RECORD OF DECISION

U.S. COAST GUARD BASE KETCHIKAN

KETCHIKAN, ALASKA

FINAL

JACOBS ENGINEERING GROUP INC.

RECORD OF DECISION

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FINAL

Prepared for:
U.S. Army Corps of Engineers &
U.S. Coast Guard
Civil Engineering Unit Juneau
Environmental Remediation
Project No: 33-J3905

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ACRONYMS AND ABBREVIATIONS

$\mu mol/g_{OC}$	micromoles per gram organic carbon
°F	degrees Fahrenheit
AAC	Alaska Administrative Code
ACL	alternative cleanup level
ADEC	Alaska Department of Environmental Conservation
AOC	area of concern
APDES	Alaska Pollutant Discharge Elimination System
ARAR	applicable or relevant and appropriate requirements
ATSDR	Agency for Toxic Substances and Disease Registry
AVS-SEM	acid-volatile sulfide-simultaneously extracted metals
bgs	below ground surface
BSU	Base Support Unit
BSY	Buoy Storage Yard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEU	Civil Engineering Unit
CFR	Code of Federal Regulations
COC	chemical of concern
COPC	chemical of potential concern
CSM	conceptual site model
cy	cubic yard
DERA	Defense Environmental Restoration Account
DPS	Distinct Population Segment
DU	decision unit
EPA	U.S. Environmental Protection Agency
ERE	Ecological Risk Evaluation
FFS	focused feasibility study
FRC	fast response cutter
g/g	grams per gram
GPS	global positioning system
HHE	human health and the environment
HSP	health and safety plan
IC	institutional control
IRIS	Integrated Risk Information System
LTM	long-term monitoring
LUC	land-use control

ACRONYMS AND ABBREVIATIONS (Continued)

mg/kg	milligrams per kilogram
MSGP	Multi-Sector General Permit
MT2	Metals Treatment Technologies, LLC
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
O&M	operations and maintenance
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SILC	Shore Infrastructure Logistics Center
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TCRA	time-critical removal action
TOC	total organic carbon
TSDF	treatment, storage, and disposal facility
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
UU/UE	unlimited use and unrestricted exposure
VOC	volatile organic compound

PART 1: DECLARATION

1.1 SITE NAME AND LOCATION

Facility Name:	USCG Base Ketchikan, Ketchikan, Alaska
Site Location:	Ketchikan, Alaska (Figure A-1)
Latitude and Longitude:	55°20'00"N and 131°37'30"W (horizontal datum WGS84)
CERCLIS ID No.:	AK8690360492
ADEC Contaminated Sites File ID No.:	1516.38.011
ADEC Contaminated Sites Hazard ID No.:	1184
Operable Unit/Site:	AOC 1 Soil at the Buoy Storage Yard AOC 2 Intertidal Sediment at the Inner Boathouse AOC 3 Intertidal Sediment at the Inner Marine Ways AOC 4 Subtidal Sediment near the Pier
Point of Contact:	ATTN: Environmental Services Division USCG Base Ketchikan 1300 Stedman St. Ketchikan, AK 99901 907-228-0308 Christa.A.Cichoski@uscg.mil

U.S. Coast Guard (USCG) Base Ketchikan is located on Revillagigedo Island, 1 mile southeast of downtown Ketchikan, Alaska (Figures A-1 and A-2) and is managed under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Four areas of concern (AOCs) were established in the Base Ketchikan focused feasibility study (FFS) based on location, medium, and historical data (U.S. Army Corps of Engineers [USACE] 2018).

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedies for four AOCs at Base Ketchikan. These remedies were chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, and, to the extent practicable, with the National Contingency Plan (NCP) (Title 40 of the Code of Federal Regulations [CFR], Part 300 et seq. [40 CFR 300 et seq.]). This ROD will become part of the Administrative Record

[NCP 300.825(a)(2)] for Base Ketchikan, which is located at the Ketchikan Public Library (for access to the FFS, Proposed Plan, and ROD) and Civil Engineering Unit (CEU) Juneau (for access to all documentation).

For Base Ketchikan, the U.S. Environmental Protection Agency (EPA) has delegated its CERCLA regulatory agency authority to the Alaska Department of Environmental Conservation (ADEC). ADEC concurs that, if properly implemented, the selected remedies for Base Ketchikan will comply with State of Alaska (the State) regulatory requirements.

1.3 ASSESSMENT OF SITE

The delineation of the AOCs was established using data collected from multiple historical investigations, principally the 2012 Supplemental Remedial Investigation (USACE 2013). Results indicate that CERCLA hazardous substances polychlorinated biphenyls (PCBs) and heavy metals (arsenic) are present above applicable ADEC cleanup levels in the soil at AOC 1 Buoy Storage Yard (BSY). CERCLA hazardous substances PCBs and heavy metals (arsenic, copper, lead, mercury, nickel, and zinc) are also present in sediment; however, Alaska has no established cleanup levels for contaminated sediment. Therefore, the *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b) was written and identifies risk-based cleanup levels for the soil and sediment for the AOCs.

The response actions selected in this ROD are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The USCG is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment (HHE).

1.4 DESCRIPTION OF THE SELECTED REMEDIES

Remedial alternatives for AOCs 1 through 4 were developed and evaluated in the FFS for USCG Base Ketchikan (USACE 2018) and presented in the *Proposed Plan* for USCG Base Ketchikan (USACE 2020).

As the lead agency, the USCG selected the following remedies based on regulator and support agency comments received during the development of the Proposed Plan:

- AOC 1 BSY: Alternative 5 (Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal)
- AOC 2 Inner Boathouse: Alternative 4 (Removal and Offsite Disposal)
- AOC 3 Inner Marine Ways: Alternative 3 (Limited Land-Based Excavation, Offsite Disposal, and Land Use Controls [LUCs])
- AOC 4 Subtidal Sediment: Alternative 2 (LUCs with Long-Term Monitoring [LTM])

If properly implemented, ADEC concurs that these remedies will be protective of HHE. The selected remedies will address source materials constituting principal threats (copper, lead, and zinc) at the site by either removing, treating, or preventing exposure to the contaminated media. Risks to HHE will be mitigated by reducing the overall metal concentration across the sediment AOCs to below the alternative cleanup levels (ACLs) or by demonstrating a reduction in bioavailability of metals across the cleanup target area leading to a calculated or predicted toxicity level of "likely not toxic." Toxicity predictions were calculated for the area using the methods presented in the toxicity study in the *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b).

The main components of the selected remedies are listed below. More specific details are provided in the discussions of the remedies in Sections 2.9.1.5, 2.9.2.3, 2.9.3.3, and 2.9.4.2.

AOC 1 BSY

- Excavating and disposing of contaminated soil containing PCBs in excess of 1.0 milligrams per kilogram (mg/kg)
- Transporting nonhazardous PCB-contaminated soil to a permitted Subtitle D landfill
- Collecting and analyzing confirmation samples from the excavation
- Mixing EcoBond with the remaining arsenic-contaminated soil in situ using an excavator to disturb the soil then mixing the media together
- Collecting post-treatment samples

- Conducting site inspections once a year for the first five years, then every five years thereafter, indefinitely or until determined to be no longer necessary during the five-year review process.
- Maintaining LUCs to limit access and prevent exposure
- Conducting CERCLA five-year reviews

AOC 2 Intertidal Sediment for the Inner Boathouse

- Excavating and disposing of contaminated sediment containing PCBs in excess of 1.0 mg/kg and metals above the project-specific ACLs
- Collecting confirmation sediment samples from the limits of excavation if sediment is present (i.e., confirmation samples will not be collected if the limit of excavation is bedrock)
- Excavating sediment using hand tools and manual labor due to the location of contamination and obstruction of piers and pilings
- Transporting excavated material and equipment using small pieces of equipment, such as a mini skid steer
- Conducting removal activities during low tide (temporary cover such as gravel or sandbags may be required to cover the exposed working area prior to the next tidal working window)
- Loading excavated sediment directly into 1 cubic yard (cy) dewatering filter bags, which would then be placed into 1-cy containment totes
- Sampling sediment and dewatered liquid for waste characterization and management

AOC 3 Intertidal Sediment for the Inner Marine Ways

- Excavating and disposing of contaminated sediment containing metals above the project-specific ACLs
- Collecting confirmation sediment samples from the excavation
- Conducting removal activities during low tide
- No sediment would be removed from below the low tide mark, which amounts to approximately 10 percent of the contaminated area
- Dewatering excavated sediment, either by being loaded directly into 1-cy dewatering filter bags, which would then be placed into 1-cy containment totes, or by being allowed to dewater within the working area prior to removal, then transported with a flocculent or similar method to ensure that no liquid leaks.
- Sampling sediment and dewatered liquid for waste characterization and management
- Maintaining LUCs to limit access and prevent exposure
- Conducting CERCLA five-year reviews

AOC 4 Subtidal Sediment Near the Pier

- Maintaining LUCs to restrict invasive activities and protect human health from exposure (LUCs would include controlled access, signage, and limitations on future in-water and in-sediment development [e.g., pier construction, demolition, maintenance, etc.] with potential to disturb the contaminated sediment)
- Conducting LTM to inspect site conditions and monitor contaminant levels no less often than once every five years, unless determined to be no longer necessary during the five-year review process
- Conducting LTM including collection of four subtidal sediment samples in the AOC along the pier to ensure that contaminants are stabilized
- Conducting CERCLA five-year reviews

1.5 STATUTORY DETERMINATIONS

The selected remedies are protective of HHE, comply with federal and state requirements that are applicable or relevant and appropriate to the remedial action, are cost-effective, and use permanent solutions and alternative treatment technologies to the maximum extent practicable. The selected remedies for AOCs 1 through 4 satisfy the statutory requirements of CERCLA and the NCP. The NCP establishes the expectation that treatment will be used to address the contaminants posed by a site whenever practicable, as specified in 40 CFR 300.430(f)(5)(ii)(F). The remedy for AOC 1 partially satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment) by treating arsenic-rich soil in situ. The PCB removal step of the selected remedy for AOC 1 BSY would not satisfy the statutory preference for treatment of contaminated material. The selected remedies for AOCs 2 through 4 do not satisfy the statutory preference for treatment as a principal element of the remedies because they will not permanently or significantly reduce the toxicity, mobility, or volume of chemicals of concern (COCs).

Because the selected remedies for AOCs 1, 3, and 4 will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure (UU/UE), a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedies are, or will be, protective of HHE.

Because the remedy for AOC 2 will not result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for UU/UE, a five-year review will not be required for this remedial action.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary located in Part 2.0 of this ROD:

- The COCs and their respective concentrations (Sections 2.5.7, 2.5.8, 2.5.9, 2.5.10 and Tables 2-4 through 2-7)
- Baseline human health and ecological risk evaluation represented by the COCs (Section 2.7)
- Cleanup levels established for the COCs and the basis for the selection (Section 2.8; Tables 2-17 and 2-18)
- How source materials constituting principal threat wastes are addressed (Section 2.11)
- Current and reasonably anticipated future land-use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 2.6)
- Potential land and surface water use that will be available at the site as a result of the selected remedy (Sections 2.6.1, 2.6.2, and 2.12.4)
- Estimated capital, operations and maintenance (O&M), total costs, and the number of years over which the remedy cost estimates are projected (Sections 2.10.7 and 2.12.3; Tables 2-15 and 2-16)
- Key factors that led to selecting the remedy, including a description of how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision (Sections 2.10 and 2.12)

Additional information can be found in files for this site kept at CEU Juneau, Alaska.

1.7 AUTHORIZING SIGNATURES

This signature sheet documents the U.S. Coast Guard approval of the remedies selected in this Record of Decision for AOC 1 Buoy Storage Yard, AOC 2 Sediment at the Inner Boathouse, AOC 3 Sediment at the Inner Marine Ways, and AOC 4 Subtidal Sediment at Base Ketchikan, Alaska.

By signing this declaration, the Alaska Department of Environmental Conservation concurs that proper implementation of the selected remedies for AOC 1 Buoy Storage Yard, AOC 2 Sediment at the Inner Boathouse, AOC 3 Sediment at the Inner Marine Ways, and AOC 4 Subtidal Sediment will comply with state environmental laws. These decisions will be reviewed and may be modified in the future if information becomes available that indicates the presence of contaminants or exposures that may cause unacceptable risk to human health or the environment.

RUMSEY.NATHAN.L.1150498518 Digitally signed by RUMSEY.NATHAN.L.1150498518 Date: 2021.04.05 16:22:59 -08'00'

04/05/2021

Nathan L. Rumsey, Commanding Officer
U.S. Coast Guard Civil Engineering Unit Juneau

Date

DocuSigned by:
Stephanie Buss
AC4B4435043402...

6/16/2021

Stephanie Buss, Program Manager
Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

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PART 2: DECISION SUMMARY

This section summarizes previous investigations that support and identify remedy selection and explains how the remedy fulfills statutory and regulatory requirements.

2.1 SITE NAME, LOCATION, AND DESCRIPTION

The Base Ketchikan installation is located on Revillagigedo Island approximately 1 mile southeast of the City of Ketchikan (Population: 8,050, from the 2010 census) and 1.5 miles northwest of the City of Saxman (Figure A-1). Base Ketchikan consists of 71 acres of land on the southeastern coast of Alaska in the Tongass National Forest.

Table 2-1
Project Information

Facility:	USCG Base Ketchikan, Alaska
Site Location:	1 mile southeast of Ketchikan, Alaska Section 29; Township 75S, Range 91E Copper River Meridian
Latitude and Longitude:	55°20'00"N and 131°37'30"W
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) ID Number:	AK8690360492
Alaska Department of Environmental Conservation Contaminated Sites Hazard ID Number	1184
Operable Unit/Site:	AOC 1 Soil at the Buoy Storage Yard AOC 2 Intertidal Sediment at the Inner Boathouse AOC 3 Intertidal Sediment at the Inner Marine Ways AOC 4 Subtidal Sediment near the Pier
Point of Contact:	Environmental Services Division USCG Base Ketchikan 1300 Stedman St. Ketchikan, AK 99901 907-228-0308 Christa.A.Cichoski@uscg.mil

The USCG is issuing this ROD under its authority as the CERCLA lead agency. This ROD is issued in accordance with and satisfies requirements of the Environmental Compliance and Restoration Program (Title 14 of U.S. Code [USC] §§318 et seq. [14 USC 318 et seq.]); CERCLA (42 USC 9601 et seq.); and Executive Order 12580.

As the regulatory support agency, ADEC provides primary oversight of the environmental restoration actions in accordance with State of Alaska contaminated site regulations as specified in Title 18 of the Alaska Administrative Code (AAC), Section 75, Article 3 (18 AAC 75.3) (ADEC 2018).

The four AOCs to be targeted for remediation were defined in 2017 in a *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b). The document described the state of the soil and sediment contamination at the site and correlated marine toxicity studies to bulk sediment contaminant concentrations in order to delineate the AOCs to be targeted for future remedial analysis (Figure A-4). The analysis described in this memorandum focused on remedial actions for the following AOCs: soil within the BSY, sediment within the Inner Boathouse, sediment in the Inner Marine Ways, and a limited area of subtidal (or subaqueous) sediment near the pier and outer boathouse.

AOC 1 BSY is in an industrial area (Figure A-5). The USCG stores and maintains between 30 and 70 buoys at the site at any given time. AOC 2 Inner Boathouse is located in the northern portion of Base Ketchikan underneath the boathouse and north shops area (Figure A-6). These buildings are raised above the intertidal zone on piles and outcropping bedrock, creating a pier structure. AOC 3 Inner Marine Ways is an area of intertidal sediment, as well as a small volume of subtidal sediment surrounding the marine railways to the southeast of the USCG station (Figure A-7). This area of the base is currently used for maintenance activities; vessels are transported to the dry/elevated dock area using the railway, then elevated for maintenance activities within the marine ways shed. AOC 4 subtidal sediment is approximately 430 by 100 feet, located to the west/southwest of the pier and the outer boathouse in a portion of the Tongass Narrows (Figure A-8).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Base Ketchikan was established as an Aid to Navigation in Alaska in 1910. Prior to the 1940s, Base Ketchikan operated as part of the Lighthouse Service at Lighthouse Depot, Ketchikan, Alaska. The main purpose of the facility prior to the 1940s was to build pilings for acetylene lamps used for navigation in the Tongass Narrows. After the acetylene lamps were replaced with electric- and battery-powered alternatives during the 1920s and 1930s, the facility was repurposed for maintenance of navigational aids and vessels. From 1941 to 1945, Base Ketchikan served as a World War II Support Depot and from 1946 to present day, post-war operations have continued.

Base Ketchikan has undergone several name changes since it was established. From 1980 to 1995, it was known as Base Ketchikan. In 1995, it became Integrated Support Command Ketchikan but was renamed Base Support Unit (BSU) Ketchikan in 2007. In 2012, it was re-established as Base Ketchikan and remains as such today.

Currently, Base Ketchikan consists of the Lower Base and Upper Base divided lengthwise by the South Tongass Highway. The Upper Base is located inland and consists mainly of residential and support facilities. The primary purpose of Base Ketchikan is maintenance (sandblasting and painting) of all District 17 aids to navigation and vessels that range from 41 to 110 feet in length. Base Ketchikan also provides support to all USCG units in central and Southeast Alaska. The extent of future maintenance activities in this area depends on future USCG missions and other factors, such as deployment of larger Fast Response Cutters (FRCs); however, the current industrial usage and USCG presence at Base Ketchikan is anticipated to remain into the foreseeable future.

Since 1988, numerous remedial and investigative activities have been performed at Base Ketchikan. The area was first investigated due to concerns about debris from sandblasting and maintenance activities and rumored waste dumping. In the late 1980s, metals were identified as a preliminary COC in sediment, and piles of debris were removed from the seafloor around the facility. In the decades following, several on-land soil investigations and removal actions

were conducted. Further details of time-critical removal actions (TCRAs) and investigation activities can be found in the reports referenced in Section 2.5.6.

There have been no enforcement activities or notices of violation at Base Ketchikan related to AOCs 1 through 4 to date, as confirmed by a search of the EPA Environmental Compliance and History Online (ECHO) database; however, LUCs that include institutional controls (ICs) were established at the USCG Ketchikan marine ways in 2013. ICs are already in place at Base Ketchikan and are documented in a 2013 letter from the USCG CEU to Base Ketchikan (USCG 2013). The ICs applicable to the marine ways include the following:

- Maintain the current signage stating that harvest of marine organisms is not permitted.
- Communicate to the primary and tenant commands that no harvesting is allowed except migratory fish.
- Maintain records with Shore Infrastructure Logistics Center (SILC) Real Property and within the master planning documents that will notify the planners of environmental concerns in the area to be addressed prior to development.
- Do not disturb soils or sediment without written approval from ADEC.

In addition to the currently implemented ICs, Base Ketchikan has an ADEC-approved long-term maintenance plan for removal of accumulated marine sediment from around rails and footings at the marine ways site. The *Long-Term Maintenances Sediment Removal Work Plan* (USCG 2017) was developed to ensure continued safe operation of the railway by mitigating hazards associated accumulated sediment while maintaining compliance with ADEC.

2.3 COMMUNITY PARTICIPATION

NCP §300.430(f)(3) requires the lead agency to conduct a number of public participation activities following preparation of the Proposed Plan and review by the regulatory agency. In accordance with NCP requirements, USCG submitted the Proposed Plan (USACE 2020) to the Ketchikan Public Library on 22 January 2020 for public review and solicited public input by submitting an advertisement to the Ketchikan Daily News summarizing the Proposed Plan, notifying the public of the location of the Proposed Plan, and providing the time and location of the public meeting. A public meeting was held on 4 February 2020; one member of the public

was in attendance. Environmental Protection Specialist Chris Rose with USCG CEU Juneau was available for a radio interview with KRBD Community Radio and met at their studio on 14 February 2019. No written comments were submitted by the community on the Proposed Plan and no verbal comments were received at the public meeting.

The FFS (USACE 2018), Proposed Plan (USACE 2020), and this ROD will be publicly available at the Ketchikan Public Library; additional documents relating to contaminated sites at Base Ketchikan are located at CEU Juneau, Alaska.

2.4 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The contaminated media at Base Ketchikan are divided into four AOCs:

- AOC 1 Soil at the BSY
- AOC 2 Intertidal Sediment at the Inner Boathouse
- AOC 3 Intertidal Sediment at the Inner Marine Ways
- AOC 4 Subtidal Sediment near the Pier

AOC 1 addresses contaminated soil at the BSY. Physical contact with and inhalation of soil particles poses a current and potential risk to human health because concentrations of contaminants are greater than the ADEC cleanup level for PCBs and the site-specific ACL for arsenic. AOCs 2, 3, and 4 address the contamination of marine sediment at Base Ketchikan. Potential human exposure pathways include physical contact with sediment in the intertidal zone and ingestion through consumption of bivalves harvested in the affected area. The subtidal zone is not physically accessible for harvesting or other usage; exposure pathways exist for sediment-dwelling (benthic) organisms in subtidal areas. Sediment in these AOCs pose a current and potential risk to human health or the environment because concentrations of contaminants are greater than the site-specific ACLs.

Selected remedies for AOCs 1 through 4 present the final response actions for these AOCs and address principal threats at the sites through combinations of actions. The selected remedies are appropriate for future land use, satisfy the USCG mission requirements, and are consistent with

other remediation activities at Base Ketchikan. Under its lead agency authority, USCG plans to remove PCB-contaminated soil and treat arsenic-contaminated soil at AOC 1 BSY, remove PCB- and metal-contaminated sediment at AOC 2 Inner Boathouse, remove the majority of metal-contaminated sediment and modify LUCs at AOC 3 Inner Marine Ways, and implement LUCs and LTM for PCB- and metal-contaminated sediment at AOC 4 Subtidal Sediment. LUCs will remain in place at AOCs 1, 3, and 4 to prevent exposure to PCB- and metal-contaminated soil and sediment; AOC 2 will be suitable for UU/UE immediately following remedy implementation.

