnel Tanks

WELL ID:	NORTHING:	EASTING:
MW-1, North of Tank 30	64612.007	371179.515

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ☐ YES ■ NO

IS THE MONUMENT IN GOOD CONDITION? ■ YES ☐ NO

TYPE OF WELL CASING: ☐ STICK-UP ■ FLUSH-MOUNT ☐ OTHER _____

SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: not observable

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs: See Appendix E; 1324

MONITORING WELL MONUMENT CAP OPENED? ☐ YES ■ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ☐ 2" ☐ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ☐ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ☐ YES ☐ NO

TYPE OF CAP:
☐ PVC SLIP CAP
☐ J-PLUG
☐ EXPANSION
☐ PRODUCTION W/TUBING
☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ☐ NO

ARE THERE ANY ODORS? ☐ YES ☐ NO

IF YES, DESCRIBE ODOR:
☐ SOLVENT
☐ SULFIDE/ROTTEN EGGS
☐ PETROLEUM
☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ☐ NO

PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS Monitoring well located visually but is behind a fence with a locked gate (8-A). Well monument is rusted with moss growing around it.

GENERAL CONDITION (CHECK ONE):
☐ GOOD CONDITION
■ MODERATE CONDITION
☐ POOR CONDITION

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	13:15	Sunny, 64 degrees fahrenheit

INSPECTOR:	COMPANY:
C.Foster	Liberty JV

SITE:	DESCRIPTION:
303	D-Tunnel Tanks

WELL ID:	NORTHING:	EASTING:
MW-3, North of Tank 30	64625.423	371219.950

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ■ YES ☐ NO

IS THE MONUMENT IN GOOD CONDITION? ■ YES ☐ NO

TYPE OF WELL CASING: ☐ STICK-UP ■ FLUSH-MOUNT ☐ OTHER _____

SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: 9/16" x 2 bolts

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs: See Appendix E

MONITORING WELL MONUMENT CAP OPENED? ■ YES ☐ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ☐ 2" ■ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ■ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ■ YES ☐ NO

TYPE OF CAP:
- ☐ PVC SLIP CAP
- ☐ J-PLUG
- ■ EXPANSION
- ☐ PRODUCTION W/TUBING
- ☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ■ NO

ARE THERE ANY ODORS? ☐ YES ■ NO

IF YES, DESCRIBE ODOR:
- ☐ SOLVENT
- ☐ SULFIDE/ROTTEN EGGS
- ☐ PETROLEUM
- ☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ■ NO

PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS

GENERAL CONDITION (CHECK ONE):
- ■ GOOD CONDITION
- ☐ MODERATE CONDITION
- ☐ POOR CONDITION

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	12:50	Sunny, 64 degrees fahrenheit

INSPECTOR:	COMPANY:
C. Foster	Liberty JV

SITE:	DESCRIPTION:
303	D-Tunnel Tanks

WELL ID:	NORTHING:	EASTING:
MW-1, South of Tank 24	64013.946	371485.35

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ☐ YES ■ NO

IS THE MONUMENT IN GOOD CONDITION? ☐ YES ■ NO

TYPE OF WELL CASING: ☐ STICK-UP ■ FLUSH-MOUNT ☐ OTHER _____

SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: 9/16" x 3 bolts

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs: See Appendix E; 1250

MONITORING WELL MONUMENT CAP OPENED? ■ YES ☐ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ■ 2" ☐ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ■ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ■ YES ☐ NO

TYPE OF CAP:
- ☐ PVC SLIP CAP
- ☐ J-PLUG
- ■ EXPANSION
- ☐ PRODUCTION W/TUBING
- ☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ■ NO

ARE THERE ANY ODORS? ☐ YES ■ NO

IF YES, DESCRIBE ODOR:
- ☐ SOLVENT
- ☐ SULFIDE/ROTTEN EGGS
- ☐ PETROLEUM
- ☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ■ NO

PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS Monument apron cracked, outer and inner casing appear to be in good condition

GENERAL CONDITION (CHECK ONE):
- ☐ GOOD CONDITION
- ■ MODERATE CONDITION
- ☐ POOR CONDITION

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	15:10	Sunny, 68 degrees fahrenheit