2.5 SITE CHARACTERISTICS

Base Ketchikan consists of a long, narrow parcel of coastal land bisected lengthwise into an Upper and Lower Base by the South Tongass Highway. The Lower Base is located southwest (seaward) of the highway, and structures include the administration building, supply warehouse, marine ways shed, marine railway, buoy shed, north and south shops, gymnasium, security building, and hazardous waste storage building (Figure A-2). This 9-acre area is fenced and secured (USCG 1992). The Upper Base comprises approximately 62 acres located on the northeast (landward) side of the highway and contains mostly residential and support facilities, storage areas, an active firing range, and an inactive firing range (USCG 2003b). The property is not secured, but a locking gate is located at the road entrance to restrict public access (USCG 2001a).

Natural site features and characteristics are explained below, followed by a brief site history of investigative and remedial actions and descriptions of the remaining contamination.

The AOCs displayed on the figures and presented in the 2017 technical memorandum (USACE 2017b) have not been digitally modeled but are drawn using historical knowledge of the site and assumed extent of contamination based on best professional judgment. The volumes in Table 2-2 have been estimated using AOC footprints presented on those figures.

Table 2-2
Estimated Volume of Contaminated Soil and Sediment at Base Ketchikan

AOC	Area (square feet)	Volume of Contaminated Material (cy, with bulking factor)
1 – BSY	17,833	3,170
2 – Inner Boathouse	6,030	97
3 – Inner Marine Ways	12,839	308
4 – Subtidal Sediment	14,670	400

Notes:
Volumes and areas shown in this table were one of the factors used to calculate the cost assumptions presented in Appendix B of the FFS (USACE 2018).
To represent an appropriate volume for costing estimates, the figures presented include a bulking factor of 20 percent.
For definitions, refer to the Acronyms and Abbreviations section.

2.5.1 Climate

Base Ketchikan is influenced by a maritime climate, consisting of cool summers and mild winters. The following data are taken from the Weather Channel as recorded from 1995 to 2014. Ketchikan's mean temperature is 45.2 degrees Fahrenheit (°F). The average annual precipitation is 141.6 inches (Weather Channel 2014). On average, the warmest month is July with a mean temperature of 57.5°F and a mean maximum temperature of 64°F. The coolest month is January, with a mean temperature of 35°F and a mean maximum of 40°F. The maximum average precipitation occurs in October, with an average of 19.22 inches of precipitation.

2.5.2 Geology

The soils at the site are moist to nearly saturated, acidic, organic-rich, and covered by sedges, dense brush, or trees. Bedrock is located between the surface and approximately 4 feet below ground surface (bgs). The bedrock of Ketchikan consists of slate, phyllite, quartzite, and schist interlaid by marble and gneiss (Berg et al. 1988).

2.5.3 Topography and Surface and Subsurface Hydrology

Hydrogeology of the site is characterized by a series of shallow and ephemeral water bodies with high surface runoff, low permeability bedrock, and a steep, seaward gradient. Wetlands are present at the Upper Base only.

2.5.4 Sediment Dynamics

The Tongass Narrows is a U-shaped glacier-carved fjord, typical of Southeast Alaska intercoastal waterways. The Narrows is divided into two channels by Pennock Island to the southeast of Ketchikan. Base Ketchikan is located on the east shore of the east channel. The width of the Tongass Narrows ranges from 0.3 to 0.6 miles in the vicinity of Ketchikan to 0.18 miles at a constriction, 3.5 miles northwest of Base Ketchikan. The width of the east channel in the vicinity of Base Ketchikan is 0.3 miles. Depths in the Tongass Narrows range from 50 to 90 feet in the deepest places of the channel at Ketchikan. The depth averages 110 feet where the channel constricts. The depth of the channel in the vicinity of Base Ketchikan ranges from 84 to 162 feet deep.

The mean tide range at Ketchikan is 12.95 feet and the mean diurnal range is 15.38 feet. Tide ranges are maximum at full and new moons (spring tides) and minimum at quarter moons (neap tides). Tongass Narrows, like all of Southeast and Southcentral Alaska, has a semi-diurnal tide with a pronounced diurnal inequality. Tidal currents are generally less than 1.15 miles per hour and reverse at Ketchikan due to the constriction of the Tongass Narrows (National Oceanic and Atmospheric Administration [NOAA] 2012; Smith and Lee 2002). Tidal currents generally flow parallel to the channel to the southeast (120°) on ebb and to the northwest (310°) on the flood. Current speeds and directions typically vary near the shore, where the flow is diverted by friction or inertial diversion by prominences, such as docks. Prominences with significant embayments in their lee may induce counter-currents associated with a circulating eddy within the embayment. Smith and Lee (2002) found that the measured current velocities were typically lower than predicted by NOAA near the shore, and higher than predicted by NOAA within the channel.

A detailed study of sediment transport has not been conducted for the Ketchikan area. An approximate sediment transport model was conceptualized in 2014 based on the hydrography and geography of the Tongass Narrows. Based on a current velocity of 1 mile per hour and a tidal cycle of six hours (i.e., coupled high and low tides occur in 12 hours) the maximum distance that sediment could be transported is 6 miles (USACE 2014). This assumption is an extreme upper limit in that it assumes the following:

- All sediment is transported as a suspended load, that is, that sediment is primarily clay size and thus transported at the same velocity as water. Sediment particles larger than clay size will settle through the water column and be transported as bed load, at a velocity lower than the maximum tidal velocity.
- Tidal currents are typically slower nearshore and with increasing depth. Nearshore is where sediment accumulates and is the area of interest.
- Sediment is transported for the entire duration of the tidal cycle, that is, tidal currents reverse instantaneously.
- The constriction of the Tongass Narrows 3.5 miles northwest of Base Ketchikan restricts tidal currents, and currents generally flow parallel to the channel 120° to the southeast on ebb and 310° to the northwest on the flood.

Additional sediment transport assumptions are that:

- The constriction is also a geographic boundary that restricts, or at least highly limits, sediment transport out of the Tongass Narrows to the northwest.
- The sediment in the Tongass Narrows is primarily supplied by the weathering of land by wave action. Sediment supplied by currents (i.e., rivers) could potentially be transported out of the Narrows, for example, during ebb tides.

The distance from the Tongass Narrows constriction to the southern end of Pennock Island is approximately 5.5 miles. This distance is comparable to the maximum transport distance calculated for suspended sediment. As a result, it is likely that the sediment present in the vicinity of Ketchikan has a substantial residence time; that is, that sediment is continually transported from the constriction to the island and back. The impact of extreme events (e.g., storm surge combined with high tide) on the sediment distribution in the area has not been considered.

2.5.5 Ecology

Coastal and downstream waters surrounding Base Ketchikan are migratory pathways and feeding areas critical for the maintenance of anadromous fish. These waters are also significant commercial and recreational fishing resources. Marine mammals including otters and harbor seals transit the area and prey on aquatic organisms that may reside or forage in the subtidal areas. Other predatory species in the area include terrestrial mammals such as black bears. Avian groups that may frequent the area include waterfowl and shorebirds. Migrating ducks, geese, and swans are common waterfowl in the Ketchikan area. Shorebirds (e.g., gulls) and eagles are examples of common fauna at the site (USCG 2003a). Marine mammals protected by the Endangered Species Act and Marine Mammal Protection Act that may occur in the area include Steller sea lion, fin whale, and humpback whale (NOAA 2020). No other endangered species are expected to occur at Base Ketchikan (U.S. Fish and Wildlife Service 2020).

The local ecology is typical of wharfs and piers. The sediment substrate varies in relation to the degree of rocky outcroppings and structures; however, the pier area provides infrastructure for invertebrates and shellfish to colonize as well as foraging areas for marine mammals and birds. A diverse array of marine life has been observed along the pier within the subtidal sediment AOC. The surveys conducted in 2002 and 2010 did not note any areas that appeared to be impaired in comparison to the surrounding area. The 2010 dive survey was not specifically conducted to assess marine life; however, the abundance and variety of marine life noted was similar, if not greater than that noted in the 2002 video survey. Overall habitat quality does not appear to be adversely affected by COCs.

2.5.6 Previous Site Characterization Activities

Base Ketchikan was established as a BSU in 1910. Since 1988, numerous remedial and investigative activities have been performed, as summarized in Table 2-3. The area was first investigated due to concerns about debris from sandblasting and maintenance activities and rumored waste dumping. In the late 1980s, metals were identified as a preliminary COC in sediment, and piles of debris were removed from the seafloor around the facility. In the decades following, several on-land soil investigations and removal actions were conducted. Further

details of TCRAs and investigation activities can be found in the reports referenced in Table 2-3.

Table 2-3
Historical Work Completed and Findings for USCG Base Ketchikan

Year	Activity	Result	Reference
1988	Preliminary assessment	• COPC – Metals	USCG 2001b
1989	Site inspection and debris removal	• COPC – Metals (500,000 pounds of debris removed)	USCG 2001b
1989	Hazardous waste storage area closure	• Closure letter for hazardous waste storage area in 1992	USCG 1989
1990	Cleanup action	• Several thousand pounds of sandblast grit and paint removed	USCG 1992
1991	Environmental site assessment	• COPC – Petroleum hydrocarbons, VOCs	USCG 2001b
1992	Preliminary assessment	• Interviews and waste generation history	USCG 1992
1992	Soil removal	• Approximately 3,000 cy of diesel fuel-contaminated soil removed	USCG 1993
1992	Site investigation	• SVOCs detected inside and in the bay of the marine ways building	USCG 1993
1993	Tissue and sediment sampling	• Metals greater than reference areas in shellfish tissue • Sediment exceedances: arsenic, copper, lead, mercury, and zinc. Recommended dredging surface sediments in area.	USCG 1994
1995	Dredging removal action	• Approximately 600 cy of sediment removed from marine railway vicinity	USCG 1995
1996	Confirmation sediment sampling	• COPC – Metals in sediment and mussel tissue	USCG 2003a
2001	Screening-level risk assessment	• Determined further information was required for closure • Proposed suction dredging for remediation	USCG 2003a
2002	Risk evaluation	• COPC – Metals • Tissue samples exceeded criteria for human consumption	USCG 2003a
2008	LTM plan	• Further risk studies required	USCG 2008
2010	Remedial Investigation	• Investigated potential sources of contamination • Sediment exceedances: SVOCs, PAHs, PCBs, metals	USACE 2012a
2011	TCRA	• Removed sediment around the railway (impeding functionality) • Sediment exceedances: SVOCs, PCBs, metals, and mercury	USACE 2011
2012	TCRA	• Removed sediment around the railway (impeding functionality). • Sediment exceedances: SVOCs, PCBs, metals, and mercury	USACE 2012b

Table 2-3 (Continued)
Historical Work Completed and Findings for USCG Base Ketchikan

Year	Activity	Result	Reference
2012	Supplemental Remedial Investigation	• Determined background concentrations of metals and organics in sediment and biota in the Tongass Narrows. • Sediment exceedances: SVOCs, PCBs, metals, mercury, and pesticides	USACE 2013
2014	Homeport activities	• Removed arsenic-contaminated soil from the former hazardous waste storage building and placed at the former small arms firing range. • Removed soil from ecology block wall. • Soil exceedances: DRO, RRO, and metals.	M.A. Mortenson Company 2015
2014	Toxicity study	• Established the toxicity of sediments in DUs. • Sediment exceedances: SVOCs, PCBs, metals, and mercury	USACE 2016b
2015	TCRA	• Sediment exceedances: SVOCs, PCBs, metals, and mercury • Wastewater exceedances: cobalt, copper, iron, lead manganese, nickel, vanadium, and zinc	USACE 2016a
2016	TCRA	• Removed sediment around the railway (impeding functionality). • Sediment exceedances: metals, PCBs, PAHs	USACE 2017a
2017	Remedial goals and cleanup target areas technical memorandum	• Reviewed COPC data in soil and sediment, as well as toxicity data in sediment, to determine site-specific proposed cleanup levels.	USACE 2017b
2018	FFS	• Evaluated alternatives developed for four separate AOCs.	USACE 2018
2019	Ecological risk evaluation for the subtidal sediment area of concern	• The potential for adverse effects to marine benthic communities and bird/mammal populations is considered low for the subtidal sediment AOC.	USACE 2019

Note:
For definitions, refer to the Acronyms and Abbreviations section

2.5.7 Nature and Extent of Contamination at Buoy Storage Yard

The BSY is in an industrial area, as shown on Figures A-3 and Figure A-5. The total size of the AOC is approximately 0.14 acres, and the USCG stores and maintains between 30 and 70 buoys at the site at any given time. Refer to Table 2-3 for a summary of investigations that have taken place at the site. Soil has been sampled for metals, chromium VI, PCBs, volatile organic compounds (VOCs), semivolatile organic compound (SVOCs), pesticides, and tributyltin during remedial investigations in 2010 and 2012. ACLs were calculated for soil for this site using the ADEC Cleanup Levels Calculator for the type of exposure (outdoor worker) and precipitation zone (greater than 40 inches). Based on these ACLs, the primary COCs at the BSY at Base Ketchikan are PCBs and metals (arsenic). The ACL established for arsenic at the BSY is 33 milligrams per kilogram (mg/kg) (USACE 2017b). This ACL is only relevant for the outdoor worker scenario; therefore, to ensure the remedy proposed remains protective, an LUC restricting residential use will be implemented at this site. Cleanup levels must meet the cumulative risk requirements of 1×10^{-5} and a Hazard Index equal to 1 (ADEC 2018). The ACL proposed for arsenic and the cleanup level of 1 mg/kg for PCBs meet these criteria.

2.5.7.1 Known or Suspected Sources of Contamination

The most likely sources of soil contamination at Base Ketchikan include historical site activities, such as buoy storage and maintenance. In addition, the area was expanded in 1994 using locally available fill, which is understood to contain the mineral arsenopyrite and the metal arsenic.

Buoy paint is considered a potential source for metal contamination at the site. Safety Data Sheets (SDSs) for buoy paint and coatings do not indicate that current top coat buoy paints and coatings are a source of soil contamination. SDSs for anti-fouling bottom paints, tints, and resins used on buoys and vessels indicate that buoys stored at this location may have been treated with zinc, copper, and lead compounds. While this presents a potential source of contamination, there were no exceedances documented in the 2010 Remedial Investigation or 2012 Supplemental Remedial Investigation for zinc. Copper and lead concentrations in BSY

soil samples were greater than the most stringent ADEC Method Two cleanup levels, but less than the site-specific ADEC Method Three ACLs.

The southern edge of the BSY was previously referred to as a temporary waste accumulation area (USCG 1992) and a temporary hazardous materials storage area (USCG 2013). During 1995 dredging activities, sediment was reportedly placed at the former temporary waste accumulation area of the BSY (USCG 1995). Although sediment was placed on a liner in the BSY, it is still be considered a potential source of contamination. The dredging stockpiles likely contained metals from sandblasting. It is unknown if the sediment was removed from the yard prior to site investigations (USACE 2016b). Waste storage in general is not a likely source of contamination because, according to personnel stationed at Base Ketchikan from 1988 through 1990 and 1994 through 2016, spent blast-grit media was not stockpiled outdoors and was stored in drums (personal communication C. Rose 2017).

An inventory of previously stored materials at the BSY is not well documented; however, treated wood has historically been used as pilings in marine environments. Wood used in marine environments has been known to contain creosote or chromated copper arsenate and could have been stored in the BSY temporarily for the short duration of the replacement project. Such temporary storage is unlikely to significantly contribute metal contamination to the site. Creosote surface or pressure-treated wood is not recommended for use in Tongass Narrows because of its toxicity to aquatic life per the Essential Fish Habitat conservation recommendations of Section 305(b)(4)(A) of the Magnuson-Stevens Act (NOAA 1996).

2.5.7.2 Types of Contamination and the Affected Media

PCBs and metals are present in soil above the ACLs, suggesting that a possible response action is warranted. Approximately 3,170 cy (including bulk factor) of contaminated soil needs to be addressed. PCBs are probable carcinogens and arsenic is carcinogenic.

The COCs at the BSY are PCBs and metals (arsenic) in soil. The physical extent of contamination in the BSY was calculated using historical data, geospatial data, sample notes, and sample depths. This area measures approximately 155 feet by 115 feet and extends an

estimated 3 feet bgs. It is estimated that approximately 3,170 cy (including estimated bulk factor) of soil are contaminated with PCBs and arsenic. The affected volume of soil was estimated based on the ADEC Method Two cleanup criterion of 1 mg/kg for PCBs and the ACL of 33 mg/kg for arsenic. Soil exceeding this ACL was identified at the BSY at depths between 0 and 3 feet bgs at concentrations up to 380 mg/kg arsenic at sample 10KTN-BSU-SO-007. PCB levels at the BSY have been found above the ADEC cleanup level up to 2.1 mg/kg at 2 to 3 feet bgs. The highest concentrations of the metals and PCBs onsite are presented in Table 2-4.

Table 2-4
Buoy Storage Yard Soil Maximum Detected Concentrations

Contaminant	Sample ID	ACL [1] (mg/kg)	Result [2] (mg/kg)
Antimony	12KTN-BSU-SO-016	520	131
Arsenic	10KTN-BSU-SO-007	33	**380**
Chromium	10KTN-BSU-SO-006	100,000	52
Copper	12KTN-BSU-SO-019	52,000	1,150
Lead	12KTN-BSU-SO-016	800	692
Thallium	12KTN-BSU-SO-021	13	0.31
Pentachlorophenol	12KTN-BSU-SO-010	44	0.14 JC-, JS-
PCBs	12KTN-BSU-SO-016	9.63	2.1

Notes:
[1] The ADEC Method Three calculator was used to determine ACLs for soil contamination at the BSY. The site parameters were adjusted using the Method Three calculator to include the type of exposure (outdoor worker) and precipitation zone (greater than 40-inch precipitation zone) (USACE 2017b).
[2] **Bold** indicates the maximum detected concentration exceeds the ACL.
[3] Although the levels of PCBs in soil at the BSY are below the ACL proposed in this table, Note 15 to Tables B1 and B2 in 18 AAC 75.341 specifies that for unrestricted land use, soil with PCBs between 1 and 10 mg/kg may only remain if the area containing PCBs in soil is capped (ADEC 2018).
For definitions, refer to the Acronyms and Abbreviations section.

Surface water, sediment, and groundwater are not present at the BSY and are not considered potential exposure pathways.

2.5.7.3 Known or Potential Routes of Migration

Potential human exposure pathways at the BSY include physical contact and inhalation. While the BSY does not receive high levels of traffic, it is still accessible to humans and poses a risk of dermal contact with contaminated surface soil for people working in the area. Dry soil has the potential to become windborne as fugitive dust; therefore, inhalation is also a risk for those

working in the area. In addition, migration to groundwater is not considered a significant pathway in this area because there is no evidence of migration to groundwater (USACE 2013).

There is minimal risk to other organisms as the BSY is in an industrial area with a gravel lot, and wildlife and vegetation are not common in the area. Drinking water for the base is not sourced from groundwater. Migration to drinking water is not a concern because bedrock exists approximately 3 feet bgs. Evidence collected during the 2010 and 2012 remedial investigations indicated that the migration to groundwater pathway should be eliminated. A groundwater use determination under Title 18 of the Alaska Administrative Code, §75.350 (18 AAC 75.350) has not been completed.

2.5.8 Nature and Extent of Contamination at Inner Boathouse

The Inner Boathouse is located in the northern portion of Base Ketchikan underneath the boathouse and north shops area. It is shown on Figures A-3 and A-6. These buildings are raised above the intertidal zone on piles and outcropping bedrock, creating a pier structure. As a result, the area has very restricted access and low head room.

The majority of the shoreline at the AOC is bedrock with shifting pockets of sediment. The sediment in this area is typically a few inches to 1 foot deep. It is likely that the sediment mixes and redistributes based on several factors including tidal currents, wind, and waves. Some sediment is exposed at every low tide and is known as intertidal sediment. In other areas the sediment is never exposed at low tide but is still affected by the tidal current; this type of sediment is referred to as subtidal sediment. The mean tide range at Ketchikan is 12.95 feet and the mean diurnal range is 15.38 feet. Tide ranges are maximum at full and new moons (spring tides) and minimum at quarter moons (neap tides).

Sediment at Base Ketchikan has been analyzed for a variety of contaminants and using different methods during the various investigations. Sediments have been analyzed for metals, PCBs, VOCs, SVOCs, polycyclic aromatic hydrocarbons (PAHs), total organic carbon (TOC), tributyltin, and acid-volatile sulfide-simultaneously extracted metals (AVS-SEM) during

various remedial investigations in 2002, 2010, 2012, and 2014. In addition, the toxicity study conducted in 2014 provided additional evidence of bioavailability of the contamination and the potential to affect marine organisms. (USACE 2016b). In this study, potential toxicity using the AVS-SEM ratio was calculated as a predictor of bioavailability. The detailed analysis of this data is presented in the *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b). Copper, lead, and zinc were identified as effective surrogates for drivers of toxicity in this area.

Based on the analysis presented in the *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b) this AOC has sediment exceeding ACLs and exhibiting characteristics of high toxicity and requires assessment in this ROD. The area exposed to air at low tide is addressed in this AOC. This AOC includes bulk sediment samples with results above the following ACLs: copper above 330 mg/kg, zinc above 550 mg/kg, lead above 540 mg/kg, and the total of the three metals (copper/lead/zinc) above 1,420 mg/kg. In addition, one sample in this area (14KTN-BSU-SE-015) had a total PCB result of 4 mg/kg. The result also exceeds the proposed cleanup level of 65 mg/kg normalized for organic carbon. The fraction of organic carbon at this location is 0.00427 grams per gram (g/g) and the average across Base Ketchikan is 0.01528 g/g. Location IT-2 (2002) and SE069/SE070 (2010) do not exceed ACLs and were not included in this AOC (Figure A-6).

2.5.8.1 Known or Suspected Sources of Contamination

Contaminant sources for this area include debris dumped directly into the water from buildings along the pier. Debris was removed during at least two removal efforts, but some debris remains. Contamination from debris may have caused sediment to become a secondary source. Sediment contamination may also result from other outside sources, including ferry traffic and bilge emptying.

2.5.8.2 Types of Contamination and the Affected Media

Metals and PCBs are present in intertidal sediment above the ACLs, suggesting that a response action is warranted. Approximately 118 cy (including bulk factor) of metal- and PCB-

contaminated sediment needs to be addressed. The highest concentrations of the metals and PCBs are presented in Table 2-5.

Table 2-5
Inner Boathouse Sediment Maximum Detected Concentrations

Contaminant	Sample ID	ACL[1] (mg/kg)	Result[2] (mg/kg)
Arsenic	14KTN-BSU-SE-015	NA	945
Copper	14KTN-BSU-SE-015	330	**1,960**
Lead	12-KTN-BSU-SE-016	540	4,180
Mercury	12-KTN-BSU-SE-016	NA	0.801
Nickel	14KTN-BSU-SE-015	NA	59.8
Zinc	14KTN-BSU-SE-015	550	2,190
Copper-Lead-Zinc Total	14KTN-BSU-SE-015	1,420	5,990
PCBs	14KTN-BSU-SE-015	1 or 0.28[3]	4

Notes:
[1] ACLs were only calculated for copper, lead, zinc, and the total of the three metals. These were identified as effective surrogates for drivers of toxicity in this area. (USACE 2017b).
[2] **Bold** indicates the maximum detected concentration across all sediment AOCs.
[3] The PCB cleanup level for human exposure is 1 mg/kg. For ecological exposure the cleanup level is normalized for TOC by multiplying the dry weight concentration by the decimal fraction representing the percent TOC content of the sediment to account for association with organic carbon (USACE 2018). The fraction of organic carbon at this location is 0.00427 g/g.
For definitions, refer to the Acronyms and Abbreviations section.

2.5.8.3 Known or Potential Routes of Migration

For sediment, potential human exposure pathways include physical contact with sediment in the intertidal zone and ingestion through consumption of bivalves harvested in the affected area. Current ICs (including signage) prohibit harvesting. Physical contact with sediment is considered minimal because sediment is washed from the skin by water in intertidal areas, and the sediment is underwater each tidal cycle. The area is not and will likely never be used for drinking water due to shallow bedrock and saltwater intrusion. Base Ketchikan receives its potable water from the City of Ketchikan.

Exposure pathways exist for sediment-dwelling (benthic) organisms around high tide and terrestrial animals around low tide. Predatory species in the area include terrestrial mammals such as black bears and birds such as gulls and bald eagles (USCG 2003a). While only bottom-dwelling organisms are expected to have direct potential contact with contamination, there is a potential for bioaccumulation and biomagnification in higher trophic levels. The primary source

of contamination in sediment has been removed. The area under the boathouse is likely a deposition zone for sediment. Sediment migration from this area would be affected by tidal action and transport in the Tongass Narrows.

2.5.9 Nature and Extent of Contamination at Inner Marine Ways

The Inner Marine Ways AOC is an area of intertidal sediment, as well as a small volume of subtidal sediment surrounding the marine railways to the southeast of the USCG station. The Inner Marine Ways AOC is shown on Figure A-7. This area of the base is currently used for maintenance activities; vessels are transported to the dry/elevated dock area using the railway, then elevated for maintenance activities within the marine ways shed. The extent of future maintenance activities in this area depends on future USCG missions and on factors, such as deployment of larger FRCs. It is assumed that some level of maintenance activities will still occur for the foreseeable future in this area.

Historical sandblasting of materials and removal of anti-fouling paint containing heavy metals is assumed to be the source of contamination in this area. Sediment underneath the marine ways shed has not been sampled in any previous investigation because the area was difficult to access while the platform was still in place. It is, however, assumed that given the origin of the contamination in this area, sediment contains elevated concentrations of metals similar to those identified in other locations at the Inner Marine Ways. Sediment has been removed from the Inner Marine Ways area during several of the TCRAs because the sediment can build up and impede operation of the railway. Refer to Table 2-3 for a summary of these activities.

Sediments have been analyzed for metals, pesticides, PCBs, VOCs, SVOCs, PAHs, TOC, tributyltin, and AVS-SEM during various remedial investigations in 2002, 2010, 2012, and 2014. Only metals are COCs at this AOC. Copper and zinc contamination demonstrated the highest correlation with chronic mortality in the toxicity study in this area (USACE 2017b). Although other heavy metals are also present, copper and zinc are considered the toxicity drivers. Areas targeted for cleanup are those where bulk sediment concentrations of one or more metals exceed the ACLs (copper above 330 mg/kg, zinc above 550 mg/kg, lead above 540

mg/kg, and a combination of all three metals above 1,420 mg/kg) (USACE 2017b). Figure A-7 shows the AOC based on these levels for reference. This area is consistent with the stormwater flow patterns suggesting that historical contamination from the anti-fouling paints has traveled with the stormwater. Sediment is between 0 and 1.25 feet deep in the Inner Marine Ways AOC. One sample within this area (KS-T4-2) is considered to be a subtidal sample (i.e., it is not exposed at low tide); the other samples within the area are intertidal.

2.5.9.1 Known or Suspected Sources of Contamination

It is reasonable to assume that contamination in this area originates from sandblasting of materials and removal of anti-fouling paint that historically has contained heavy metals. Since 1994, releases of this material have been controlled through implementation of best management practices during maintenance activities, and runoff from sandblasting operations is managed with the stormwater associated with the marine ways shed in compliance with the *Base Ketchikan Stormwater Pollution Prevention Plan (USCG 2015)* and the Alaska Pollutant Discharge Elimination System (APDES) Multi-Sector General Permit (MSGP) (APDES MSGP No. AKR06AB12). Runoff from sandblasting operations is not considered to be an ongoing source of contamination.

2.5.9.2 Types of Contamination and the Affected Media

Metals are present in intertidal sediment above the ACLs, suggesting that a possible response action is warranted. Approximately 308 cy (including bulk factor) of metal-contaminated sediment needs to be addressed. The highest concentrations of the metals are presented in Table 2-6.

Table 2-6
Inner Marine Ways Sediment Maximum Detected Concentrations

Contaminant	Sample ID	ACL [1] (mg/kg)	Result (mg/kg)
Arsenic	12-KTN-BSU-SE-014	NA	463
Copper	10KTN-BSU-SE-059	330	1,400
Lead	14KTN-BSU-SE-012	540	1,400
Mercury	14KTN-BSU-SE-012	NA	0.58
Nickel	10KTN-BSU-SE-059	NA	240
Zinc	10KTN-BSU-SE-058	550	3,100
Copper-Lead-Zinc Total	10KTN-BSU-SE-058	1,420	4,650

Notes:
[1] ACLs were only calculated for copper, lead, zinc, and the total of the three metals. These were identified as effective surrogates for drivers of toxicity in this area. (USACE 2017b).
For definitions, refer to the Acronyms and Abbreviations section.

2.5.9.3 Known or Potential Routes of Migration

For sediment, potential human exposure pathways include physical contact with sediment in the intertidal zone and ingestion through consumption of bivalves harvested in the affected area. Current ICs (including signage) prohibit harvesting. Physical contact with sediment is considered minimal because sediment is washed from the skin by water in intertidal areas, and the sediment is under water each tidal cycle. The area is not and will likely never be used for drinking water due to shallow bedrock and saltwater intrusion. Base Ketchikan receives its potable water from the City of Ketchikan.

Exposure pathways exist for sediment-dwelling (benthic) organisms around high tide and terrestrial animals around low tide. Predatory species in the area include terrestrial mammals such as black bears and birds such as gulls and bald eagles (USCG 2003a). While only bottom-dwelling organisms are expected to have direct potential contact with contamination, there is a potential for bioaccumulation and biomagnification in higher trophic levels. The primary source of contamination in sediment has been removed. The area in the Inner Marine Ways is likely a deposition zone for sediment. Sediment migration from this area would be affected by tidal action and transport in the Tongass Narrows.

2.5.10 Nature and Extent of Contamination at Subtidal Sediment

The subtidal sediment AOC is approximately 430 by 100 feet, located to the west/southwest of the pier and the outer boathouse in a portion of the Tongass Narrows. The actual footprint of contaminated sediment is estimated to be 14,670 square feet, of which a portion (roughly 4,670 square feet) is located beneath the pier and is considered only accessible by divers (Figure A-8). Sediment thickness is estimated at 0 to 1 foot thick (USACE 2013).

Sediments have been analyzed for metals, pesticides, PCBs, VOCs, SVOCs, PAHs, TOC, tributyltin, and AVS-SEM during various remedial investigations in 2002, 2010, 2012, and 2014. Only metals and PCBs are COCs at this AOC. An area of subtidal sediment near the pier and outer boathouse exceeds ACLs (USACE 2017b). There is no intertidal zone in these areas; only an area of armored shore. All sample locations remain underwater and are considered subtidal even if they are not subject to the same current patterns due to their location under the wharf. The subtidal sediment AOC is shown on Figure A-8. A small area of subtidal sediment associated with the docks to the south-west of the south shops around samples 10KTN-BSU-SE-024/SE-025 and IT-S-3 is considered practically inaccessible for health and safety reasons. This area is under the dock between the south shops and the wharf and is likely only accessible to divers. Remedial action attempted in this area may be considered a confined space.

Based on the analysis presented in the 2017 *Remedial Goals and Cleanup Target Areas Technical Memorandum*, the area shown on Figure A-8 exceeds ACLs and exhibits characteristics of potentially high toxicity (USACE 2017b). This area encompasses bulk sediment samples with copper above 330 mg/kg, zinc above 550 mg/kg, lead above 540 mg/kg, and the total of the three metals (copper/lead/zinc) above 1,420 mg/kg. In addition, one sample in this area (10KTN-BSU-SE-013) had a total PCB result of 14.1 mg/kg.

The sediment in this area is subtidal (i.e., remains covered by water even at low tide). The height of the water column varies depending on the tide. The bathymetry of the area was established in the 2012 Supplemental Remedial Investigation (USACE 2013), and indicated that the depth varies in this area from 30 feet to approximately 100 feet. The depth appears to drop off a steep

underwater cliff moving in a southwesterly direction away from the pier. Sediment thickness was estimated using evidence from the sample collection, the bathymetry survey and vibracores collected during the marine geophysical study (USACE 2013).

2.5.10.1 Known or Suspected Sources of Contamination

Contaminant sources for the subtidal sediment include historical contamination from the removal of bottom anti-fouling paints, which may have moved with stormwater into the deeper sediment and debris dumped directly into the water from buildings along the pier. Debris was removed during at least two removal efforts, but some debris remains.

2.5.10.2 Types of Contamination and the Affected Media

Metals are present in subtidal sediment above the ACLs, suggesting that a possible response action is warranted. Approximately 408 cy (including bulk factor) of metal-contaminated sediment needs to be addressed. The highest concentrations of the metals and PCBs are presented in Table 2-7.

Table 2-7
Subtidal Sediment Maximum Detected Concentrations

Contaminant	Sample ID	ACL [1] (mg/kg)	Result [2] (mg/kg)
Arsenic	10KTN-BSU-SE-009	NA	**1,100**
Copper	IT-S-3 (2002)	330	1,290
Lead	IT-S-3 (2002)	540	**6,410**
Mercury	12-KTN-BSU-SE-025	NA	**4.46**
Nickel	10KTN-BSU-SE-012	NA	**300**
Zinc	10KTN-BSU-SE-010	550	**4,400**
Copper-Lead-Zinc Total	10KTN-BSU-SE-010	1,420	**9,700**
PCBs	10KTN-BSU-SE-013	1[3]	**14.1**

Notes:
[1] ACLs were only calculated for copper, lead, zinc, and the total of the three metals. These were identified as effective surrogates for drivers of toxicity in this area. (USACE 2017b).
[2] **Bold** indicates the maximum detected concentration across all sediment AOCs.
[3] The PCB cleanup level is normalized for TOC by multiplying the dry weight concentration by the decimal fraction representing the percent TOC content of the sediment to account for association with organic carbon (USACE 2018). The average fraction of organic carbon average across Base Ketchikan is 0.01528 g/g.
For definitions, refer to the Acronyms and Abbreviations section.

2.5.10.3 Known or Potential Routes of Migration

The subtidal zone is not physically accessible by people for harvesting or other use. Exposure pathways exist for sediment-dwelling (benthic) organisms in subtidal areas. Video surveys conducted in 2002 and 2010 revealed an ecosystem typical to Southeast Alaska, including sea anemones, sea urchins, hydroids, nudibranchs, bivalves, crustaceans, mollusks, echinoderms, fish, and flatworms (USCG 2003a; USACE 2012a). Additionally, mammals such as otters and harbor seals transit the area and prey on the abovementioned biota; however, this 430-foot by 100-foot AOC is a small portion of these mammals' habitats. Other predatory species in the area include terrestrial mammals such as black bears and birds such as gulls and bald eagles (USCG 2003a). While only bottom-dwelling organisms are expected to have direct potential contact with contamination, there is a potential for bioaccumulation and biomagnification in higher trophic levels. The primary source of contamination in sediment has been removed. Sediment migration from this area would be affected by tidal action and transport in the Tongass Narrows.

2.6 CURRENT AND POTENTIAL FUTURE LAND AND WATER USES

Conceptual site models (CSMs) were developed for Base Ketchikan to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media. These pathways are based upon current and reasonably likely future land uses. Human receptors considered for Base Ketchikan include commercial/industrial workers, construction workers, subsistence harvesters and consumers, site visitors, trespassers, and recreational users. Ecological receptors include aquatic and terrestrial receptors. These are described more fully in the Ecological Risk Evaluation (ERE) (USACE 2019).

Potential contaminant sources for the Inner Marine Ways area at Base Ketchikan are historic spills and discharges associated with maintenance and repair of USCG vessels, as well as a long history of industrial use at the site dating back to the early 1900s. These release mechanisms might have caused surface water and sediment to become secondary contaminant sources. Contaminant sources near the pier area include debris dumped directly into the water from

buildings along the pier. Debris was removed during at least two removal efforts, but some debris remains. Contamination from debris may have caused sediment to become a secondary source. Sediment contamination may also result from other outside sources, including ferry traffic and bilge emptying.

Surface soil, subsurface soil, and sediment are directly affected by contamination at Base Ketchikan. Soil, air, and surface water are considered exposure media. Several exposure pathways are considered complete under current site conditions. Incidental soil ingestion and dermal absorption of contaminants from the soil and dermal absorption of contaminants from sediment are the most likely current exposure pathways. The inhalation of outdoor air contaminated with volatiles (PCBs) is possible although unlikely. Dermal contact with surface water is possible but unlikely during site work, recreational, or subsistence activities in the area. Surface water is considered a minor pathway because of the dispersion of contaminants within the water.

Actual groundwater has not been observed during any of the soil or upland site investigations. If groundwater is present, regular ingestion by site workers is not reasonable or anticipated due to the availability of treated drinking water at Base Ketchikan. Development of groundwater as a drinking water source in this portion of Base Ketchikan is neither likely nor feasible, but a determination under 18 AAC 75.350 has not been completed.

ADEC CSM scoping and graphic forms for Base Ketchikan are presented in Appendix C and are based upon current and reasonably likely future land uses.

2.6.1 Current and Potential Future Land and Water Uses

Base Ketchikan comprises land-based administration, accommodation and workshop buildings required to maintain the USCG ships, and associated materials for Southeast Alaska. The waterfront area is secured in the vicinity of the base by a gated fence and guardhouse, and to the south signage indicates that the area is USCG property and trespassers will be prosecuted.

Additional signage is located around the base indicating that harvesting of shellfish is not permitted.

As the lead agency, the USCG has the authority to determine the future anticipated land use of Base Ketchikan. After considering input from community residents, support agencies, and public meetings, the USCG has determined that the most likely future land use of Base Ketchikan over the foreseeable future will continue to be industrial use.

2.6.2 Current and Potential Future Groundwater and Surface Water Uses

Groundwater is not used as a drinking water supply at Base Ketchikan. The area is not and will likely never be used for drinking water due to shallow bedrock and saltwater intrusion. Base Ketchikan receives its potable water from the City of Ketchikan. The City of Ketchikan obtains surface water from the Ketchikan Lakes and Granite Creek drainages. This water is treated prior to entering the municipal delivery system.

2.7 SUMMARY OF SITE RISKS

Risk characterization is the process of quantifying cancer risk due to potential exposures to carcinogenic toxicants and of quantifying the hazard posed by potential exposures to non-carcinogenic toxicants. A baseline risk assessment estimates what risks the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. Cancer risk is assumed to be additive for all carcinogens. Non-cancer risk is assumed to be additive for chemicals with similar sites of toxicological action. In the event that any combination of these chemicals results in synergistic effects, risk might be underestimated. Conversely, the assumption of additivity would overestimate risk if a combination of these chemicals acted antagonistically or had no combined toxic effect at all. The methods are designed to be health-protective and tend to overestimate rather than underestimate risk. Risk characterization is limited to those source area-related chemicals selected as COPCs selected during a screening process.

The aim of the 2017 technical memorandum was to summarize the state of soil and sediment at Base Ketchikan and to establish cleanup levels using previous contaminant concentration sampling, toxicity predictions based on bioavailability, and the outcome of actual toxicity testing (USACE 2017b). The cleanup levels presented therein were established to be protective of HHE and created a path forward for this ROD. Tables 2-8 and 2-9 display the soil cleanup criteria and the derived sediment cleanup criteria presented in the 2017 technical memorandum.

Table 2-8
Method Three Outdoor Worker Soil Cleanup Levels

Contaminant	Cleanup Level for Outdoor Worker (mg/kg)
Arsenic, inorganic	33
PCBs	9.6

Notes:
Although PCB levels in soil at the BSY are below the ACL of 9.6 mg/kg, note 15 to Tables B1 and B2 in 18 AAC 75.341 specifies that for unrestricted land use, soil with PCBs between 1 and 10 mg/kg may only remain if the area containing PCBs in soil is capped (ADEC 2018). PCB levels at the BSY have been found above the ADEC cleanup level at 1 and 2.1 mg/kg at 2 to 3 feet bgs.
For definitions, refer to the Acronyms and Abbreviations section.

Table 2-9
Derived Cleanup Criteria for Sediment at Base Ketchikan

Contaminant	Cleanup Criteria (mg/kg)
Copper	330
Lead	550
Zinc	540
Combined Total: Copper/Zinc/Lead	1,420
PCBs	1 mg/kg for human exposure 65 mg/kg normalized for organic carbon for ecological exposure[1]

Note:
[1] The sediment cleanup level for protection of ecological risk is derived from Washington Sediment cleanup criteria (Washington Administrative Code 173-204-560 Table III Marine Sediment Cleanup Objectives) as presented in USACE 2018 and is normalized for organic carbon content. The dry weight concentration in a sample is divided by the decimal fraction representing the percent TOC content of the sediment to account for the association with organic carbon and is then compared to this cleanup level. The cleanup level for the protection of human health is 1 mg/kg.
Additional discussion regarding toxicity presented below.
For definitions, refer to the Acronyms and Abbreviations section.

Soil

For soil, the ADEC Method Three calculator was used to determine ACLs. The site parameters were adjusted using the Method Three calculator to include the type of exposure (outdoor

worker) and precipitation zone (greater than 40-inch precipitation zone). Table 2-8 presents the ACLs, as presented in the 2017 technical memorandum (USACE 2017b). For the COCs at the BSY (arsenic), the ACL was established at 33 mg/kg as discussed in the BSY portion of Section 2.5.7.

Sediment

Alaska has no established cleanup levels for contaminated sediment. Because there are no established or representative standards, a toxicity study, such as the one performed in 2014 combining sampling of contaminant levels and correlating toxicity, is a viable alternative. The proposed areas targeted for cleanup are those where bulk sediment concentrations of two or more metals exceed the proposed cleanup levels (copper above 330 mg/kg, zinc above 550 mg/kg, lead above 540 mg/kg, and the total of the three metals [copper/lead/zinc] above 1,420 mg/kg), where AVS-SEM also predicted bioavailability, and direct toxicity testing confirmed a significant effect. Table 2-9 presents the ACLs.

Risk to HHE is mitigated by reducing the overall metal concentration across the cleanup target area to below the proposed cleanup levels (330 mg/kg copper, 550 mg/kg zinc, 540 mg/kg lead, and 1,420 mg/kg combined total copper/lead/zinc) or demonstrating a reduction in bioavailability of metals across the cleanup target area leading to a calculated or predicted toxicity level of "likely not toxic." Further discussion of the remedial action objectives (RAOs) is presented in Section 2.8. Toxicity predictions will be calculated for the area using the method presented in the toxicity study reproduced here (USACE 2016b).

In order to predict if sediment will be toxic, the difference between ΣSEM and AVS is calculated and normalized with the fraction of organic carbon using the following equation:

$$Toxicity\ value\ =\ (\Sigma SEM\ -\ AVS)/f_{OC}$$

Where:

ΣSEM = summation of simultaneously extracted metals
AVS = acid-volatile sulfide
f_{OC} = organic carbon fraction

Substituting values from this study into the equation yields the following conclusions:

- Toxicity values greater than 1,000 micromoles per gram organic carbon ($\mu mol/g_{OC}$) are likely toxic to benthic organisms due to their level of bioavailability.
- It is uncertain if toxicity values between 130 and 1,000 $\mu mol/g_{OC}$ are toxic or non-toxic.
- Toxicity values less than 130 $\mu mol/g_{OC}$ are likely not toxic to benthic organisms because the metals are not bioavailable.

Determining successful cleanup of these target areas may consider factors other than bulk concentrations of remaining metals. Tidal influence, the AVS-SEM ratio, and carbon content of remaining sediment in the area could all affect the concentration and bioavailability of any sediment that remains or re-deposits in these areas after a potential removal action or treatment. Successful remedial action will likely be defined by a statistically significant decrease in toxicity, an AVS-SEM ratio that no longer predicts toxicity across the area, and/or meeting the proposed cleanup benchmarks. While this may not result in cleanup to specific final concentrations, analyzing the trend of toxicity in the area would meet the RAO of decreasing risk to HHE while taking into account the variable nature of sediment due to environmental factors.

The direct risk to human health associated with physical contact to contaminated sediment is considered minimal due to sediment being washed off by the water.