INSPECTOR:	COMPANY:
C.Foster	Liberty JV

SITE:	DESCRIPTION:
304	Industrial Area

WELL ID:	NORTHING:	EASTING:
MW-1	64019.596	371750.902

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ☐ YES ■ NO

IS THE MONUMENT IN GOOD CONDITION? ■ YES ☐ NO

TYPE OF WELL CASING: ☐ STICK-UP ■ FLUSH-MOUNT ☐ OTHER _____

SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: 9/16" X 3 bolts

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs: See Appendix E; 1509

MONITORING WELL MONUMENT CAP OPENED? ☐ YES ■ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ☐ 2" ☐ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ☐ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ☐ YES ☐ NO

TYPE OF CAP:
☐ PVC SLIP CAP
☐ J-PLUG
☐ EXPANSION
☐ PRODUCTION W/TUBING
☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ☐ NO

ARE THERE ANY ODORS? ☐ YES ☐ NO

IF YES, DESCRIBE ODOR:
☐ SOLVENT
☐ SULFIDE/ROTTEN EGGS
☐ PETROLEUM
☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ☐ NO

PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS Maintenance to monument lid seal may be appropriate.

GENERAL CONDITION (CHECK ONE):
☐ GOOD CONDITION
■ MODERATE CONDITION
☐ POOR CONDITION

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	14:56	Sunny, 68 degrees fahrenheit

INSPECTOR:	COMPANY:
C. Foster	Liberty JV

SITE:	DESCRIPTION:
304	Industrial Area

WELL ID:	NORTHING:	EASTING:
MW-2	64106.184	371804.246

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ☐ YES ■ NO

IS THE MONUMENT IN GOOD CONDITION? ■ YES ☐ NO

TYPE OF WELL CASING: ☐ STICK-UP ■ FLUSH-MOUNT ☐ OTHER _____

SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: 3/4" x 2 bolts

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs: See Appendix E; 1456

MONITORING WELL MONUMENT CAP OPENED? ■ YES ☐ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ■ 2" ☐ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ■ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ■ YES ☐ NO

TYPE OF CAP:
- ☐ PVC SLIP CAP
- ☐ J-PLUG
- ■ EXPANSION
- ☐ PRODUCTION W/TUBING
- ☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ■ NO

ARE THERE ANY ODORS? ☐ YES ■ NO

IF YES, DESCRIBE ODOR:
- ☐ SOLVENT
- ☐ SULFIDE/ROTTEN EGGS
- ☐ PETROLEUM
- ☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ■ NO

PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS

GENERAL CONDITION (CHECK ONE):
- ■ GOOD CONDITION
- ☐ MODERATE CONDITION
- ☐ POOR CONDITION

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	14:49	Sunny, 68 degrees fahrenheit

INSPECTOR:	COMPANY:
C. Foster	Liberty JV

SITE:	DESCRIPTION:
304	Industrial Area

WELL ID:	NORTHING:	EASTING:
MW-4	64054.635	371808.329

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ☐ YES ■ NO

IS THE MONUMENT IN GOOD CONDITION? ■ YES ☐ NO

TYPE OF WELL CASING: ☐ STICK-UP ■ FLUSH-MOUNT ☐ OTHER _____

SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: _____

WERE PICTURES TAKEN? ■ YES ☐ NO

PHOTO IDs: See Appendix E; 1449

MONITORING WELL MONUMENT CAP OPENED? ☐ YES ■ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ☐ 2" ☐ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ☐ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ☐ YES ☐ NO

TYPE OF CAP:
☐ PVC SLIP CAP
☐ J-PLUG
☐ EXPANSION
☐ PRODUCTION W/TUBING
☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ☐ NO

ARE THERE ANY ODORS? ☐ YES ☐ NO

IF YES, DESCRIBE ODOR:
☐ SOLVENT
☐ SULFIDE/ROTTEN EGGS
☐ PETROLEUM
☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ☐ NO

PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS Groundwater Monitoring well MW-4 was located, but not opened. Well monument covered by pallets and materials.