2.7.1 Toxicity Assessment and Carcinogenic Risk

PCBs are a probable human carcinogen. PCBs are bioaccumulative, which means an organism can absorb a toxic substance at a rate greater than at which the substance is lost. In 2010 and 2012, biota samples collected from intertidal areas at Base Ketchikan exceeded human consumption risk criterion for PCBs. The highest total PCBs result in biota was 0.046 mg/kg in 2010.

The key metalloid and metallic COCs at Base Ketchikan are arsenic in soil and copper, lead, and zinc in sediment. Several other metals, including arsenic, nickel, and mercury, are also

considered COCs in sediment but are collocated with the other metals. The focus of this ROD is on copper, lead, and zinc, as these metals were identified as effective surrogates for drivers of ecological toxicity. EPA has classified arsenic as Group A, indicating that it is a human carcinogen (Integrated Risk Information System [IRIS] 2020a). EPA has classified copper and zinc as Group D, indicating that they are not classifiable as a human carcinogen (IRIS 2020b,d). EPA has classified lead as Group B2, indicating that it is a probable human carcinogen (IRIS 2020c). Lead is highly toxic to humans at very low levels although it is not typically evaluated for cancer risk.

2.7.2 Health Effects

Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage (Agency for Toxic Substances and Disease Registry [ATSDR] 2014b).

Arsenic is a potent toxicant that may exist in several oxidation states and in a number of inorganic and organic forms (ATSDR 2007a). There are many reports of death in humans due to ingestion of high doses of inorganic arsenic, as well as from chronic exposure at lower concentrations (ATSDR 2007a). Serious respiratory effects have been reported in some cases of acute oral inorganic arsenic poisoning. Inorganic arsenic ingestion may also lead to serious effects on the cardiovascular system from both acute and long-term exposure. Signs of gastrointestinal irritation include nausea, vomiting, diarrhea, and abdominal pain. Anemia and leukopenia are common effects of arsenic poisoning and have been reported following acute, intermediate, and chronic oral exposure. Ingestion of inorganic arsenic can cause injury to the nervous system. Exposure to inorganic arsenic in drinking water has been associated with adverse reproductive outcomes in some studies. There is evidence that ingestion of inorganic arsenic increases the risk of developing skin cancer; it may also increase the risks of internal cancers. Adverse effects from dermal exposure to inorganic and organic arsenicals have not

been extensively investigated (ATSDR 2007a); however, several studies of humans exposed to arsenic dust have reported that it can cause contact dermatitis.

Copper can cause adverse effects in humans including liver and kidney damage, anemia, immunotoxicity, and developmental toxicity. There have been reports of death from ingestion of large doses of copper sulfate (ATSDR 2004). Some studies have found an increased risk of coronary heart disease deaths with increasing serum copper levels. Signs of gastrointestinal irritation include nausea, vomiting, abdominal pain, and diarrhea. Acute hemolytic anemia and acute intravascular hemolysis have been reported. There is strong evidence that suggests that Wilson's disease, Indian childhood cirrhosis, and idiopathic copper toxicosis are caused by an increased genetic susceptibility to copper toxicity (ATSDR 2004).

Lead targets the nervous system and may also cause weakness in fingers, wrists, or ankles (ATSDR 2007b). In children, lead can cause cognitive developmental effects. In adults, small increases in blood pressure and anemia may follow lead exposure, especially in middle-aged and older people. At high levels, lead can severely damage the brain and kidneys, cause decreases in sperm production in men or miscarriage in women, and ultimately result in death.

Zinc is an essential nutrient in humans and animals and certain levels of zinc intake are recommended. Both zinc deficiency and overexposure have been associated with adverse effects in humans and animals (ATSDR 2005).

2.7.3 Ecological Risks

The marine habitat at Base Ketchikan is typical of rocky intertidal shores in Southeast Alaska. Coastal and downstream waters surrounding the base consist of migratory pathways and feeding areas of anadromous fish, as well as providing habitat for resident populations of marine invertebrates and fish. Field visits and video surveys were completed in 2002 and 2010 (USCG 2003a, USACE 2012a). Marine wildlife was abundant in both surveys and observations included several species of crustaceans, mollusks, echinoderms, bivalves, and fish. In the video survey conducted in 2002, the dock floats were largely covered with sea anemones, sea urchins,

hydroids, and nudibranchs, with some flatworm markings also evident. The rocky seafloor was largely covered with green algae, larger brown algae seaweed, shell fragments, and the occasional softer sand/sediment pockets. The subtidal areas and the face of the pier were sandier. Species observed included epifaunal polychaetes, bivalves, anemones, and limited algae. Bedrock and large boulders were common in the video and during the nearshore field visit (USCG 2003a). The 2010 dive survey conducted along the pier was not conducted specifically to survey marine life, however, incidental observations of marine life were recorded (USACE 2012a). Numerous sea stars, leather stars, feather dusters, sunflower sea star (*Pycnopodia*), tube worms, sea cucumbers, nudibranchs, sea urchins, clams, blue mussels, scallops, shells, kelp, and fish were observed along the portions of the pier included in the subtidal sediment AOC.

The benthic invertebrate community is the group that is the most likely to be chronically exposed to elevated concentrations of COCs in the subtidal sediment AOC. The most frequently observed invertebrates were echinoderms (sea stars, sea urchins, sea cucumbers), polychaetes (tube worms), gastropods (nudibranch), and bivalves (clams, mussels, scallops). Most of these species have very limited movement in their adult stage and may only move a few meters a day in search of food. However, larval stages may have greater mobility as they can have free-floating stages until metamorphosis. Echinoderms, polychaetes, and mollusks are widely distributed. They are found in all oceans and all climates (tropical to polar) and can inhabit the marine bed to rocky shores. From the population and community perspective, potential impacts to the benthic invertebrate populations living in the subtidal sediment AOC would be indistinguishable from natural causes such as predation.

Marine mammals including otters and harbor seals transit the area and prey on aquatic organisms that may reside or forage in the subtidal areas. Other predatory species in the area include terrestrial mammals such as black bears. Avian groups that may frequent the area include waterfowl and shorebirds. Migrating ducks, geese, and swans are common waterfowl in the Ketchikan area. Shorebirds (e.g., gulls) and eagles are examples of common fauna at the site (USCG 2003a).

Per a NOAA online tool, Base Ketchikan is within the distribution range for the Stellar sea lion, fin whale, and humpback whale (NOAA 2019). The Stellar sea lion Eastern Distinct Population Segment (DPS) was federally delisted in 2013 (Title 78 of the Code of Federal Regulation, §66139, 4 November 2013), however the Stellar sea lion Western DPS, fin whale, and humpback whale are federally-listed as endangered. Other marine mammals whose distribution range may include the Tongass Narrows include harbor seal, harbor porpoise, Pacific white-sided dolphin, gray whale, killer whale, and Minke whale all of which are protected under the Marine Mammal Protection Act.

An ERE was conducted in 2019 and reviewed data collected and evaluated for the subtidal sediment AOC (USACE 2019). Data extended from 2002 through 2014 and included numerous individual lines of evidence. The purpose of the ERE was to evaluate the available data and evaluate the results of each study in combination with the others. The EPA weight of evidence procedure was implemented to evaluate and weigh the individual sources as well as the body of evidence as a whole, such that the reader could more readily see how each line of evidence was used to support the conclusion.

Based on the multiple lines of evidence, the potential for adverse effects to marine benthic communities and bird/mammal populations was considered low for the subtidal sediment AOC and it was recommended for no further evaluation or action (USACE 2019).

2.7.4 Basis for Action

The response actions selected in this ROD are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. If achieved, the RAOs (Section 2.8) developed for Base Ketchikan will adequately and effectively mitigate human health risks and the potential for ecological exposure.

2.8 REMEDIAL ACTION OBJECTIVES

RAOs provide a general description of what the CERCLA response action will accomplish. These goals typically serve as the design basis for the remedial alternatives, which were originally evaluated in the 2018 FFS (USACE 2018) and presented in the Proposed Plan (USAF 2020). These alternatives are also discussed in the next section (Section 2.9).

The following RAOs were identified for soil at the BSY:

- Prevent human exposure to soil containing arsenic in excess of the site-specific ACL of 33 mg/kg.
- Prevent human exposure to soil contamination exceeding cumulative risk standards for metals for industrial land use.
- Prevent human exposure to soil containing PCBs in excess of 1 mg/kg.
- Reduce the potential for COCs to migrate from the site.

The cleanup levels selected for this site are chemical-specific applicable or relevant and appropriate requirements (ARARs) for arsenic, based on the site-specific ACL (33 mg/kg). Cleanup levels must meet the cumulative risk requirements of 1×10^{-5} and HI=1 (ADEC 2018). The ACL proposed for arsenic and the cleanup level of 1 mg/kg of PCBs meet these criteria. Achievement of these RAOs will be necessary to be protective of HHE, allowing continued use of the BSY for the USCG mission at Base Ketchikan.

The following RAOs were identified for sediment:

- Minimize or eliminate ecological exposure to sediment containing copper in excess of 330 mg/kg and zinc in excess of 550 mg/kg or lead in excess of 540 mg/kg, and the total of the three metals in excess of 1,420 mg/kg or demonstrating a reduction in bioavailability leading to a calculated or predicted toxicity level of "likely not toxic."
- Prevent human exposure to sediment containing PCBs in excess of 1 mg/kg.
- Minimize or eliminate ecological exposure to sediment containing PCBs in excess of 65 mg/kg normalized for organic carbon.
- Minimize or eliminate the potential for bioaccumulation and biomagnification to upper trophic-level consumers from ingestion of benthic organisms.

The cleanup levels selected for this site are chemical-specific ARARs for copper, lead, and zinc based on the ACLs established in the 2017 technical memorandum (USACE 2017b). The PCB confirmation sample result is normalized for TOC by dividing the dry weight concentration by the decimal fraction representing the percent TOC content of the sediment to account for association with organic carbon. Conversely a cleanup level can be created for a specific sample by multiplying 65 mg/kg by the fraction of organic carbon at that location. The average fraction of organic carbon across Base Ketchikan from the 2012 and 2014 sediment samples is 0.01528 g/g. Achievement of these RAOs will be necessary to be protective of HHE, allowing continued use of the site for the USCG mission at Base Ketchikan.

2.9 DESCRIPTION OF ALTERNATIVES

A set of remedial alternatives was developed and evaluated for each AOC. Alternatives were retained for further analysis based on their overall protection of HHE and compliance with the ARARs applicable to each AOC. The remedial alternatives summarized in Table 2-10 were evaluated in the 2018 FFS (USACE 2018) and presented in the Proposed Plan (USACE 2020). These ARARs are discussed in Section 2.10.2, and a complete list of ARARs is provided in Appendix B.

In accordance with CERCLA guidance, a range of alternatives was developed to include the No Action alternative, an alternative that focuses on reducing risk by preventing exposure, and (to the extent practicable) alternatives that focus on treatment of contaminated media. The number of feasible alternatives considered was generally limited due to the remote location of Base Ketchikan on the shores of the Tongass Narrows.

Table 2-10
Summary of Remedial Alternatives Evaluated for Base Ketchikan

Alternative	Key Assumptions	Advantages	Disadvantages	Cost Estimate (millions)[1]
AOC 1 BSY				
Alternative 1: No Action	• No action planned to mitigate risk • Baseline for comparison	• Easy to implement • No cost • No five-year reviews	• Not protective • Does not comply with ARARs	$0
Alternative 2: Limited PCB Removal and LUCs	• LUCs will effectively prevent exposure • Volume estimates are accurate	• Easy to implement • Highly effective for addressing PCB contamination	• Does not address exposure to or mobility of arsenic • Short-term risks associated with soil handling at the base and along the transportation chain • Requires mobilization of heavy equipment to transport and spread backfill • Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required	$0.61
Alternative 3: Concrete Cap and LUCs	• LUCs will effectively prevent exposure • Regular inspections and maintenance will continue indefinitely, or until determined to be no longer necessary during the five-year review process, to ensure the integrity and protectiveness of the cap	• No soil handling or transport, eliminating short-term exposure potential for site workers • Installation is simple and effective • Cap adds additional level of protectiveness and prevents potential migration and both human health and ecological exposure	• Requires structural reinforcement to meet storage requirements for buoys and sinkers • Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required • Requires mobilization of heavy equipment to transport and pour the concrete	$0.80

Table 2-10 (Continued)
Summary of Remedial Alternatives Evaluated for Base Ketchikan

Alternative	Key Assumptions	Advantages	Disadvantages	Cost Estimate (millions)[1]
Alternative 4: Gravel Cap and LUCs	• LUCs will effectively prevent exposure • Cap will be constructed of material available in Ketchikan and be of sufficient strength and durability to withstand site conditions and maintained as needed • Regular inspections and maintenance will continue indefinitely, or until determined to be no longer necessary during the five-year review process, to ensure the integrity and protectiveness of the cap	• No soil handling or transport, eliminating short-term exposure potential for site workers • Cap adds additional level of protectiveness and prevents potential migration and both human health and ecological exposure	• Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required • Requires mobilization of heavy equipment to transport and spread backfill	$0.72
Alternative 5: Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal*	• Volume estimates are accurate • Treatment will effectively render the arsenic-contaminated soil non-hazardous as defined by RCRA • LUCs will effectively prevent exposure • Regular inspections will continue indefinitely, or until determined to be no longer necessary during the five-year review process, to ensure the integrity and protectiveness of the treated soil	• Satisfies CERCLA statutory preference for treatment • Protective of the community and workers during the remediation process with no environmental impacts. • Meets the RAOs rapidly.	• Significant cost and short-term risks associated with soil handling at the base and along the transportation chain • LUCs and CERCLA five-year reviews would be required • Requires the mobilization of heavy equipment to excavate, backfill, and transport the soil to a permitted landfill	$1.10
Alternative 6: Excavation, Gravel Fill, and Offsite Disposal	• Volume estimates are accurate • Fill material is available in Ketchikan	• The BSY will be available for unrestricted use; no LUCs or CERCLA five-year reviews will be required.	• Highest cost • Does not satisfy the CERCLA statutory preference for the treatment of contamination • Significant cost and short-term risks associated with soil handling at the base and along the transportation chain • Requires the mobilization of heavy equipment to excavate, backfill, and transport the soil to a permitted landfill	$3.37

Table 2-10 (Continued)
Summary of Remedial Alternatives Evaluated for Base Ketchikan

Alternative	Key Assumptions	Advantages	Disadvantages	Cost Estimate (millions)[1]
AOC 2 Intertidal Sediment at the Inner Boathouse				
Alternative 1: No Action	• No action planned to mitigate risk • Baseline for comparison	• Easy to implement • No cost • No five-year reviews	• Not protective • Does not comply with ARARs	$0
Alternative 3: Limited Cap and LUCs	• LUCs will effectively prevent exposure • Cap will be constructed of material (riprap) available in Ketchikan and be of sufficient strength and durability to withstand site conditions and maintained as needed • Small pieces of equipment could place material during low tide and be able to reach the majority of the AOC. • Regular inspections and maintenance will continue indefinitely, or until determined to be no longer necessary during the five-year review process, to ensure the integrity and protectiveness of the cap	• No sediment handling or transport associated with removal, eliminating short-term exposure potential for site workers • Cap adds additional level of protectiveness and prevents potential migration and both human health and ecological exposure	• Highest cost • Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required • Requires mobilization of heavy equipment to transport and spread backfill • Difficult to access area to be capped.	$1.53
Alternative 4: Removal and Offsite Disposal*	• Excavation and removal of sediment would need to occur using hand tools and manual labor. • Small pieces of equipment could carry material and equipment.	• Highly effective for addressing PCB contamination • The Inner Boathouse will be available for unrestricted use; no LUCs or CERCLA five-year reviews will be required.	• Does not satisfy the CERCLA statutory preference for the treatment of contamination • Significant cost and short-term risks associated with sediment handling at the base and along the transportation chain • Requires manual labor to remove contaminated sediment. • Requires the mobilization of heavy equipment to transport the sediment to a permitted landfill • Difficult to access sediment to be removed.	$1.42

Table 2-10 (Continued)
Summary of Remedial Alternatives Evaluated for Base Ketchikan

Alternative	Key Assumptions	Advantages	Disadvantages	Cost Estimate (millions)[1]
AOC 3 Intertidal Sediment at the Inner Marine Ways				
Alternative 1: No Action	• No action planned to mitigate risk • Baseline for comparison	• Easy to implement • No cost • No five-year reviews	• Not protective • Does not comply with ARARs	$0
Alternative 3: Limited Land-Based Excavation, Offsite Disposal, and LUCs*	• Land-based excavation would occur at low tide. • Dewatering of the sediment, or another alternative for dewatering, will occur prior to transportation and disposal. • LUCs will effectively prevent exposure	• The total volume of contaminated sediment would be greatly reduced and sediment handling would be more straightforward.	• Approximately 10% of the contaminated area would remain. • Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required • Requires mobilization of heavy equipment to transport.	$1.23
Alternative 4: Dredging and Limited Land-Based Excavation	• Dredging would occur at high tide. • Land-based excavation would occur at low tide. • Dewatering of the sediment will occur prior to transportation and disposal.	• The Inner Marine Ways will be available for unrestricted use; no LUCs or CERCLA five-year reviews will be required.	• Highest cost • Sediment handling is more difficult because it involves controlling re-suspended sediment during excavation. • Greater potential for environmental impacts. • Does not satisfy the CERCLA statutory preference for the treatment of contamination • Requires mobilization of heavy equipment to transport.	$1.72
AOC 4 Subtidal Sediment				
Alternative 1: No Action	• No action planned to mitigate risk • Baseline for comparison	• Easy to implement • No cost • No five-year reviews	• Not protective • Does not comply with ARARs	$0
Alternative 2: LUCs and LTM*	• LUCs will effectively prevent exposure • LTM would include site inspections and sample collection	• Easy to implement • No sediment handling or transport associated with removal, eliminating short-term exposure potential for site workers	• Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required	$0.55

Table 2-10 (Continued)
Summary of Remedial Alternatives Evaluated for Base Ketchikan

Alternative	Key Assumptions	Advantages	Disadvantages	Cost Estimate (millions)[1]
Alternative 3: Limited Removal and Offsite Disposal with LUCs	• LUCs will effectively prevent exposure • Some metal-contaminated sediment cannot be reached for removal	• Highly effective for addressing the PCB contamination and the majority of metals contamination	• Meets chemical-specific ARARs but not all contamination can be reached for removal. • Very difficult to implement • A technical impracticability waiver may be required for the inaccessible portion of the site underneath structures. • Does not satisfy the CERCLA statutory preference for the treatment of contamination • LUCs and CERCLA five-year reviews would be required	$2.27

Notes:
* Indicates selected remedy.
[1] Costs are estimated with +50/-30% accuracy based on subcontractor quotes, construction drawings, and engineering estimates
For additional definitions, see the Acronyms and Abbreviations section.

2.9.1 Remedial Alternatives for Upland Soil at the BSY

To develop a remedial strategy for arsenic- and PCB-contaminated soil at the BSY at Base Ketchikan, a conceptual understanding of the volume and location of the contamination was needed. Figure A-5 presents the extent of contamination at the site; the volume of associated soil is presented in Table 2-2 (Section 2.5). Approximately 3,170 cubic yards (cy) of metal- and PCB-contaminated soil are present at the BSY.

2.9.1.1 Alternative 1: No Action

- No response action would be taken. This alternative is a baseline for comparison as required under the NCP [40 CFR 300.430(e)(6)].
- Exposure risks to HHE would persist. Administrative approval would be unlikely.

2.9.1.2 Alternative 2: Limited PCB Removal and LUCs

- All PCB-contaminated soil above the ADEC Method Two direct contact cleanup level (1 mg/kg), estimated at 84 cy, would be excavated and removed for disposal at an approved facility in the contiguous United States.
- Confirmation soil samples would be collected from the excavations to show that remaining PCB concentrations are below the cleanup level.
- The approximate cost for this alternative is $0.61 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is nine days.
- This alternative requires five-year reviews under CERCLA. Metal-contaminated soil would remain above ACLs. LUCs such as barriers or fences for the public would be implemented to limit site access and, therefore, exposure to metals. As part of the LUCs there will be a requirement to inspect for erosion and other site conditions. Only nonresidential use would be permitted. USCG would be responsible for enforcing these LUCs and maintenance of these LUCs.
- Inspections would occur no less often than once every five years, in conjunction with the five-year reviews.

2.9.1.3 Alternative 3: Concrete Cap and LUCs

- Soil contaminated with PCBs greater than 1 mg/kg and arsenic greater than 33 mg/kg would be capped with concrete. The concrete would be laid 12 inches thick and would cover an area of approximately 18,000 square feet. The slab would require structural reinforcement in order to meet storage requirements for the buoys and sinkers that weigh a minimum of

20,000 pounds currently stored on the gravel pad. Surface drainage would have to be incorporated into the design to divert surface water.

- The approximate cost for this alternative is $0.80 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 11 days.
- This alternative requires five-year reviews under CERCLA. Metal-contaminated soil would remain above ACLs. LUCs such as controlled access, dig restrictions, and signage would be implemented to limit site access and, therefore, exposure to PCBs and metals. Only nonresidential use would be permitted. USCG would be responsible for enforcing and maintaining these LUCs.
- Cap inspections would occur once a year for the first five years, then every five years thereafter, indefinitely or until determined to be no longer necessary during the five-year review process.

2.9.1.4 Alternative 4: Gravel Cap and LUCs

- Soil contaminated with PCBs greater than 1 mg/kg and arsenic greater than 33 mg/kg would be capped with a minimum 12-inch gravel cap. The gravel would be laid 12 inches thick and would cover an area of approximately 18,000 square feet. The cap would require structural support, a geogrid or other appropriate geocell-type reinforcement, in order to meet storage requirements for the buoys and sinkers that weigh a minimum of 20,000 pounds currently stored on the gravel pad.
- Appropriately sized gravel/rock would be chosen based on availability within Ketchikan and more widely where necessary. Due to the high natural concentrations of arsenic in the Ketchikan area, it is recommended that fill is confirmed clean with characterization sampling prior to using it as material in the BSY. Crushed concrete or other recycled alternatives may be used, providing the material meets the structural requirements and specifications of geogrid/geotextile.
- The approximate cost for this alternative is $0.72 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 11 days.
- This alternative requires five-year reviews under CERCLA. Metal-contaminated soil would remain above ACLs. LUCs such as controlled access, dig restrictions, and signage would be implemented to limit site access and, therefore, exposure to PCBs and metals. Only nonresidential use would be permitted. USCG would be responsible for enforcing these LUCs and maintenance of these LUCs.
- Cap inspections would occur once a year for the first five years, then every five years thereafter, indefinitely or until determined to be no longer necessary during the five-year review process.

2.9.1.5 Alternative 5: Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal

- All PCB-contaminated soil above the ADEC Method Two direct contact cleanup level (1 mg/kg), estimated at 84 cy, would be excavated and removed for disposal at an approved facility in the contiguous United States.
- Confirmation soil samples would be collected from the excavations to show that remaining PCB concentrations are below the cleanup level.
- The gravel fill present onsite would then be excavated to approximately 4 feet, where concrete riprap boulders characterize the BSY foundation. Previous data indicate the depth and lateral distance of the excavation would be determined by arsenic, but confirmation sampling at the extent of the excavation would include total metals.
- A stabilization product such as EcoBond would be placed on the soil in situ using water and a sprayer to increase stabilization and prevent leaching of arsenic. An excavator would disturb the soil in situ and add the EcoBond, then mix the two media together. This action would limit the migration of arsenic from the site. Post-application samples would be collected after stabilization and analyzed for total arsenic and other metals in soil and total metals after performing the toxicity characteristic leaching procedure (TCLP).
- The approximate cost for this alternative is $1.26 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 17 days.
- This alternative requires five-year reviews under CERCLA. LUCs such as controlled access, dig restrictions, and signage would be implemented to limit site access and, therefore, exposure to metals. As part of the LUCs there will be a requirement to inspect for erosion and other site conditions. Only nonresidential use would be permitted. USCG would be responsible for enforcing these LUCs and maintenance of these LUCs.
- Inspections would occur once a year for the first five years, then every five years thereafter, indefinitely or until determined to be no longer necessary during the five-year review process.

2.9.1.6 Alternative 6: Excavation, Gravel Fill, and Offsite Disposal

- All PCB-contaminated soil above the ADEC Method Two direct contact cleanup level (1 mg/kg) and arsenic-contaminated soil above the ACL (33 mg/kg), estimated at 3,170 cy, would be excavated and removed for disposal at an approved facility in the contiguous United States.
- Segregating excavated soil into Resource Conservation and Recovery Act (RCRA) hazardous and nonhazardous waste streams and containing arsenic-contaminated soils in stockpiles.
- Confirmation soil samples would be collected from the excavations to show that remaining PCB and metal concentrations are below the cleanup level and ACL, respectively.

- Approximately 3,170 cy of gravel fill would be required to refill the excavation (at 4-foot depth) and provide a structurally stable area for replacement of the buoys.
- At the conclusion of site work, the BSY would be available for UU/UE. No periodic or CERCLA five-year reviews would be required, as any remaining contaminants would be at concentrations below ADEC cleanup levels.
- The approximate cost for this alternative is $3.37 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 36 days.

2.9.2 Alternatives for Intertidal Sediment at the Inner Boathouse

To develop a remedial strategy for metal- and PCB-contaminated sediment at the Inner Boathouse, a conceptual understanding of the volume and location of contamination was developed. Figure A-6 presents the extent of contamination at the site; Table 2-2 (Section 2.5) presents the volume of sediment associated with this AOC. Five remedial alternatives were initially developed for this AOC; however, Alternatives 2 (PCB Removal and LUCs) and 5 (In Situ Stabilization) were rejected in the FFS due to the limited effectiveness associated with Alternative 2 and the prohibitive costs and difficult degree of implementation associated with Alternative 5 (USACE 2018).

2.9.2.1 Alternative 1: No Action

- No response action would be taken. This alternative is a baseline for comparison as required under the NCP [40 CFR 300.430(e)(6)].
- Exposure risks to HHE would persist. Administrative approval would be unlikely.

2.9.2.2 Alternative 3: Limited Cap and LUCs

- Limited capping will involve placing a layer (approximately 6 to 30 inches) of clean riprap over the impacted sediment area with concentrations in surface sediment greater than the site-specific ACLs. Since the water depth in the intertidal areas ranges from 0 to 3 meters in depth, the riprap thickness would vary throughout the intertidal sediment at the Inner Boathouse AOC.
- The initial capping is expected to remain effective long enough to allow natural deposition of clean sediment over impacted riprap areas. This deposition layer would accrue over the top of the limited capping and provide a surface stratum of cleaner sediment, resulting in both a reduction in surface contaminant concentrations (via the limited capping placement)

and a long-term barrier to exposure (via additional deposition of clean marine sediment). Biological and wave-induced mixing would further dilute potential contaminated residuals.

- The approximate cost for this alternative is $1.53 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 16 days.
- This alternative requires five-year reviews under CERCLA. Metal- and PCB-contaminated sediment would remain above ACLs. LUCs would include controlled access, shellfish consumption warnings, and limitations on future in-water and in-sediment development. USCG would be responsible for enforcing these LUCs and maintenance of these LUCs.
- Cap inspections would occur every five years to ensure it is still functioning correctly. This would be required indefinitely, or until determined to be no longer necessary during the five-year review process, to ensure long-term protectiveness.

2.9.2.3 Alternative 4: Removal and Offsite Disposal

- All PCB- and metal-contaminated sediment above ACLs, estimated at 97 cy, would be excavated and removed for disposal at an approved facility in the contiguous United States.
- Confirmation sediment samples would be collected from the excavation to show that remaining contaminant concentrations are below the ACLs.
- Due to the location of contamination and obstruction of piers and pilings, excavation of sediment would need to occur using hand tools and manual labor.
- Small pieces of equipment, such as a mini skid steer, could be used to carry excavated material and equipment.
- Removal would occur only during low tide. Temporary cover such as gravel or sandbags may be required to cover the exposed working area prior to the next tidal working window.
- Excavated sediment would be loaded directly into 1-cy dewatering filter bags (or similar), which would then be placed into 1-cy containment totes (or appropriate size for the bags).
- Sediment and dewatered liquid would be sampled for waste characterization and management.
- The approximate cost for this alternative is $1.42 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 37 days.
- Excavation of contaminated sediment will not prevent deposition or redeposition of contaminated sediment at the AOC from locations within the range of tidal influence (i.e., within approximately 6 miles of the AOC). However, by removing the existing contaminated sediment at the AOC, the degree of risk reduction would offset the potential future risk associated with deposition.

2.9.3 Alternatives for Intertidal Sediment at the Inner Marine Ways

To develop a remedial strategy for the heavy metal-contaminated intertidal sediment at the Base Ketchikan marine ways, a conceptual understanding of the volume and location of the contamination was developed. Figure A-7 presents a visual interpretation of the extent of contamination at the site, as described in Section 2.5.9. Five remedial alternatives were initially developed for the Inner Marine Ways AOC; however, Alternative 5 (Limited Removal and Capping) was rejected in the FFS (USACE 2018) due to implementability concerns associated with maintaining operation of the railway during and after construction of the cap, and Alternative 2 (LUCs) was rejected during the Proposed Plan phase because it does not address ecological risk associated with metal exposure in the intertidal area (USACE 2020).

2.9.3.1 Alternative 1: No Action

- No response action would be taken. This alternative is a baseline for comparison as required under the NCP [40 CFR 300.430(e)(6)].
- Exposure risks to HHE would persist. Administrative approval would be unlikely.

Note that for the purposes of the FFS and this ROD the No Action alternative for the Inner Marine Ways assumes LUCs are not in place.

2.9.3.2 Alternative 3: Limited Land-Based Excavation, Offsite Disposal, and LUCs

- Accessible metal-contaminated sediment above ACLs, estimated at 220 cy, would be excavated and removed for disposal at an approved facility in the contiguous United States.
- No sediment would be removed from below the low tide mark; approximately 10 percent of the contaminated area would remain.
- Confirmation sediment samples would be collected from the excavation to show that remaining contaminant concentrations are below the ACLs.
- Standard construction equipment (an excavator or similar machine) would be used and removal would occur only during low tide. Remaining sediment around the rails would be hand excavated to ensure the maximum extent of contamination is removed.
- Excavated sediment would require some dewatering, either by being loaded directly into dewatering filter bags, which would then be placed into containment totes, or by being allowed to dewater within the working area prior to removal, then transported with a flocculent or similar method to ensure that no liquid leaks.

- Sediment and dewatered liquid would be sampled for waste characterization and management.
- The approximate cost for this alternative is $1.23 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 15 days.
- This alternative requires five-year reviews under CERCLA. Metal-contaminated sediment would remain above ACLs. LUCs would include shellfish consumption warnings. USCG would be responsible for enforcing these LUCs and maintenance of these LUCs.

2.9.3.3 Alternative 4: Dredging and Limited Land-Based Excavation

- Metal-contaminated sediment above ACLs, estimated at 308 cy, would be excavated and removed for disposal in the contiguous United States.
- Confirmation sediment samples would be collected from the excavation to show that remaining contaminant concentrations are below the ACLs.
- A barge-mounted excavator would be used to dredge the subtidal sediments, as well as the submerged intertidal sediments at high tide. A global positioning system (GPS) unit would be used to determine the exact dredging locations.
- Some excavation at low tide would occur for a small area of sediment underneath the marine ways shed because this area would not be accessible by dredge. Remaining sediment around the rails would be hand excavated to ensure the maximum extent of contamination is removed.
- Following removal, the slurry mixture would be dewatered prior to transportation and disposal. A pilot test may be required to determine the best method for this site. Examples include the addition of a coagulant or flocculent, use of geobags (sacks made of a geofabric that allow water to escape but sediment to remain), and passive dewatering. Passive dewatering usually requires a large amount of space as the sediment is either allowed to dry naturally or agitated mechanically. It is unlikely that Base Ketchikan has the capacity for this method. Cost estimates for this alternative assume a slurry will be pumped to geobags staged at the BSY.
- Sediment and any dewatered liquid would be sampled for waste characterization and management .
- The approximate cost for this alternative is $1.72 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 19 days.

2.9.4 Alternatives for Subtidal Sediment

To develop a remedial strategy for subtidal contaminated sediment in this AOC, a conceptual understanding of the volume and location of the contamination was needed. This is presented in Section 2.5.10, Figure A-8, and Table 2-2 (Section 2.5). The subtidal area has an estimated

volume of 400 cy of sediment to be addressed in this ROD. The accessible volume of sediment is approximately 180 cy. The remainder is beneath the dock and not accessible by any practicable removal method. Remedial alternatives for this area were considered to address only potential ecological risk because there is no current human exposure pathway. Ecological risk is possible but only theoretical based on the bulk sediment concentrations. A screening level risk assessment completed in 2003 concluded ecological risk to foraging piscivorous birds or marine mammals was not high enough to pose unacceptable risk based on foraging areas and toxicity data. The contamination is not present across a large enough area to have an unacceptable effect. Risk to bivalves was considered moderated through bioavailability but is theoretically possible. A diverse epibenthic community has been observed in the area. Thus, ecological risk to sediment-dwelling organisms is possible, but no widespread effects to higher trophic levels are predicted.

2.9.4.1 Alternative 1: No Action

- No response action would be taken. This alternative is a baseline for comparison as required under the NCP [40 CFR 300.430(e)(6)].
- Exposure risks to HHE would persist. Administrative approval would be unlikely.

2.9.4.2 Alternative 2: LUCs and LTM

- LUCs would be used to restrict invasive activities and protect human health from exposure to PCBs and metals contamination in sediment above the site-specific RAOs and ACLs. LUCs would include signage to prevent access and harvesting of marine organisms and limitations on future in-water and in-sediment development (e.g., construction or other human activities that may disturb contaminated sediment).
- The approximate cost for this alternative is $0.55 million, based on a 30-year implementation period; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 0 days. This alternative will not eliminate or minimize ecological exposure to contamination, nor would it prevent bioaccumulation or biomagnification to upper trophic-level consumers from ingestion of benthic organisms.
- This alternative requires five-year reviews under CERCLA. PCBs- and metal-contaminated sediment would remain above ACLs.
- LTM inspections would occur no less often than once every five years, in conjunction with the five-year reviews, and would include collection of four subtidal sediment samples in the AOC along the pier to ensure that contaminants are stabilized. This would be required indefinitely, or until contaminants are stabilized, to ensure long-term protectiveness.

2.9.4.3 Alternative 3: Limited Removal and Offsite Disposal with LUCs

- PCB- and metal-contaminated sediment above ACLs, estimated at 180 cy, would be excavated and removed for disposal in the contiguous United States.
- Confirmation sediment samples would be collected from the excavation to show that remaining contaminant concentrations are below the ACLs.
- Either hydraulic dredging with a cutter head or similar machine or excavation using a barge-mounted excavator would be used to dredge the subtidal sediments. A GPS unit would be used to determine the exact dredging locations.
- There are areas within this AOC that are, for health and safety reasons, practically inaccessible. A technical impracticability waiver would be appropriate for this area.
- Following removal, the slurry mixture would be dewatered prior to transportation and disposal. A pilot test may be required to determine the best method for this site. Examples include the addition of a coagulant or flocculent, use of geobags (sacks made of a geofabric that allow water to escape but sediment to remain), and passive dewatering. Passive dewatering usually requires a large amount of space as the sediment is either allowed to dry naturally or agitated mechanically. It is unlikely that Base Ketchikan has the capacity for this method. Cost estimates for this alternative assume a slurry will be pumped to geobags staged at the BSY.
- Sediment and dewatered liquid would be sampled for waste characterization and management.
- Typically, measures are required to reduce resuspension of sediment during dredging. In order to determine the appropriate mitigation, factors such as sediment grain size, site conditions, and underwater impediments would have to be established.
- The approximate cost for this alternative is $2.27 million; project duration (i.e., the time required to complete the remedial action and achieve RAOs) is 24 days.
- This alternative requires five-year reviews under CERCLA. Metal- and PCB-contaminated sediment would remain above ACLs. LUCs would include shellfish consumption warnings. USCG would be responsible for enforcing these LUCs and maintenance of these LUCs.

2.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, the alternatives were evaluated using the nine criteria described in CERCLA §121(a) and (b) and 40 CFR Section 300.430 (e)(9)(i) as cited in NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. Two of the nine criteria are considered threshold criteria:

- Overall protection of HHE
- Compliance with, or an applicable waiver of ARARs

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one balancing criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria indicate whether technical and administrative issues have been met by the alternative and address the public concerns in the decision-making process. Two of the nine criteria are considered modifying criteria:

- Community acceptance
- State/support agency acceptance

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how each alternative compares to the other alternatives under consideration. Tables 2-11 through 2-14 summarize how well each alternative satisfies the evaluation criteria and provides a basis for comparison to the other alternatives under consideration.

Table 2-11
Screening of Alternatives for Metals- and Polychlorinated Biphenyl-Contaminated Soil at AOC 1 BSY

Alternative	Threshold Criteria		Primary Balancing Criteria					Modifying Criteria	
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost (millions)	State Acceptance	Community Acceptance
Alternative 1: No Action	○	○	0	0	0	5	$0	No	No
Alternative 2: Limited PCB Removal and LUCs	●	●	2	0	3	3	$0.61	Yes	Yes
Alternative 3: Concrete Cap and LUCs	●	●	5	0	3	3	$0.80	Yes	Yes
Alternative 4: Gravel Cap and LUCs	●	●	4	0	3	3	$0.72	Yes	Yes
Alternative 5: Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal	●	●	5	5	5	3	$1.26	Yes	Yes
Alternative 6: Excavation, Gravel Fill, and Offsite Disposal	●	●	5	0	4	3	$3.37	Yes	Yes

Notes:

● or 5 = fully meets criterion

◐ or 1 to 4 = somewhat meets criterion

○ or 0 = does not meet criterion

For definitions, refer to the Acronyms and Abbreviations section.

Table 2-12
Screening of Alternatives for Metals- and Polychlorinated Biphenyl-Contaminated Sediment at AOC 2 Inner Boathouse

Alternative	Threshold Criteria		Primary Balancing Criteria					Modifying Criteria	
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost (millions)	State Acceptance	Community Acceptance
Alternative 1: No Action	○	○	0	0	0	5	$0	No	No
Alternative 3: Limited Cap and LUCs	●	●	2	0	3	2	$1.53	Yes	Yes
Alternative 4: Removal and Offsite Disposal	●	●	5	0	5	3	$1.42	Yes	Yes

Notes:

● or 5 = fully meets criterion

◐ or 1 to 4 = somewhat meets criterion

○ or 0 = does not meet criterion

For definitions, refer to the Acronyms and Abbreviations section.

Table 2-13
Screening of Alternatives for Metals-Contaminated Sediment at AOC 3 Inner Marine Ways

Alternative	Threshold Criteria		Primary Balancing Criteria					Modifying Criteria	
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost (millions)	State Acceptance	Community Acceptance
Alternative 1: No Action	○	○	0	0	0	5	$0	No	No
Alternative 3: Limited Land-Based Excavation, Offsite Disposal, and LUCs	●	●	3	0	4	3	$1.23	Yes	Yes
Alternative 4: Dredging and Limited Land-Based Excavation	●	●	4	0	3	2	$1.72	Yes	Yes

Notes:

● or 5 = fully meets criterion

◐ or 1 to 4 = somewhat meets criterion

○ or 0 = does not meet criterion

For definitions, refer to the Acronyms and Abbreviations section.

Table 2-14
Screening of Alternatives for Metals- and Polychlorinated Biphenyl-Contaminated Sediment at AOC 4 Subtidal Sediment

Alternative	Threshold Criteria		Primary Balancing Criteria					Modifying Criteria	
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost (millions)	State Acceptance	Community Acceptance
Alternative 1: No Action	○	○	0	0	0	5	$0	No	No
Alternative 2: LUCs and LTM	●	●	1	0	2	4	$0.55	Yes	Yes
Alternative 3: Limited Removal and Offsite Disposal with LUCs	●	●	3	0	3	2	$2.27	Yes	Yes

Notes:

● or 5 = fully meets criterion

◐ or 1 to 4 = somewhat meets criterion

○ or 0 = does not meet criterion

For definitions, refer to the Acronyms and Abbreviations section.

2.10.1 Overall Protection of HHE

Overall protection of HHE addresses whether each alternative provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or LUCs.

The No Action alternatives fail to comply with the threshold criteria for PCBs or metals. Because these alternatives lack either LUCs or contaminant removal, a possibility exists that humans could be exposed to site contaminants that are above cleanup levels. The remaining alternatives are protective of HHE at project completion and would be implemented in a manner that complies with all chemical-, location-, and action-specific ARARs. Because all Alternative 1s fail to attain the threshold criteria, they will not be considered further, but will be used as a baseline for comparison of the other alternatives.

2.10.1.1 Soil at the Buoy Storage Yard

Alternatives 2, 3, 4, 5, and 6 all either remove or treat PCB and arsenic contamination in soil or include measures to prevent human exposure. Where arsenic contamination above the ACL remains (under Alternatives 2, 3, 4, and 5), LUCs will be implemented to protect HHE. These alternatives meet the threshold criteria and, thus, are further assessed in this evaluation.

2.10.1.2 Intertidal Sediment at the Inner Boathouse

Alternatives 3 and 4 either remove PCB and metals contamination in sediment or include measures to prevent human exposure. Where PCBs and metals contamination above the ACLs remains (under Alternative 3), LUCs will be implemented to protect HHE. These alternatives meet the threshold criteria and, thus, are further assessed in this evaluation.

2.10.1.3 Intertidal Sediment at the Inner Marine Ways

Alternatives 3 and 4 either remove metals contamination in sediment or include measures to prevent human exposure. Where metals contamination above the ACLs remains (under Alternatives 3 and 4), LUCs will be implemented to protect HHE. These alternatives meet the threshold criteria and, thus, are further assessed in this evaluation.

2.10.1.4 Subtidal Sediment

Alternatives 2 and 3 either remove PCB and metals contamination in sediment or include measures to prevent human exposure. Where PCBs and metals contamination above the ACLs remains (under Alternatives 2 and 3), LUCs will be implemented to protect HHE. These alternatives meet the threshold criteria and, thus, are further assessed in this evaluation.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Under CERCLA §121(d) and NCP §300.430(f)(1)(ii)(B), remedial actions at CERCLA sites are required to legally satisfy ARARs on federal and state levels unless waived under CERCLA §121(d)(4). ARARs are divided into three categories. Chemical-specific ARARs are used to set cleanup levels that are protective of both human health and ecological receptors (i.e., 18 AAC 75 and project-specific ACLs) during site work. Location-specific ARARs require that potential wildlife habitat, migration patterns, and negative effects on the ecosystem be considered as part of project design. Action-specific ARARs are included to highlight proper waste management procedures and provide pollution control and notification procedures in the event of a spill. ARARs, once identified, are then further classified as applicable, relevant, and appropriate, or to be considered. The ARARs for Base Ketchikan are presented in Appendix B.

Applicable requirements refer to the cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by the State of Alaska in a timely manner and that are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at

the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Compliance With ARARs addresses whether a remedy will meet all of the ARARs of other federal and state environmental statutes or provides a basis for invoking a waiver. There are areas within AOC 4 Subtidal Sediment that are, for health and safety reasons, practically inaccessible. A technical impracticability waiver would be appropriate for this area.

Because the No Action alternatives would result in contaminated soil or sediment remaining onsite in an uncontrolled manner, they would not be protective of human health or the environment under any exposure scenario and therefore would not comply with ARARs.

AOC 1 Alternatives 2, 3, 4, 5, and 6; AOC 2 Alternatives 3 and 4; AOC 3 Alternatives 3 and 4; and AOC 4 Alternatives 2 and 3 are compliant with the ARARs. All waste streams will be handled, manifested, transported, and disposed of in accordance with applicable federal and state regulations.