GENERAL CONDITION (CHECK ONE):
☐ GOOD CONDITION
■ MODERATE CONDITION
☐ POOR CONDITION

Naval Base Kitsap Manchester, Kitsap County, WA
Naval Facilities Engineering Systems Command Northwest

MONITORING WELL CHECKLIST FOR LUC INSPECTION

DATE (MM|DD|YY):	TIME (HH:MM):	WEATHER/TEMPERATURE:
06/05/2024	0846	Partly cloudy, 58 degrees fahrenheit

INSPECTOR:	COMPANY:
C. Foster	Liberty JV

SITE:	DESCRIPTION:
Tank 50	Release Site

WELL ID:	NORTHING:	EASTING:
MW-1	64407.051	370946.014

Part 1: TYPE OF MONITORING WELL AND MONUMENT CONDITION

TYPE OF MONITORING WELL: ■ GROUNDWATER ☐ SOIL VAPOR

MONITORING WELL LOCATED? ■ YES ☐ NO

IS THE WELL CLEARLY LABELED? ■ YES ☐ NO

IS THE MONUMENT IN GOOD CONDITION? ■ YES ☐ NO

TYPE OF WELL CASING: ■ STICK-UP ☐ FLUSH-MOUNT ☐ OTHER _____ SIZE & NUMBER OF BOLTS ON FLUSH-MOUNT LID: _____

WERE PICTURES TAKEN? ■ YES ☐ NO PHOTO IDs: See Appendix E

MONITORING WELL MONUMENT CAP OPENED? ☐ YES ■ NO (IF NO, SKIP TO PART 3)

Part 2: MONITORING WELL CONDITION

CASING DIAMETER ☐ 2" ☐ 4" ☐ 6" ☐ 8" OTHER _____

IS THE CASING IN GOOD CONDITION? ☐ YES ☐ NO

IS THERE A CAP ON THE MONITORING WELL? ☐ YES ☐ NO

TYPE OF CAP:
☐ PVC SLIP CAP
☐ J-PLUG
☐ EXPANSION
☐ PRODUCTION W/TUBING
☐ OTHER _____

IS THERE ANY EVIDENCE OF TAMPERING WITH THE WELL CASING OR CAP? ☐ YES ☐ NO

ARE THERE ANY ODORS? ☐ YES ☐ NO

IF YES, DESCRIBE ODOR:
☐ SOLVENT
☐ SULFIDE/ROTTEN EGGS
☐ PETROLEUM
☐ OTHER _____

WERE PICTURES TAKEN? ☐ YES ☐ NO PHOTO IDs: _____

Part 3: ADDITIONAL NOTES OR COMMENTS Well contains a lock (brass, 1-inch shank) on the stove top monument.

GENERAL CONDITION (CHECK ONE):
■ GOOD CONDITION
☐ MODERATE CONDITION
☐ POOR CONDITION

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Appendix E:
Regulatory Concurrence and Response to Comments

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Comments by: Ecology (B. Chaudhary, J. Morman, K. Reed); ***Per Shawn Blocker on 10/16/2024: "The Tribe concurs with Ecology's comments"***
Comments Received: October 15, 2024

#	Doc/Para No.	Comment (10/15/2024)	Navy Comment Response (10/25/2024)	10/28/24 Discussion notes
1.	Table ES-1	Ecology does not agree with the Navy's protectiveness statements in this table. We believe with the discovery of PFAS compounds on site that the protectiveness statements for sites 302, 303, 304, and Tank 50 should be changed to short term protective given the emerging contaminant (PFAS) found within the sites and the remaining ICs that are in place for the sites. We believe that the ICs on site are reducing the risk for PFAS exposure and therefore used short term as opposed to not protective. In addition to PFAS, Site 302 has some outstanding conformational sampling in the sediments in Little Clam Bay that have not been addressed. According to Site 302 PCB Data Gaps Study Technical Memorandum (Liberty JV, 2022), the contractor suggested, and Ecology agrees, that the Navy should confirm the sediments are indeed clean and continue to be clean. As well as additional fencing that still needs to be repaired for the required ICs.	For Site 302, the Site Inspection (SI) concluded PFAS were not present at concentrations warranting further investigation, and no further investigation was recommended. In addition, the 2022 PCB Data Gaps Study concluded that "…the remedy at Site 302 remains protective of human health and the environment…" and the reasons cited for this conclusion are listed in Table ES-1. Based on this and the NFA status of the site, Navy has determined that the protective statement remains "Protective" and additional sampling is not needed. For Site 303, the Preliminary Assessment recommended No further action (NFA) for PFAS was for site. The protective statement remains "Protective." For Site 304 (Building 12 specifically), the Human Health Risk Screening (HHRS) conducted as part of the SI did not identify any PFAS as COPCs in soil. However, PFAS were identified as COPCs in groundwater indicating potential unacceptable human health risks at Building 12. Therefore, based on the presence of PFAS in groundwater, the protectiveness statement has been revised to "Short-term Protective." For Tank 50, although the HHRS did not identify any PFAS as COPCs in soil or groundwater, however due to the uncertainty presented by the pending remedial investigation, the protectiveness statement has been revised to "Short-term Protective."	Site 302 will be Short Term Protective based on Little Clam Bay and Fencing repair and PFAS. Site 303 will be Short Term Protective based on vicinity of Building 85 and PFAS. Concur with Site 304. Tank 50 will be considered Short Term Protective due to the upcoming investigation at Building 185. Sites 305 & 306 were developed for PFAS only, which includes Sites 303 and 304 within Site 305 and Tank 50 within Site 306.

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2.	Table 3-2	In last 5 year review Ecology commented a statement "1) In accordance with the 2013 update to the Sediment Management Standards (SMS) in WAC 173-204, protection of human health and higher trophic organisms must be considered when establishing sediment cleanup standards for bioaccumulative COCs (e.g., PCBs). Only benthic communities were previously considered when establishing/reviewing sediment cleanup standards. 2) Historical PCB detection limits were above both historical and current Washington State and ambient water quality criteria for aquatic and human health. Therefore, the absence of PCBs above its cleanup standard in surface water has not been verified." The Navy Response is "Completed. A PCB Data Gaps Study (Liberty JV, 2022) included an evaluation of ARARs and an updated CSM was completed. The report concluded that the historical analytical results do not provide a low enough detection limit for comparison of PCB concentrations in surface water and sediment to currently applicable screening and regulatory criteria for protection of human health, and recommended additional sediment and water sampling if this pathway could become complete in the future. Navy has determined additional sampling is not needed at this time because the remedy remains protective, and the pathway is incomplete." The determination for no additional samples is in direct contradiction of the recommendation of the PCB Data Gaps Study. The study recommends collecting samples for several reasons. First, the existing sampling does not show the remedy is protective under current Ecology Marine SQS. The existing samples are PCB Arochlors which are no longer used in SQS. Samples analyzed for PCB congener should be used instead. Second, the tribe has stated they may use Little Clam Bay in the future which completes the pathway for human health. Samples at the site have not been evaluated for protection of human health.	Please see the response to comment #1. The PCB Data Gap Study cited indicated that there were several lines of evidence indicating that the remedy remains protective.	ECY doesn't agree. Historical data. Surface water can come from off base due to size of Little Clam Bay. LUC with surface cap at Site 302. ECY thinks ST protective is needed. Sampling would confirm. Team agrees to disagree. **Short Term Protective is acceptable to the Navy**. ECY still wants to see sampling at Little Clam Bay. Tribe states that ECY could rescind NFA. ECY doesn't want to go that direction at this point.

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3.	Sec. 3.3	Please include off-base drinking water wells sampling activities conducted during this FYR period due to on-site PFAS contaminations. Provide a brief description on evaluating drinking water wells samples results and explain effects on those evaluations due to the recently promulgated MCLs. Ecology believes that Navy needs to consider the MCLs in terms of additional investigations and protectiveness determinations.	The following text has been added to Section 3.3 regarding off-base drinking water well sampling: "*Drinking water at NBK Manchester is currently supplied by the Manchester Water District (MWD), and the MWD supply wells are upgradient of NBK Manchester. As part of the Third Unregulated Contaminant Monitoring Rule, untreated drinking water was tested for PFAS at MWD wells (USEPA, 2017). Drinking water was also tested at the point on NBK Manchester where it ties-in to MWD and at two on-base buildings. PFAS were not detected in the drinking water samples (CH2M, 2023).*" Navy does not concur with use of MCLs. The purpose of a FYR is to discuss the response action with respect to the contaminants of concern in the ROD. PFAS were not a part of the decision documents for NBK Manchester. PFAS (including the applicability of the MCLs) will be addressed through the CERCLA process and ultimately will be included in a ROD amendment or ESD, if warranted.	ECY agrees with language. **Tech Memo is available from Off site Drinking Water.**
4.	Sec. 3.3.2	Since the completion of PFAS site inspection (SI) report, Ecology has updated soil direct contact Method B levels for PFOA and PFOS, which are lower than the screening levels used in the SI report. Therefore, Ecology recommends identifying these changes and subsequent actions needed to address these changes. Ecology thinks that current remedies at sites (Site 302, 303, 304 and Tank 50) are only short-term protective because concentrations of one or more PFAS compounds in either soil or groundwater exceed(s) MTCA Method B levels or recently promulgated MCLs and some of these sites are moving to PFAS remedial investigations.	Updates to Method B levels will be addressed during the PFAS RI phase. See Response to Comment #1 regarding protectiveness statements.	Site 302 – no RI but will be Short Term Protective. Navy policy to Move sites to RI that are 3x the MCLs for drinking water. Site 302 levels were below. Additional investigation is needed.