2.10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of HHE over time, once RAOs have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

2.10.3.1 Soil at the Buoy Storage Yard

Alternatives 2, 5, and 6 have the potential to be highly effective regarding the removal of contaminated soil at the BSY. PCB-contaminated soil would be removed and disposed of offsite for a high degree of long-term effectiveness under Alternatives 2, 5, and 6. Under Alternative 2, arsenic-contaminated soil would remain and LUCs would be implemented to protect HHE. Under Alternative 5, the remaining arsenic-rich soil would be treated in situ for a high degree of long-term effectiveness. Under Alternative 6, arsenic-contaminated soil would also be

removed. Five-year reviews would be required for Alternatives 2 and 5 to monitor and control the site.

Alternatives 3 and 4 have the potential to be moderately to highly effective for addressing PCB and arsenic contamination in soil at the BSY. The long-term effectiveness of Alternatives 3 and 4 are dependent on maintenance of the concrete or gravel cap. The covers may require periodic maintenance. LUCs would be instated to ensure the quality of the caps do not degrade and lose integrity over time. Contamination at concentrations above the RAOs will remain onsite for more than five years; therefore, CERCLA five-year reviews would be required for both alternatives.

2.10.3.2 Intertidal Sediment at the Inner Boathouse

The long-term effectiveness of Alternative 3 is dependent on maintenance of the riprap cap. The riprap cover may require periodic maintenance. Contamination at concentrations above the RAOs will remain onsite for more than five years; therefore, CERCLA five-year reviews would be required.

Alternative 4 has the potential to be highly effective for addressing PCB and metals contamination. PCB- and metal-contaminated sediment would be removed from the site for a high degree of long-term effectiveness.

2.10.3.3 Intertidal Sediment at the Inner Marine Ways

Alternative 3 would substantially be permanent as the majority of contaminated sediment would be removed. Residual COCs would remain above the established RAOs but it is considered that the small volume remaining would not pose a significant risk to the environment. Human health exposure would be controlled through LUCs and five-year reviews. These are considered effective at Base Ketchikan as the industrial area and controlled access to the base already prevents uncontrolled access. Five-year reviews would be in place to monitor and control the site.

Alternative 4 would be permanent as the contaminated sediment would be removed. No residual contamination above the site-specific ACLs would remain.

2.10.3.4 Subtidal Sediment

Alternative 2 is effective based on the premise that there is not an unacceptable ecological risk from PCB and heavy metal contamination in hard to reach subtidal areas around Base Ketchikan. Long-term effectiveness would be monitored indefinitely or until determined to be no longer necessary during the five-year review process. Alternative 3 has the potential to be moderately effective for targeting PCB- and heavy metal-contaminated subaqueous sediment in areas where sediment is accessible. The sediment removed by dredging would be removed to an offsite storage area for a moderate degree of long-term effectiveness. It is reasonable to assume that with the stringent access controls and the industrial area at Base Ketchikan, LUCs would maintain effective control over human access to the site and activities such as shell fish harvesting. LUCs and five-year reviews would have to be maintained through the base command at the site in that manner would be effective. Five-year reviews would be in place to monitor and control the site.

2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

2.10.4.1 Soil at the Buoy Storage Yard

Only Alternative 5 satisfies the treatment preference. No PCBs from the two locations with exceedances would remain at the site above the ADEC cleanup level under Alternative 5; instead, the PCB-contaminated soil would be disposed of offsite. The PCB removal step for this alternative would not satisfy the statutory preference for treatment of contaminated material. The treatment of the remaining arsenic-rich soil in situ would satisfy the statutory preference for treatment.

2.10.4.2 Intertidal Sediment at the Inner Boathouse

Alternatives 3 and 4 would not satisfy the statutory preference for treatment as a principal element. The goal of Alternative 3 would be to prevent exposure to, rather than treatment of, PCB- and metal-contaminated sediment. Under Alternative 4, no PCBs or metals would remain at the site above the site-specific ACLs. Instead, excavated sediment would be sent to a treatment, storage, and disposal facility (TSDF) (RCRA-regulated, when necessary) for ultimate disposal.

2.10.4.3 Intertidal Sediment at the Inner Marine Ways

Alternatives 3 and 4 would not satisfy the statutory preference for treatment as a principal element. Under Alternative 3, the majority of contaminated sediment would permanently be removed through disposal. It is estimated that approximately 10 to 20 cy of potentially contaminated sediment would remain completely submerged associated with sample KS-T4-2, collected in 2002. The remaining sediment would not be treated although may disperse through natural sediment processes. Alternative 4 also reduces volume of contaminated material through removal. Material would be transported to a TSDF (RCRA-regulated, when necessary) for ultimate disposal via barge.

2.10.4.4 Subtidal Sediment

Alternatives 2 and 3 do not propose to treat the contaminated sediment and do not meet the statutory preference for treatment as the principal element.

2.10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, or the environment during construction, and operation of the remedy until cleanup levels are achieved.

2.10.5.1 Soil at the Buoy Storage Yard

Excavation of PCB-contaminated soil under Alternatives 2, 5, and 6 and arsenic-contaminated soil under Alternative 6 results in some potential risk to workers and site users during

implementation, as the risk of exposure to contaminated soil would temporarily increase. Development of a health and safety plan (HSP) and use of appropriate personal protective equipment (PPE) would be necessary to minimize risks to workers and site users. The removal operations may affect site users and workers in surrounding areas, primarily through noise, heavy equipment operation, traffic onsite, and potentially through a minor decrease in available parking space during operations if excavated soil is stored onsite. Engineering controls to reduce or eliminate fugitive dust and tracking of soil offsite would be implemented to reduce potential risks.

Alternatives 3 and 4 would be moderately protective of the community and site workers during the remedial actions. Because of surface contamination, there is a possibility of short-term exposure risk to workers associated with construction of the concrete and gravel caps. The capping and installation of the geogrid under Alternative 3 may temporarily affect site personnel in the immediate vicinity through noise, heavy equipment operation, traffic onsite, and potentially through a decrease in parking space adjacent to the BSY. Short-term risks associated with cap maintenance may also present an exposure concern for future site workers. Natural processes would not reduce PCBs or metals to concentrations below the RAOs.

Treatment of the remaining arsenic-rich soil at the BSY under Alternative 5 results in some potential risk to workers and personnel at the site during treatment. An employee from Metals Treatment Technologies, LLC (MT2) would oversee the excavation, mixing, and benching of the soil, which mitigates some of the potential risk. Treatment activities may affect workers and site personnel in the immediate vicinity through noise, heavy equipment operation and potentially through a decrease in parking space adjacent to the BSY due to possible benching of the treated soil (e.g., 1 foot at a time, 4 feet total of soil to mix). Engineering controls such as fugitive dust control can be implemented, as needed, to reduce potential risks.

2.10.5.2 Intertidal Sediment at the Inner Boathouse

Alternative 3 would be moderately protective of the community and site workers during the remedial action. Because of surface contamination, there is a possibility of short-term exposure risk to workers associated with construction of the riprap cap. Short-term risks associated with

cap maintenance may also present an exposure concern for future site workers. However, natural processes would not reduce PCBs or metals to concentrations below the RAOs.

Excavation of PCB- and metal-contaminated sediment under Alternative 4 results in some potential risk to workers and site users during implementation, as the risk of exposure to contaminated sediment would temporarily increase. Development of an HSP, as well as use of appropriate PPE, would be necessary to minimize risks to workers and site users. The removal operations may affect site users and workers in surrounding areas, primarily through noise, heavy equipment operation, traffic onsite, and potentially through a minor decrease in available parking space during operations if excavated sediment is stored onsite. Controls to reduce or eliminate tracking of sediment offsite would be implemented to reduce the potential risks.

2.10.5.3 Intertidal Sediment at the Inner Marine Ways

Excavation of contaminated sediment under Alternatives 3 and 4 and dredging under Alternative 4 results in some potential risk to workers and site users during implementation, as the risk of exposure to contaminated sediment would temporarily increase. Development of an HSP, and use of appropriate PPE, would be necessary to minimize risks to workers and site users. The removal operations may affect site users and workers in surrounding areas, primarily through noise, heavy equipment operation, traffic onsite, and potentially through a minor decrease in available parking space during operations if excavated sediment is stored onsite. In addition, the removal effort in the Inner Marine Ways area would have to be cognizant of the base activity and coordinate with any boat maintenance activity. Controls to reduce or eliminate tracking of sediment offsite would be implemented to reduce the potential risks.

2.10.5.4 Subtidal Sediment

Implementing Alternative 2 would not involve intrusive activities or other actions that would subject workers or members of the community to short-term risks. Implementation would have no negative impacts on community or worker health and safety or environmental quality. Development of an HSP, and use of appropriate PPE, would be necessary to minimize risks during LTM activities.

Removal of contaminated sediment under Alternative 3 results in some potential risk to site personnel during execution of the field stage of the project, as the risk of exposure to contaminated sediment would temporarily increase. In addition, sediment is likely to be disturbed during removal, which is typical for all dredging activities; mitigation measures, such as those described in FFS, would be employed (USACE 2018). Development and adherence of an HSP, and use of appropriate PPE, would be necessary to minimize the risk to personnel.

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

2.10.6.1 Soil at the Buoy Storage Yard

Alternatives 2 and 3 are easily implemented from a technical standpoint. Equipment and personnel are readily available in the area. Excavation at the BSY would not be complicated (Alternative 2), and contractors and materials required to implement Alternatives 2 and 3 are easily obtained. For Alternative 2, the number of shipping containers and space needed for temporary storage may be difficult and would require fairly involved logistical organization. Equipment and materials may need to be staged offsite. Although Alternatives 2 and 3 do not provide for UU/UE, current and expected future use at the BSY are conducive to both alternatives' protective measures. Care would be taken to avoid spreading contamination during removal and capping activities. Contamination at concentrations above the RAOs would remain onsite for more than five years; therefore, CERCLA five-year reviews would be required. Stakeholder approval should be possible, though more challenging under Alternative 3 because PCB- and metal-contaminated soil remains onsite.

The implementation of Alternative 4 would be moderately to highly complex in terms of logistics. Equipment and personnel are available in the area; however, installation of the geogrid may require the presence of a skilled technician knowledgeable of the specific geotextile to

ensure the installation is executed correctly. The geogrid materials would be barged from Seattle, Washington, to Ketchikan, Alaska. Mobilization of additional supplies and personnel could be carried out through air transport to Ketchikan. Demobilization of equipment, personnel, and surplus supplies would be handled similarly to mobilization. Stakeholder approval should be easily attained.

Implementation of Alternative 5 would be moderately challenging in terms of logistics. Equipment and some personnel are readily available in the area; however, a project manager/field chemist from MT2, would need to oversee the mixing of the EcoBond compound, and the compound material would need to be shipped/barged from Seattle, Washington, to Ketchikan, Alaska. Mobilization of additional supplies and personnel could be done through air transport to Ketchikan. Timing the project start date is critical because, prior to project execution, MT2 would need to process two elevated arsenic soil samples to ensure efficiency of the compound and, if necessary, tailor the chemical constituents. At project execution, the implementation would be minimally challenging with regard to logistics and would not require much time.

The implementation of Alternative 6 would be moderately logistically challenging. Equipment and personnel are available in the area; however, removal of the soil, containing it in Super Sacks, and barging the soil to an out-of-state TSDF requires complex coordination between subcontractors, waste management personnel and shipping agencies. Mobilization of supplies and personnel could be carried out through air transport to Ketchikan. After excavation, 2 feet of gravel fill would be placed at the BSY. Sourcing of the gravel fill is important because it is preferable to put clean fill at the BSY without the naturally occurring concentrations of arsenic, which can be typical in Southeast Alaska.

2.10.6.2 Intertidal Sediment at the Inner Boathouse

Implementation of Alternative 3 would provide a moderate challenge and implementation of Alternative 4 would be logistically challenging. Equipment and personnel are readily available in the area; however, working under the pier and around the concrete pillars presents challenges. Under Alternative 3, small pieces of equipment, such as a mini skid steer could place material

during low tide and be able to reach the majority of the AOC; however, the riprap may need to be placed by hand in some areas of contamination. Under Alternative 4, hand-digging would be the likely methodology with equipment such as a skid steer being used to move Super Sacks. Mobilization of supplies and personnel could be achieved through air transport to Ketchikan. Demobilization of equipment, personnel, and surplus supplies would be handled similarly to mobilization.

Although Alternative 3 does not provide for UU/UE, current and expected future use at the Inner Boathouse are conducive to this alternative's protective measures. Under Alternative 4, sediments would be barged from Ketchikan to the TSDF in the contiguous United States. Care would be taken to avoid spreading contamination during capping and excavation and containerization activities. Contamination at concentrations above the RAOs would remain onsite under Alternative 3 for more than five years; therefore, CERCLA five-year reviews would be required. Stakeholder approval is possible, though more challenging because PCB- and metal-contaminated sediment remains onsite. The implementability factor for this alternative also takes into account the potential challenge of mobilizing to the site every five years and performing maintenance activities on the cap with replacement as necessary. No additional activities would be required for sediment if Alternative 4 were implemented. Stakeholder approval should be easily attained.

2.10.6.3 Intertidal Sediment at the Inner Marine Ways

Generally, implementation of Alternative 3 would be moderately challenging in Ketchikan and working in the submarine environment equipment would be familiar to any proposed contractors. Equipment and personnel are readily available. Logistical challenges of working in the boat maintenance area would have to be managed in coordination with Base Ketchikan. Mobilization would be through barge and air. Demobilization of equipment, personnel, and surplus supplies would be handled similarly to mobilization. Sediments would be barged from Ketchikan to the TSDF in the contiguous United States. Care would be taken to avoid spreading sediment during excavation and containerization activities. No additional activities would be required for sediment if this alternative were implemented. Stakeholder approval should be easily attained.

For Alternative 4, dredging is a commonly employed remediation technique, although it has not been employed during previous investigation activities at Base Ketchikan. It is assumed, for the purposes of this ROD that appropriate barges are available in Ketchikan. Typically for dredging operations, a standard barge would be modified and it is assumed that this can be done within the local area. A long reach exactor would likely be specified. It would be logistically very challenging within the space available at Base Ketchikan to manage the slurry material produced during dredging, although dredging companies are experienced in dealing with this material. Sediments would be barged from Ketchikan to the TSDF in the contiguous United States. No additional activities would be required for sediment if this alternative were implemented. Additional permits may be required for dredging although, given that the area is routinely dredged for navigational and operational purposes, this would be moderately easy to obtain. The land-based excavation would be relatively easy to implement and uses commonly available construction equipment and techniques.

2.10.6.4 Subtidal Sediment

Implementation of Alternative 2 would be straightforward. Personnel are available in the area for setting up LUCs and for LTM. A boat for sampling and personnel for the LTM would be readily available in Ketchikan. If additional personnel were needed, air transport would be provided to Ketchikan, Alaska from other parts of the state.

The implementation of Alternative 3 would be moderately to highly complex in terms of logistics. Subtidal (i.e., mounted from a barge) dredging is a common remediation technique for contaminated sediment sites; however, it has not been used previously at Base Ketchikan. It is noted, however, that dredging activities are typically more commonly applied for larger volumes of sediment where the bedrock does not intrude into the sample area. Scattered remaining debris in the area left behind after previous removal actions may also hamper the operation of the remote-controlled dredge head. It is assumed, for the purposes of this ROD, that appropriate barges are available in Ketchikan. Typically, for dredging operations the barge could be modified locally with appropriate equipment (hydraulic). It would be extremely logistically challenging within the space available at Base Ketchikan to manage the slurry material, although dredging companies are experienced in dealing with the material. The BSY

is assumed to be available for use as a dewatering area. If this is not the case, implementation of this alternative is likely unfeasible. Sediments would be barged from Ketchikan to a TSDF in the contiguous United States. No additional activities would be required for sediment if this alternative were implemented. Additional permits may be required for dredging although, given that the nearby marine railways area is routinely dredged for navigational purposes, this would be moderately easy to obtain.

2.10.7 Relative Cost

Costs for each alternative are presented in Table 2-15. These estimates include labor, equipment, waste transport and disposal, laboratory analysis, sampling, re-seeding, and five-year monitoring where applicable for a period of 30 years although it would continue indefinitely so long as contaminants remain above acceptable levels or until determined to be no longer necessary during the five-year review process.

Table 2-15
Base Ketchikan Alternatives Cost Summary

Alternative	Capital (millions)	Present Worth O&M [1] (millions)	Total Present Worth Cost [2] (millions)
AOC 1 Buoy Storage Yard			
Alternative 1: No Action	$0	$0	$0
Alternative 2: Limited PCB Removal and LUCs	$0.57	$0.04	$0.61
Alternative 3: Concrete Cap and LUCs	$0.64	$0.16	$0.80
Alternative 4: Gravel Cap and LUCs	$0.55	$0.16	$0.72
Alternative 5: Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal	$1.10	$0.16[3]	$1.26
Alternative 6: Excavation, Gravel Fill, and Offsite Disposal	$3.37	$0	$3.37
AOC 2 Inner Boathouse			
Alternative 1: No Action	$0	$0	$0
Alternative 3: Limited Cap and LUCs	$0.52	$1.01	$1.53
Alternative 4: Removal and Offsite Disposal	$1.42	$0	$1.42

Table 2-15 (Continued)
Base Ketchikan Alternatives Cost Summary

Alternative	Capital (millions)	Present Worth O&M [1] (millions)	Total Present Worth Cost [2] (millions)
AOC 3 Inner Marine Ways			
Alternative 1: No Action	$0	$0	$0
Alternative 3: Limited Land-Based Excavation, Offsite Disposal, and LUCs	$1.14	$0.81	$1.23
Alternative 4: Dredging and Limited Land-Based Excavation	$1.72	$0	$1.72
AOC 4 Subtidal Sediment			
Alternative 1: No Action	$0	$0	$0
Alternative 2: LUCs and LTM	$0.37	$0.18	$0.55
Alternative 3: Limited and Removal and Offsite Disposal with LUCs	$2.17	$0.10	$2.27

Notes:
[1] O&M costs include tasks such as site inspections, cap inspections, cap maintenance, and five-year reviews using 5 percent rate of return over 30 years.
[2] Costs estimated with +50% / -30% accuracy based on subcontractor quotes, construction drawings, and engineering estimates. Values include total capital costs, total annual costs, and present worth of annual costs (5 percent rate of return).
[3] The costs presented in the FFS did not include LUC and annual costs. The present worth O&M costs are the same as AOC 1 Alternatives 3 and 4.
For definitions, refer to the Acronyms and Abbreviations section.

2.10.8 State/Support Agency Acceptance

ADEC will not accept the No Action alternatives because they are not protective of HHE, nor do they comply with the ARARs. ADEC concurs that, if implemented correctly, all other alternatives would be protective of HHE. Of these, both USCG and ADEC concur that Alternative 5 is the best remedy for AOC 1 BSY, Alternative 4 is the best remedy for AOC 2 Inner Boathouse, Alternative 3 is the best remedy for AOC 3 Inner Marine Way, and Alternative 2 is the best remedy for AOC 4 Subtidal Sediment because they will achieve RAOs, comply with ARARs, and meet the threshold criteria while providing the best balance of tradeoffs with respect to the balancing criteria, in particular, implementability due to the difficulties associated with remediating marine sediment.

2.10.9 Community Acceptance

During the public comment period for the Proposed Plan (USACE 2020), no public comments were received. A summary of the public comment process is provided in Part 3. Based on the

lack of local response, it is assumed that the community accepts the selection of Alternative 5 for AOC 1 BSY, Alternative 4 for AOC 2 Inner Boathouse, Alternative 3 for AOC 3 Inner Marine Way, and Alternative 2 for AOC 4 Subtidal Sediment as presented in the 2020 Proposed Plan (USACE 2020).

2.11 PRINCIPAL THREAT WASTES

The NCP expects that treatment that reduces the toxicity, mobility, or volume of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or that acts as a source for direct exposure.

The most likely sources of soil contamination at Base Ketchikan include historical site activities, such as buoy storage and maintenance. Buoy paint is considered a potential source for metal contamination at AOC 1 BSY. Contaminant sources for sediment at AOC 2 Inner Boathouse includes debris dumped directly into the water from buildings along the pier. Debris was removed during at least two removal efforts, but some debris remains. Contamination from debris may have caused sediment to become a secondary source. Sediment contamination may also result from other outside sources, including ferry traffic and bilge emptying. It is reasonable to assume that contamination in AOC 3 Inner Marine Ways originates from sandblasting of materials and removal of anti-fouling paint that historically has contained heavy metals. Contaminant sources for AOC 4 subtidal sediment include historical contamination from the removal of bottom anti-fouling paints, which may have moved with stormwater into the deeper sediment and debris dumped directly into the water from buildings along the pier.

The toxicity study performed in 2014 and synthesized in the *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b), determined that bulk sediment where concentrations of two or more metals exceed the ACLs (copper above 330 mg/kg, zinc above

550 mg/kg, lead above 540 mg/kg, and the total of the three metals [copper/lead/zinc] above 1,420 mg/kg), where acid-volatile sulfide-simultaneously extracted metals (AVS-SEM) ratio also predicted bioavailability, and direct toxicity testing confirmed a significant effect should be targeted for cleanup (USACE 2016b, 2017b). Copper, lead, and zinc in sediment could therefore be considered principal threat wastes. Risk to HHE is mitigated by reducing the overall metal concentration across the sediment AOCs to below the ACLs or demonstrating a reduction in bioavailability of metals across the cleanup target area leading to a calculated or predicted toxicity level of "likely not toxic."

2.12 SELECTED REMEDIES

The remedies selected in this ROD were evaluated against the other alternatives in the FFS and presented for public comment in the Proposed Plan. The selected remedies for each AOC are as follows:

- AOC 1 BSY: Alternative 5 Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal
- AOC 2 Intertidal Sediment for the Inner Boathouse: Alternative 4 Removal and Offsite Disposal
- AOC 3 Intertidal Sediment for the Inner Marine Ways: Alternative 3 Limited Land-Based Excavation, Offsite Disposal, and LUCs
- AOC 4 Subtidal Sediment: Alternative 2 LUCs with LTM

These remedies satisfy overall protectiveness, comply with ARAR criteria to the extent practicable, and achieve state and community acceptance. The selected remedies meet the RAOs for all four AOCs as presented in Section 2.8 of this ROD.