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5.	Sec. 3.5	Additional sampling was suggested in reports in 2022 by the Navy's contractor and Ecology agreed that further sampling should be conducted to confirm levels in the sediment in Little Clam Bay. This was addressed as a future task, but a completion date was never set. The Navy concluded that levels were trending down and because of time and further sediment deposition that levels should be well below the CULs. Ecology wants to see this confirmed with further sampling in the Bay.	Please see the response to Comment #1.	See previous.
6.	Sec. 3.7	Date for this repair should be included here.	Per the last sentence of the paragraph on Page 3-12, "The field activities were conducted from February through June 2023 (EA Engineering, Science, and Technology, Inc., PBC, 2024)." However, after review of field documentation, this was an error. The text has been revised to indicate that fence repairs were conducted *on March 11, 2024*.	Concur.
7.	Sec. 4.2.2	Can Ecology get updates and documents related to the tank decommissioning's? Given that these are being removed from identified sites, Ecology should be receiving reports.	These activities are being performed through the State UST program and reporting has been submitted to Ecology through that program.	Concur.
8.	Table 5-1 Sec. 5.1	Question C for Site 302 should be "yes" as there is still a portion of the fence that is down.	Do not concur. Navy agrees that the fence requires repair, and the necessary repairs will be completed. However, the area is covered in heavy (blackberry) vegetation and remains inaccessible.	ECY – doesn't think it meets ICs. A functional fence should be in place. Navy – who else can be impacted? Area is remote and overgrown. Site 302 will be Short Term Protective and will be fixed in 2025.

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9.	Sec. 5.5.1 Pg 5-9	"Nevertheless, given current site conditions (i.e., effectiveness of the remedy based on post-closure monitoring results, land use remains industrial, no current use of Little Clam Bay for fishing or shellfishing (see Section 5.5.2), . . ." The Tribes are not using this area due to the lack of confirmation of contamination. This area could be used in the future and should be considered when making a statement of this nature. This sounds like the tribe is choosing to not use the area. The Navy addresses this fact on pg 5-30.	Please see Response to Comment #1.	See previous.
10.	Pg 5-10	This paragraph appears to be incomplete.	Text has been revised to remove the partial sentence.	Concur.
11.	Table 5-3	Sediment Cleanup Levels for Tank 24 at Site 303: Marsh sediment samples exceed the CSL for TPH-Diesel. This should be further investigated to ensure the current remedy is protective.	Do not concur. Ecology issued an NFA for Site 303 in 2001 (Ecology, 2001), stating that although petroleum hydrocarbon contamination continues to exist in upland soils, the monitoring of Site 303 demonstrated there is a lack of impact to marine sediments and marine surface water that would warrant sediment or groundwater remedial actions.	It's over the level but agreement was previously agreed upon. Page 5-20 Site 303, Tank 24 (paragraph 1).

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12.	Sec 5.5.2	Site 302: It is stated that "Given current site conditions (i.e., effectiveness of the remedy based on post-closure monitoring results, land use remains industrial, no current use of Little Clam Bay for fishing or shellfishing, and implementation of LUCs to prevent exposures) and the NFA letter issued by Ecology (2000), it is assumed that the remedy remains protective. Additional sediment and surface water sampling at Site 302 and/or along the western shoreline of Little Clam Bay is expected to confirm protectiveness of human health." What basis is used to state that sampling of Little Clam Bay is expected to confirm protectiveness of human health? Ecology is not aware of any human health analysis of this area in the past to back this statement. When is this testing going to occur?	The text in questions was inadvertently carried over from the prior FYR and has been revised to remove the following: "*Additional sediment and surface water sampling at Site 302 and/or along the western shoreline of Little Clam Bay is expected to confirm protectiveness of human health*."	Concur.
13.	Pg 5-31	Review of Ecological Exposure Assumptions: Navy states that the SQS is not protective of higher trophic organisms. This is partially preventing Tribes from their rights to this area for use. Until this is verified this is not considered protective.	Do not concur. The text states that the SQS may not be protective of higher trophic organisms where consumption of fish/shellfish is associated with a greater risk; however, given current site conditions, land use, implementation of LUCs and the NFA letter issued by Ecology (2000), the remedy remains protective.	See previous.
14.	Figure 1-3	Please show the extent of areas where excess soil removal occurred in 2023, direction of groundwater flow and surface water runoff.	Figure 1-3 has been revised to indicate the approximate extent of the soil stockpiles that were removed.	Concur.
15.	Figure 1-6	Show the location of the well in this figure that was found during inspection.	Figure 1-6 has been revised to indicate where MW-1 is located.	Concur.

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16.	Sec. 6.2	Ecology recommends identifying analytes in various matrices that have current MTCA values less than the remedial goal designated in the decision document and historical data indicate that the concentration of those analytes on different matrices are higher than current MTCA values. Also, provide recommendations for monitoring of those analytes to ensure that concentrations of those analytes in respective matrices are below current MTCA values.	The tables in Section 5 identify with color-coded cells if the current MTCA values are less than or the same as the remediation goal designated in the decision document. If the current MTCA is greater than the remediation goal, the cell does not contain a color. Do not concur. Due to the NFA at the sites at NBK Manchester, no additional monitoring will be conducted at this time.	Concur.
17.	Sec. 6.2	As per monitoring well inspection checklists, conditions of few monitoring wells are moderate. Please include necessary maintenances needed for these wells to prevent from potential migrations of surface contaminants if any into groundwater.	If recommendations for maintenance items are required, they are presented in the Land Use Control (LUC) Technical Memorandum. However, please note that bolts and gaskets that may need replacement are not LUC violations and are not considered a protectiveness concern.	Plug needs to be in good condition. Bolts can be replaced.
18.	Table 6-2	Affect Current Protectiveness should be "yes" until the fencing is repaired.	Do not concur. See Response to Comment #8.	See previous
19.	6.3	Identify IC breaches as issues that resulted in characterization and off-site removal of 196 dump truck loads from site 302. Also, provide recommendations for a proper implementation of ICs to prevent from such things happening again in future.	Per Section 3.4, the soil stockpiles were present in 2016 prior to the first LUC site inspection. The breaches have been resolved with the inception of LUC annual inspections.	Concur. Additionally, Navy has put lock on the gate.
20.	Table 7-1	All protectiveness statements, Site specific and site wide, should be "short term protective" given the LUCs that need repair and the sediment confirmation for Site 302, as well as the emerging PFAS contamination.	See Response to Comment #1.	See previous.

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21.	Table 7-1	Site 302: The protectiveness statement includes human health protectiveness when this is not backed up by the Data Gaps Study (Liberty JV, 2022). The report recommends additional sampling of Little Clam Bay which has not been performed. Additionally, it is stated that "land use has not changed since the RODs, nor is it expected to change" The tribe has stated that they may exercise their treaty rights to fish Little Clam Bay in the future. This is an expected land use change opening a fish consumption pathway.	See Response to Comment #1.	See previous.
22.	Appendix D	Appendix E is referenced for photos of monitoring wells as per monitoring wells checklist. But there are no photos in Appendix E. Please make correction for the references of photos taken during the inspection and provide those photographs on the respective appendix.	The reference to Appendix E is based on the LUC Technical Memo. The reference to Appendix E will be removed from the Checklist. All photos will be included in the 2024 LUC Technical Memorandum.	Concur.