The primary indicator of remedial action performance will be satisfying the RAOs for AOCs 1 through 4 (see Section 2.8) and protecting HHE. Performance measures are defined herein as the required actions to achieve RAOs. It is anticipated that successful implementation, O&M, and completion of the performance measures will achieve a protective and legally compliant remedies for AOCs 1 through 4.

These remedies provide the best balance of tradeoffs with respect to the balancing criteria, implementability in particular, and long-term effectiveness and permanence. The selected remedies are protective of HHE because exposure to PCBs and heavy metals is either eliminated by removal or will be controlled through LUCs, inspections, and/or prompt maintenance of any protective cap deficiencies. LUCs are maintained through notice of activity and use limitations on the property. Five-year reviews will be conducted at AOCs 1, 3, and 4 indefinitely or until the AOCs have been approved for UU/UE; USCG will maintain responsibility for these sites in perpetuity or until such a time that contaminants no longer pose a threat to HHE.

As the lead agency, USCG is responsible for implementing, maintaining, and monitoring the response actions identified herein for the duration of the remedies selected in this ROD. The USCG will exercise this responsibility in accordance with CERCLA and the NCP.

2.12.1 Summary of the Rationale for the Selected Remedy

The remedies selected include Alternative 5 – Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal for AOC 1 BSY, Alternative 4 – Removal and Offsite Disposal for AOC 2 Inner Boathouse, Alternative 3 – Limited Land-Based Excavation, Offsite Disposal, and LUCs for AOC 3 Inner Marine Ways, and Alternative 2 – LUCs and LTM for AOC 4 Subtidal Sediment. USCG and ADEC believe that the remedies meet the threshold criteria and provide the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. A comparative analysis among alternatives for AOCs 1 through 4 (refer to Tables 2-11 through 2-14) found AOC 1 Alternative 5, AOC 2 Alternative 4, AOC 3 Alternative 3, and AOC 4 Alternative 2 to be the best response action alternatives for addressing the risks associated with the site characteristics, land use, and type of contamination currently present at AOCs 1 through 4.

2.12.1.1 Soil at the Buoy Storage Yard - Offsite Disposal and Onsite Treatment

Removing all PCB-contaminated soil and treating the remaining arsenic-contaminated soil eliminates the potential for human/ecological exposure and future contaminant migration from AOC 1 BSY. Transportation and disposal costs are moderate and logistics are difficult in a

heavily used site. Alternative 5 allows all PCB-contaminated soil to be safely disposed of offsite and for the remaining arsenic-contamination to become non-hazardous provided that the site is maintained and LUCs are implemented and enforced. This alternative will achieve substantial risk reduction by both treating the source materials constituting principal threats at the site and providing safe management of remaining material. This combination reduces risk sooner and costs less than the other alternatives.

2.12.1.2 Intertidal Sediment at the Inner Boathouse - Removal and Offsite Disposal

Removing all PCB- and metal-contaminated sediment to the extent practicable eliminates the potential for human/ecological exposure and future contaminant migration from AOC 2 Inner Boathouse. Transportation and disposal costs are moderate and logistics are difficult due to working underneath a pier. Alternative 3 allows all of PCB- and metal-contaminated sediment to be safely disposed of offsite. This alternative will achieve substantial risk reduction by removing the source materials constituting principal threats at the site. This combination reduces risk sooner and costs less than the other alternatives.

2.12.1.3 Intertidal Sediment at the Inner Marine Ways - Limited Land-Based Excavation, Offsite Disposal, and LUCs

Removing all metal-contaminated sediment to the extent practicable (except for contaminants at subtidal sample location KS-T4-2) eliminates the potential for human/ecological exposure and future contaminant migration from AOC 3 Inner Marine Ways. No sediment would be removed from below the low tide mark. Although some contaminated sediment will remain under this alternative, it is in a subtidal area; therefore, human access is very limited (and other access would be restricted through LUCs). Transportation and disposal costs are high and logistics are moderate. Alternative 3 allows the majority of metal-contaminated sediment to be safely disposed of offsite and LUCs are implemented and enforced. This alternative will achieve substantial risk reduction by both removing the source materials constituting principal threats at the site and providing safe management of remaining material. This combination reduces risk sooner and costs less than the other alternatives.

2.12.1.4 Subtidal Sediment - LUCs and LTM

Contaminated sediment in the subtidal areas underneath the pier is inaccessible to humans and the potential for adverse effects to marine benthic communities and bird/mammal populations is considered low for the subtidal sediment AOC and no further evaluation or action for the subtidal sediment was recommended in the ERE (USACE 2019). Alternative 2 allows the remaining contamination to be inaccessible provided that LUCs are implemented and enforced. This alternative will achieve risk reduction by providing safe management of remaining material. This alternative reduces risk and costs less than the other alternative.

2.12.2 Description of the Selected Remedies

Remedial alternatives for AOCs 1 through 4 were developed and evaluated in the FFS (USACE 2018). USCG selected Alternative 5 – Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal for AOC BSY, Alternative 3 – Removal and Offsite Disposal for AOC 2 Inner Boathouse, Alternative 4 – Limited for AOC 3 Inner Marine Ways, and Alternative 2 – LUCs and LTM for AOC 4 Subtidal Sediment. The major components of the remedies are listed in the following subsections.

Any changes to the selected remedies as described in this ROD, if they occur, will be documented in a technical memorandum that will be made available in the Administrative Record, an Explanation of Significant Differences document, and/or a ROD amendment.

2.12.2.1 Soil at the Buoy Storage Yard

- All PCB-contaminated soil above the ADEC Method Two direct contact cleanup level (1 mg/kg), estimated at 84 cy, would be excavated and removed for disposal in the contiguous United States.
- PCB concentrations above 1 mg/kg and below 50 mg/kg will be disposed of as nonhazardous waste. Approximately 67 cy of excavated soil is anticipated to have PCB concentrations between 1 and 50 mg/kg and will therefore be shipped as nonhazardous waste in one bulk shipment. Approximately 17 cy of excavated soil is anticipated to have PCB concentrations greater than 50 mg/kg, based on prior analytical sampling and assuming a 15-foot by 15-foot excavation to 3 feet bgs centered at these two sample locations (Figure A-5); these 17 cy will be shipped as hazardous waste.

- Confirmation soil samples will be collected from the excavations to show that remaining PCB concentrations are below the cleanup level (1 mg/kg) at the BSY.
- The gravel fill present onsite would then be excavated to approximately 4 feet, where concrete riprap boulders characterize the BSY foundation. Previous data indicate the depth and lateral distance of the excavation would be determined by arsenic, but confirmation sampling at the extent of the excavation would include total metals.
- A stabilization product such as EcoBond would be placed on the soil in situ using water and a sprayer to increase stabilization and prevent leaching of arsenic. An excavator would disturb the soil in situ and add the EcoBond, then mix the two media together. This action would limit the migration of arsenic from the site. Post-application samples would be collected after stabilization and analyzed for total arsenic and other metals in soil and total metals after performing the TCLP. This will allow for a final cumulative risk calculation.
- Potentially contaminated water (approximately 5 to 10 gallons) resulting from decontamination of excavator buckets during and after excavation of PCB-contaminated soil and during application of EcoBond will be generated. Waste characterization samples will need to be collected from the decontamination water to confirm that the water is nonhazardous prior to disposal. Small quantities (e.g., less than 5 gallons) of PPE and disposable sampling materials will also be generated during remedial activities. PPE and sampling materials waste will be disposed of as nonhazardous waste.
- Inspections and maintenance will be performed to ensure the long-term integrity of the BSY and will occur once a year for the first five years, then every five years thereafter, indefinitely or until determined to be no longer necessary during the five-year review process.
- LUCs such as controlled access, signage, and dig restrictions will be implemented to notify the public of potential risks and limit human exposure to arsenic. These remedy components will be implemented once this ROD has been approved. The LUC boundary for AOC 1 BSY proposed in this ROD includes the entire BSY. LUC management will be performed by Base Ketchikan and will include the following:
  - Maintaining site security at the BSY and preventing access by children and residents
  - Posting warnings around the perimeter of the BSY indicating that arsenic concentrations in the soil exceed the residential cleanup level, but are below the outdoor worker cleanup level
  - Maintaining records with the USCG Environmental Program Environmental Liabilities database of record and within the master planning documents that will not allow development of this area for residential use or the installation of drinking water wells
  - Preventing soil disturbance (including re-grading or re-graveling) without written approval from the ADEC through a notice of activity
- This alternative requires five-year reviews under CERCLA. Arsenic-contaminated soil, although rendered nonhazardous by the treatment, will remain above the ACL at the BSY. Five-year reviews evaluate the overall effectiveness of the remedy and ensure that it remains protective over the long term, to include the integrity of the BSY surface and the frequency,

scope, and nature of LUC monitoring activities, the results of such monitoring, any changes to the LUCs, and any corrective measures resulting from monitoring during the time period. Documentation from inspections and any subsequent maintenance performed as a result of deficiencies will be compiled in the five-year review reports.

Following these activities, if properly implemented and no additional environmental concerns are discovered, cleanup will be complete and the site will receive a designation of "Construction Complete" under CERCLA, and "Cleanup Complete – Institutional Controls" under 18 AAC 75. The selected remedy, Alternative 5: Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal, will require five-year reviews under CERCLA. Any changes, if they occur, to the selected remedy as described in this ROD will be documented in a technical memorandum that will be made available in the Administrative Record, an Explanation of Significant Differences document, and/or a ROD amendment.

2.12.2.2 Intertidal Sediment at the Inner Boathouse

- All PCB- and metal-contaminated sediment above ACLs, estimated at 97 cy, would be excavated and removed for disposal in the contiguous United States.
- Sediment with PCB concentrations above 1 mg/kg and below 50 mg/kg, as well as copper, nickel, and zinc concentrations above the ACLs, will be disposed of as nonhazardous waste at a RCRA Subtitle D facility. Arsenic- and lead-contaminated sediment above 100 mg/kg (based on the RCRA 20 Times Rule) is assumed to be hazardous and will be disposed of as hazardous waste in a RCRA) Subtitle C facility. The estimated volume of nonhazardous and hazardous waste sediment generated during remedial activities is 77 cy and 19 cy, respectively.
- Confirmation sediment samples would be collected from the excavation to show that remaining contaminant concentrations are below the ACLs.
- Due to the location of contamination and obstruction of piers and pilings, excavation of sediment would need to occur using hand tools and manual labor.
- Small pieces of equipment, such as a mini skid steer, could be used to carry excavated material and equipment.
- Removal would occur only during low tide. Temporary cover such as gravel or sandbags may be required to cover the exposed working area prior to the next tidal working window.
- Excavated sediment would be loaded directly into dewatering filter bags, which would then be placed into containment totes.
- Sediment and dewatered liquid would be sampled for waste characterization and management.

- Dewatered liquid will be disposed of as nonhazardous waste.
- Potentially contaminated water (approximately 5 to 10 gallons) resulting from decontamination of sampling equipment (e.g., skid steer and other hand-held tools) during and after excavation will be generated. Waste characterization samples will need to be collected from the decontamination water to confirm the water is nonhazardous prior to disposal. Small quantities (e.g., less than 5 gallons) of PPE and disposable sampling materials will also be generated during remedial activities. PPE and sampling materials will be disposed of as nonhazardous waste.

Following these activities, if properly implemented and no additional environmental concerns are discovered, cleanup will be complete and the site will receive a designation of "Construction Complete" under CERCLA, and "Cleanup Complete – Institutional Controls" under 18 AAC 75. The selected remedy, Alternative 4: Removal and Offsite Disposal, will not require five-year reviews under CERCLA and the AOC will be available for UU/UE. Any changes, if they occur, to the selected remedy as described in this ROD will be documented in a technical memorandum that will be made available in the Administrative Record, an Explanation of Significant Differences document, and/or a ROD amendment

2.12.2.3 Intertidal Sediment at the Inner Marine Ways

- PCB- and metal-contaminated sediment above ACLs, estimated at 220 cy, would be excavated and removed for disposal in the contiguous United States.
- Confirmation sediment samples would be collected from the excavation to show that remaining contaminant concentrations are below the ACLs.
- Standard construction equipment (an excavator or similar machine) would be used and removal would occur only during low tide. Remaining sediment around the rails would be hand excavated to ensure the maximum extent of contamination is removed.
- No sediment would be removed from below the low tide mark; approximately 10 percent of the contaminated area would remain.
- Excavated sediment would require some dewatering, either by being loaded directly into dewatering filter bags, which would then be placed into containment totes, or by being allowed to dewater within the working area prior to removal, then transported with a flocculent or similar method to ensure that no liquid leaks.
- Sediment and dewatered liquid would be sampled for waste characterization and management. Assuming 20-percent of the excavated sediment is hazardous, approximately 44 cy of PCB- and metal-contaminated sediment are anticipated to be shipped as hazardous waste, and approximately 176 cy of sediment are anticipated to be shipped as nonhazardous.

- Potentially contaminated water (approximately 5 to 10 gallons) resulting from decontamination of sampling equipment (e.g., excavator bucket or other construction equipment) during and after excavation will be generated. Waste characterization samples will need to be collected from the decontamination water to confirm the water is nonhazardous prior to disposal. Small quantities (e.g., less than 5 gallons) of PPE and disposable sampling materials will also be generated during remedial activities. PPE and sampling materials will be disposed of as nonhazardous waste.
- This alternative requires five-year reviews under CERCLA. Metal-contaminated sediment would remain above ACLs.
- LUCs such as signage, dig restrictions, and shellfish consumption warnings will be implemented to notify the public of potential risks and limit human exposure to metals. These remedy components will be implemented once this ROD has been approved. The LUC boundary for AOC 3 Inner Marine Ways proposed in this ROD includes the area shown on Figure A-7. LUC management will be performed by Base Ketchikan and will include the following:
  - Maintaining the current signage stating that harvest of fish, shellfish, clams, or other items intended for human consumption is not permitted
  - Communicating to the primary and tenant commands that no harvesting is allowed except for migratory fish
  - Maintaining records with the USCG Environmental Program Environmental Liabilities database of record and within the master planning documents that will notify planners that the area has environmental concerns to be addressed prior to development
  - Preventing soil or sediment disturbance without written approval from the ADEC through a notice of activity, except in the case of removal of accumulated marine sediment along the rail and footings in accordance with the ADEC-approved *Long-Term Maintenance Sediment Removal Work Plan* (USCG 2017) to ensure safe operation of the marine railway
- This alternative requires five-year reviews under CERCLA. Metal-contaminated sediment will remain above the ACLs at the Inner Marine Ways. Five-year reviews evaluate the overall effectiveness of the remedy and ensure that it remains protective over the long term, to include the frequency, scope, and nature of LUC monitoring activities, the results of such monitoring, any changes to the LUCs, and any corrective measures resulting from monitoring during the time period. Documentation from inspections and any subsequent maintenance performed as a result of deficiencies will be compiled in the five-year review reports.

Following these activities, if properly implemented and no additional environmental concerns are discovered, cleanup will be complete and the site will receive a designation of "Construction Complete" under CERCLA, and "Cleanup Complete – Institutional Controls" under 18 AAC 75. The selected remedy, Alternative 3: Limited Land-Based Excavation, Offsite Disposal, and

LUCs, will require five-year reviews under CERCLA. Any changes, if they occur, to the selected remedy as described in this ROD will be documented in a technical memorandum that will be made available in the Administrative Record, an Explanation of Significant Differences document, and/or a ROD amendment

2.12.2.4 Subtidal Sediment

- LUCs would be used to restrict invasive activities and protect human health from exposure to PCBs and metals contamination in sediment above the site-specific RAOs and ACLs. LUCs would include controlled access, signage to prevent access and harvesting of marine organisms, and limitations on future in-water and in-sediment development.
- The approximate cost for this alternative is $0.55 million based on a 30-year implementation period; project duration is 0 days.
- This alternative requires five-year reviews under CERCLA. PCBs- and metal-contaminated sediment would remain above ACLs.
- LTM inspections would occur no less often than once every five years, in conjunction with the five-year reviews, and would include collection of four subtidal sediment samples in the AOC along the pier to ensure that contaminants are stabilized. Small quantities (e.g., less than 5 gallons) of PPE and disposable sediment sampling materials will be generated and disposed of as nonhazardous waste during each sampling effort. LTM inspections and sediment sampling would be required indefinitely, or until determined to be no longer necessary during the five-year review process, to ensure long-term protectiveness.
- LUCs such as signage, dig restrictions, and shellfish consumption warnings will be implemented to notify the public of potential risks and limit human exposure to PCBs and metals. These remedy components will be implemented once this ROD has been approved. The LUC boundary for AOC 4 Subtidal Sediment proposed in this ROD includes the area shown on Figure A-8. LUC management will be performed by Base Ketchikan and will include the following:
  - Maintaining the current signage stating that harvest of fish, shellfish, clams, or other items intended for human consumption is not permitted
  - Communicating to the primary and tenant commands that no harvesting is allowed except for migratory fish
  - Maintaining records with the USCG Environmental Program Environmental Liabilities database of record and within the master planning documents that will notify planners that the area has environmental concerns to be addressed prior to development
  - Preventing sediment disturbance without written approval from the ADEC through a notice of activity
- This alternative requires five-year reviews under CERCLA. Metal- and PCB-contaminated sediment will remain above the ACLs in subtidal sediment. Five-year reviews evaluate the

overall effectiveness of the remedy and ensure that it remains protective over the long term, to include the frequency, scope, and nature of LUC monitoring activities, the results of such monitoring, any changes to the LUCs, and any corrective measures resulting from monitoring during the time period. Documentation from inspections and any subsequent maintenance performed as a result of deficiencies will be compiled in the five-year review reports.

Following these activities, if properly implemented and no additional environmental concerns are discovered, cleanup will be complete and the site will receive a designation of "Construction Complete" under CERCLA, and "Cleanup Complete – Institutional Controls" under 18 AAC 75. The selected remedy, Alternative 2: LUCs and LTM, will require five-year reviews under CERCLA. Any changes, if they occur, to the selected remedy as described in this ROD will be documented in a technical memorandum that will be made available in the Administrative Record, an Explanation of Significant Differences document, and/or a ROD amendment.

2.12.3 Summary of Estimated Remedial Costs

The information in the cost estimate summary is based on the best available information regarding the anticipated scope of the remedial alternatives. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering designs of the selected alternatives. Table 2-16 presents an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 2-16
Capital and O&M Cost Estimates for the Selected Remedies

AOC	Remedy	Description	Cost[1]	Time to Achieve RAOs (days)
1 BSY	Alternative 5 Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal	Capital cost	$1,101,648	17
		Estimated present worth (annual overhead and maintenance over 30 years[2])	$162,931	
		Total estimated present worth and capital costs	**$1,264,579**	
2 Inner Boathouse	Alternative 4 Removal and Offsite Disposal	Capital cost	$1,420,644	37
		Estimated present worth (annual overhead and maintenance over 30 years[2])	$0	
		Total estimated present worth and capital costs	**$1,420,644**	
3 Inner Marine Ways	Alternative 3 Limited Land-Based Excavation, Offsite Disposal, and LUCs	Capital cost	$1,143,956	15
		Estimated present worth (annual overhead and maintenance over 30 years[2])	$81,275	
		Total estimated present worth and capital costs	**$1,225,231**	
4 Subtidal	Alternative 2 LUCs and LTM	Capital cost	$367,307	0
		Estimated present worth (annual overhead and maintenance over 30 years[2])	$181,353	
		Total estimated present worth and capital costs	**$548,661**	
		Total for all remedial actions	**$4,459,115**	--

Notes:
[1] Costs estimated with +50% / -30% accuracy based on subcontractor quotes, construction drawings, and engineering estimates. A complete breakdown of costs is available as Appendix B to the FFS (USAF 2018).
[2] Maintenance costs include LUCs, LTM inspections, and five-year reviews. These remedial actions will continue indefinitely, or until determined to be no longer necessary during the five-year review process, but for the purposes of estimating costs have been estimated over a 30-year period.
Cost estimates are expressed in 2017 dollars.
Bold indicates cost totals.
For definitions, refer to the Acronyms and Abbreviations section.

2.12.4 Expected Outcomes of Selected Remedies

Under this set of alternatives, soil and sediment contamination will be addressed using a combination of removal, treatment, and LUCs. COCs and final cleanup levels are presented in Tables 2-17 and 2-18.

Table 2-17
Cleanup Levels for COCs in Soil

COC	Alternative Cleanup Level (mg/kg)	Basis for Cleanup Level
Arsenic	33	Chemical-specific ARAR for arsenic based on ACLs established in the 2017 technical memorandum (USACE 2017b)
PCBs	1	Compliance with State of Alaska ARAR (18 AAC 75)

Note:
For definitions, refer to the Acronyms and Abbreviations section.

Table 2-18
Cleanup Levels for COCs in Sediment

COC	Alternative Cleanup Level (mg/kg)	Basis for Cleanup Level
Copper	330	Chemical-specific ARARs for copper, lead, zinc, and PCBs based on the ACLs established in the 2017 technical memorandum (USACE 2017b)
Lead	550	
Zinc	540	
Copper/Lead/Zinc Total	1,420	
PCBs	1[1]	
	65[2]	

Notes:
[1] ACL to prevent human exposure.
[2] ACL to minimize or eliminate ecological exposure.
For definitions, refer to the Acronyms and Abbreviations section.

2.12.4.1 Soil at the Buoy Storage Yard

Under this alternative, all PCB contamination will be removed and arsenic concentrations would fall below the ACL after in situ treatment. The ACL for arsenic at the BSY, calculated using ADEC Cleanup Levels Calculator (33 mg/kg), is only relevant for the outdoor worker scenario; therefore, to ensure the remedy remains protective, an LUC restricting residential use will be implemented at this site. CERCLA five-year reviews would be required indefinitely. Site inspections would occur once a year for the first five years and then once every five years, indefinitely, or until determined to be no longer necessary during the five-year review process, and all necessary maintenance would occur promptly to ensure that the remedy remains protective over the long term.

Land use at the BSY is not anticipated to change. Removal of PCB contamination, treatment of arsenic contamination to render it nonhazardous, LUCs to include signage and dig restrictions, and site inspections, if properly implemented, are an effective and legally compliant way to prevent both human and ecological exposure.

2.12.4.2 Intertidal Sediment at the Inner Boathouse

Under this alternative, all PCB and metal contamination will be removed. The ACLs for metals in sediment, calculated using site-specific toxicity data as described in the *Remedial Goals and Cleanup Target Areas Technical Memorandum* (USACE 2017b), would be achieved upon completion of site work; therefore, AOC 2 would be restored for UU/UE. No LUCs or CERCLA five-year reviews would be required.

Land use at the Inner Boathouse is not anticipated to change. Removal of PCB and metals contamination is an effective and legally compliant way to prevent both human and ecological exposure.

2.12.4.3 Intertidal Sediment at the Inner Marine Ways

Under this alternative, the majority of metal-contaminated sediment would be removed. Because contamination will remain in the subtidal area, LUCs restricting residential use and shellfish consumption will be implemented at this site. CERCLA five-year reviews would be required indefinitely to ensure that the remedy remains protective over the long term.

Land use at the Inner Marine Ways is not anticipated to change. Removal of the majority of metal-contaminated sediment, and LUCs to include signage and shellfish consumption restrictions, if properly implemented, are an effective and legally compliant way to prevent both human and ecological exposure.

2.12.4.4 Subtidal Sediment

Under this alternative, no contaminants would be removed; therefore, LUCs restricting use will be implemented at this site. CERCLA five-year reviews would be required indefinitely. LTM

inspections would occur no less often than once every five years, in conjunction with the five-year reviews, and would include collection of four subtidal sediment samples in the AOC along the pier to ensure that contaminants are stabilized to ensure that the remedy remains protective over the long term.

Use of the subtidal sediment area along the pier is not anticipated to change. LUCs to include signage and dig restrictions, and site inspections, if properly implemented, are an effective and legally compliant way to prevent both human and ecological exposure.

The ERE concluded that the potential for adverse effects to marine benthic communities and bird/mammal populations was considered low for the subtidal sediment AOC and it was recommended for no further evaluation or action (USACE 2019).

2.13 STATUTORY DETERMINATIONS

Under CERCLA §121 as required by NCP §300.430(f)(5)(ii), the lead agency must select a remedy that is protective of HHE, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes (1) a statutory preference for remedies that employ a treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element; and (2) a bias against offsite disposal of untreated wastes.

Only AOC 1 Alternative 5 complies with the statutory preference for treatment as a principal element. Although PCB-contaminated soil would be removed, arsenic-contaminated soil would be treated with a stabilization compound to render the soil nonhazardous. The remedies for AOCs 2, 3, and 4 do not comply with the statutory preference for treatment as a principal element. No reduction of toxicity, mobility, or volume of waste through treatment would occur under AOC 2 Alternative 4, AOC 3 Alternative 3, and AOC 4 Alternative 2 as effective treatment technologies would be very difficult and costly to implement at this site due in part to difficulty mobilizing the necessary equipment and supplies, the lack of an onsite space,

increased exposure risk to onsite personnel, and the inaccessibility of contamination. These alternatives instead eliminate the potential risks to HHE by implementing LUCs to restrict land use and prevent the removal and transportation of contaminated sediment.

2.13.1 Protection of HHE

2.13.1.1 Soil at the Buoy Storage Yard

The selected remedy, Alternative 5, will protect HHE by permanently eliminating exposure risks to PCB and arsenic contamination above RAOs. RAOs will be achieved upon remedy implementation and additional short-term risks to site workers or visitors would be minimized as additional invasive activities have been discontinued. Long-term risks depend on the adequate implementation of LUCs, site inspections, and review cycle assessments.

2.13.1.2 Intertidal Sediment at the Inner Boathouse

The selected remedy, Alternative 4, will protect HHE by permanently eliminating exposure risks to PCB and metal contamination above RAOs. RAOs will be achieved upon remedy implementation and additional short-term risks to site workers or visitors would be minimized as additional invasive activities have been discontinued.

2.13.1.3 Intertidal Sediment at the Inner Marine Ways

The selected remedy, Alternative 3, will protect HHE by permanently eliminating exposure risks to the majority of metal contamination above RAOs. RAOs will be achieved upon remedy implementation and additional short-term risks to site workers or visitors would be minimized as additional invasive activities have been discontinued. Long-term risks depend on the adequate implementation of LUCs, site inspections, and review cycle assessments.

2.13.1.4 Subtidal Sediment

The selected remedy, Alternative 2, will protect HHE by eliminating exposure risks to PCBs and metal contamination above RAOs. RAOs will be achieved upon remedy implementation and additional short-term risks to site workers or visitors would be minimized as additional

invasive activities have been discontinued. Long-term risks depend on the adequate implementation of LUCs, site inspections, and review cycle assessments.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

Response actions must comply with both the federal and state ARARs presented and described in Appendix B. All AOC selected remedies comply with the chemical-specific, location-specific, and action-specific ARARs. The selected remedies for AOCs 1 through 4 comply with the chemical-specific, location-specific, and action-specific ARARs, including RCRA (42 USC 6901), the Alaska Oil and Other Hazardous Substances Pollution Control regulations (18 AAC 75), Alaska Air Quality Control Regulations (18 AAC 50, 15), Alaska Solid Waste Management Regulations (18 AAC 60), Alaska Hazardous Waste Regulations (18 AAC 62), Toxic Substances Control Act (40 CFR 761), Clean Water Act (33 USC 1251 – 1376), Alaska Water Quality Standards (18 AAC 70.20), Navigable Water Pollution, Prevention, and Control Act (40 CFR 10), Federal Coastal Zone Management Act (16 USC 1451, 15 CRF 923), Clean Air Act (42 USC 7401, 40 CFR 230), Migratory Bird Treaty Act (50 CFR Parts 10, 20, 21), and U.S. Department of Transportation Regulations (49 CFR 170-199; 40 CFR 263).

2.13.3 Cost Effectiveness

In USCG's judgment, the selected remedies are cost-effective and represent a reasonable value for the money that is to be spent. In making this determination, the following definition from 40 CFR 300.430(f)(1)(ii)(D) was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria, meaning that they are protective of HHE and comply with the ARARs identified for AOCs 1 through 4. The overall effectiveness of the selected remedies for AOCs 1 through 4 were demonstrated in the comparative analysis of alternatives (Section 2.10) and are summarized in Table 2-19.

Table 2-19
Cost and Effectiveness Summary

Alternative	Present-Worth Cost	Long-Term Effectiveness and Performance	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness
AOC 1 Alternative 5 Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal	$1,264,579	Eliminates exposure to PCBs 1 mg/kg and above through removal and disposal. Highly effective regarding the removal of PCB-contaminated soil and the in situ treatment of remaining arsenic-rich soil.	The treatment of the arsenic-rich soil in situ would satisfy the statutory preference for treatment; however, the PCB removal step for this alternative would not satisfy the statutory preference for treatment of contaminated material.	During site work, exposure risks would be minimized with proper training and the use of appropriate PPE. Short-term risks to site workers or visitors to the site would be mitigated through the use of site controls such as fencing and signage will be used to restrict access. An employee from MT2 would oversee the excavation, mixing, and benching of the soil, which mitigates some of the potential risk. LUCs will be implemented to ensure that this remedy remains protective to HHE.
AOC 2 Alternative 4 Removal and Offsite Disposal	$1,420,644	PCB- and metal-contaminated sediment would be removed from the site for a high degree of long-term effectiveness.	No reduction in toxicity, mobility, or volume through treatment will occur under this alternative. Few treatment technologies exist for PCB contamination, and implementation would be difficult and costly. PCBs are stable compounds that are not likely to reduce in concentration or volume naturally.	During site work, exposure risks would be minimized with proper training and the use of appropriate PPE. Short-term risks to site workers or visitors to the site would be mitigated through the use of site controls such as fencing and signage will be used to restrict access

Table 2-19 (Continued)
Cost and Effectiveness Summary

Alternative	Present-Worth Cost	Long-Term Effectiveness and Performance	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness
AOC 3 Alternative 3 Limited Land-Based Excavation, Offsite Disposal, and LUCs	$1,225,231	Would substantially be permanent as the majority of contaminated sediment would be removed. Residual COCs would remain above the established RAOs but it is considered that the small volume remaining would not pose a significant risk to the environment. Human health exposure would be controlled through LUCs and five-year reviews.	No reduction in toxicity, mobility, or volume through treatment will occur under this alternative.	During site work, exposure risks would be minimized with proper training and the use of appropriate PPE. Short-term risks to site workers or visitors to the site would be mitigated through the use of site controls such as fencing and signage will be used to restrict access. LUCs will be implemented to ensure that this remedy remains protective to HHE.
AOC 4 Alternative 2 LUCs and LTM	$548,661	Has the potential to be mildly effective for addressing PCB and heavy metal contamination in hard to reach subtidal areas around Base Ketchikan. It is reasonable to assume that with the stringent access controls and the industrial area at Base Ketchikan, LUCs would maintain effective control over human access to the site and activities such as shell fish harvesting.	No reduction in toxicity, mobility, or volume through treatment will occur under this alternative. Few treatment technologies exist for PCB contamination, and implementation would be difficult and costly. PCBs are stable compounds that are not likely to reduce in concentration or volume naturally.	Implementation would have no negative impacts on community or worker health and safety or environmental quality. LUCs will be implemented to ensure that this remedy remains protective to HHE.

Note:
For definitions, refer to the Acronyms and Abbreviations section.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

AOC 2 Inner Boathouse will be suitable for UU/UE upon remedy implementation. While AOCs 1, 3, and 4 are unlikely to become available for UU/UE under the selected remedies, exposure risks will have been minimized upon remedy implementation through the removal of PCBs and metals to the extent practicable and LUCs. Five-year reviews and LUC and site inspections, if properly implemented, remain effective in preventing exposure to the subsurface.

2.13.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable based on 40 CFR 300.430(a)(1)(iii)(A). The selected remedy for AOC 1 BSY includes the treatment of arsenic-rich soil in situ, which satisfies the statutory preference for treatment as a principal element of remediation.

The selected remedies for AOCs 2, 3, and 4 do not satisfy the statutory preference for treatment of all waste streams as a principal element of remediation. PCBs and metals in sediment contamination will not be treated because the costs and short-term risks would be substantially higher without a significant reduction in long-term risk at these AOCs.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(4)(ii), because the selected remedies for AOCs 1, 3, and 4 will result in hazardous substances, pollutants, or contaminants remaining above levels that allow for UU/UE, a statutory review will be required five years after initiation of the response action to verify that the remedies are, or will be, protective of HHE. The five-year review is separate from but inclusive of the LUC and site inspections that are a primary remedy component.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for Base Ketchikan (USACE 2020) was released for public comment in February 2020. The Proposed Plan identified the proposed remedial actions. No written comments were submitted during the public comment period. It was determined that no significant changes to the remedies, as originally identified in the Proposed Plan, were necessary or appropriate.

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PART 3: RESPONSIVENESS SUMMARY

This section provides a summary of the public comments regarding the *Proposed Plan for U.S. Coast Guard Base Ketchikan, Ketchikan, Alaska* (USACE 2020). At the time of the public review period, USCG proposed Alternative 5: Excavation, Onsite In Situ Treatment, and Offsite PCB Disposal to address PCB- and metal-contaminated soil at AOC 1 BSY; Alternative 4: Removal and Offsite Disposal to address PCB- and metal-contaminated sediment at AOC 2 Inner Boathouse; Alternative 3: Limited Land-Based Excavation, Offsite Disposal, and LUCs to address metal-contaminated sediment at AOC 3 Inner Marine Ways; and Alternative 2: LUCs and LTM to address PCB- and metal-contaminated sediment at AOC 4 Subtidal Sediment. None of the proposed alternatives changed after the public review period.

The state regulatory agency, ADEC, was invited to comment on the draft of the Proposed Plan, prior to the public comment period. All regulator comments on the Proposed Plan were addressed and integrated into the final version. All regulator comments on the draft ROD will also be addressed and integrated into the final version.

NCP 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct as part of the CERCLA process; these are discussed in detail in Section 2.3. The Proposed Plan (USACE 2020) was made available to the public for review during a 30-day public comment period that began on 22 January 2020 and lasted through 20 February 2020. A notice announcing the 4 February 2020 public meeting was published in the *Ketchikan Daily News* on 20 January and 1 February 2020 (Appendix D). Environmental Protection Specialist Chris Rose with USCG CEU Juneau was available for a radio interview with KRBD Community Radio and met at their studio on 14 February 2019. Copies of the Proposed Plan were distributed for public review and comment to several local agencies in Ketchikan, Alaska. No comments were received during the public comment period.

3.1 ORAL AND WRITTEN COMMENTS AND RESPONSES

No public comments on the Base Ketchikan 2020 Proposed Plan were received; however, the interviewer with KRBD raised concerns with potential impacts on subsistence activities near Saxman, which is approximately 1.5 miles away.

3.2 TECHNICAL / LEGAL ISSUES

No additional technical or legal issues were identified.

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APPENDIX A

Figures

Basemap Source: National Geographic World Map; http://services.arcgisonline.com/ArcGIS/rest/services/NatGeo_World_Map/MapServer August 2012

Credits: National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, iPC

0 1 2 3 4
Miles

WGS 1984 Web Mercator Auxiliary Sphere

N

COAST GUARD BASE
KETCHIKAN LOCATION AND VICINITY

KETCHIKAN, ALASKA

JACOBS	DATE: 09 OCT 2020	PROJECT MANAGER: D. FLEMING	FIGURE NO: A-1

P:\Ketchikan_TO53_2020_ROD\MXD\FigA-1_LocVic_NatGeo.mxd beatyj

333100 333200 333300 333400 333500 333600 333700 333800 333900

6135100 6135000 6134900 6134800 6134700

UNITED STATES OF AMERICA
CITY OF KETCHIKAN
HARBOR ENTERPRISES INC
CITY OF KETCHIKAN
CITY OF KETCHIKAN
CITY OF KETCHIKAN
CITY OF KETCHIKAN
HARBOR ENTERPRISES INC
To Ketchikan
Health Facility
Gym
Security
Club Galley Mess
Boathouse
Administration
Supply Warehouse
U S COAST GUARD
North Shops
Boat Storage
Barracks
Outside Storage Area
Buoy Shed
Marine Ways Shed
South Shops
U S COAST GUARD
Former Hazardous Waste Storage Building
U S COAST GUARD
Marine Railway
Tidal Zone
Wharf
S. Tongass Hwy
Small Arms Firing Range
Float
Breakwater
Tongass Narrows
Float
To Saxman

Project Location
Juneau
Petersburg
Wrangell
Sitka
Craig
Ketchikan
Metlakatla
Gulf of Alaska

Service Layer Credits: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Legend

Tax Parcels

1 inch = 200 feet

0 100 200 300 400

Feet

WGS 1984 UTM Zone 9N

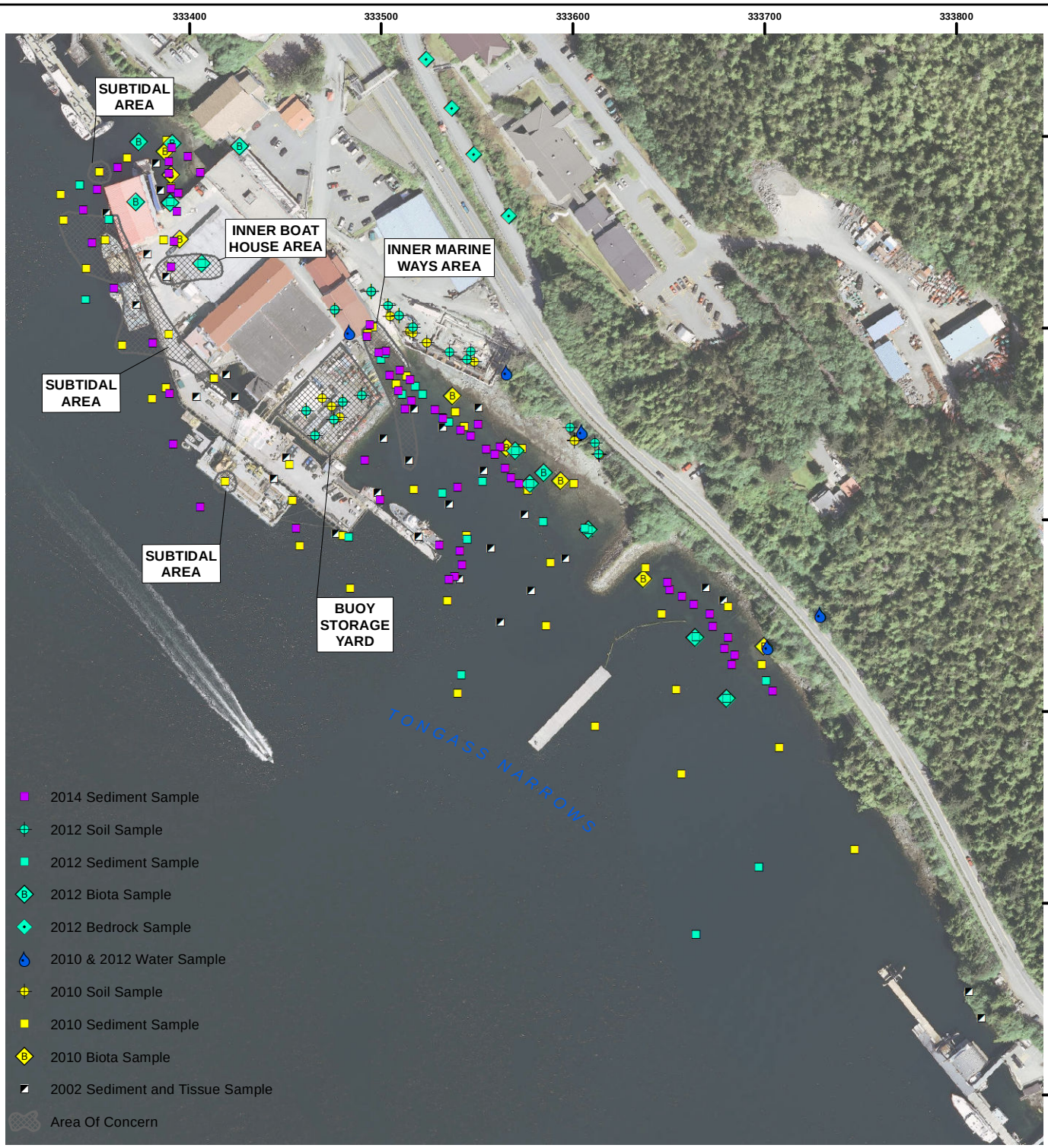
N

BASE KETCHIKAN SITE MAP

COAST GUARD BASE KETCHIKAN, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	06 OCT 2020	D. FLEMING	A-2

P:\Ketchikan_TO53_2020_ROD\MXD\FigA-2_KetchikanROD_SiteMap.mxd beatycj



Service Layer Credits: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

All Locations Are Approximate

0 100 200 300 400

Feet

WGS 1984 UTM Zone 9N Transverse Mercator

N

HISTORICAL ANALYTICAL SAMPLE LOCATIONS

BASE KETCHIKAN, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	09 OCT 2020	D. FLEMING	A-3

P:\Ketchikan_TO53_2020_RODM\MXD\FigA-3_HistoricalSamples.mxd beatycj

333433 333585

6134984 6134831 6134679

AVS>0.1, Likely Toxic
AVS>0.1, Uncertain
AVS>0.1, Likely Non-Toxic
AVS<0.1, Uncertain
AVS<0.1, Likely Non-Toxic
2014 Sediment Sample Location [Toxicity Study]
2012 Sediment Sample [Supplemental RI]
2012 Soil Sample [Supplemental RI]
2010 Sediment Sample Location [Remedial Investigation]
2002 Sediment and Tissue Sample Location
Toxicity Study Decision Unit (DU)
Area Of Concern (AOC)

To Ketchikan
S. Tongass Hwy
Gym
Security
Club Gâlley Mess
Boat house
Administration
North Shops
Supply Warehouse
Marine Ways Shed
Buoy Shed
South Shops
Wharf
Float
Tongass Narrows
Breakwa
Barrac

SUBTIDAL AREA
INNER BOAT HOUSE AREA
INNER MARINE WAYS AREA
BUOY STORAGE YARD
SUBTIDAL AREA
SUBTIDAL AREA

SE067 SE017 SE014 SE016 IT-S-1 IT-1 SE038 SE013 SE068 SE022 SE016 SE015 SE023 KS-T6-2 SE025 SE014 SE069 SE070 SE013 IT-2 SE010 SE011 SE015 SE016 IT-S-2 SE021 KS-T6-1 SE039 SE040 SE041 SE042 SE043 SE044 SE048 SE009 IT-3 SE022 SE023 SE025 SE020 SE008 KS-T5-4 IT-S-3 SE019 KS-T5-3 SE049 KS-T5-2 SE018 SE021 KS-T5-1 SE027 SE028 SE017 SE031 SE032 SE033 SE019 SE026 SE024 SE039 SE030 SE037 SE043 KS-T1-1 SE040 KS-T1-2 KS-T1-3 SE029 KS-T2-1 KS-T2-2 KS-T2-3 SE011 SE012 SE003 SE002 KS-T3-1 SE030 SE026 SE027 SE028 KS-T3-2 SE025 SE022 SE031 KS-T3-3 SE029 SE019 SE019MS/MSD SE054 SE052 KS-T4-1 KS-T4-2 SE018 KS-T4-3 SE017 SE018 SE055 SE057 SE008 SE005 SE007 SE006 SE032 SE033 SE010 SE011 IT-4 IT-S-4 SE012 SE006 SE060 SE021 SE020MS/MSD SE034 SE035 SE036 IT-5 SE010 SE007 SE013 SE061 SE062 SE014 SE058 SE059 SE009

Likely toxic: $(\Sigma SEM - AVS)/f_{OC} > 1000$ and $meanSedQC_{TCS}\text{-}Q > 1$

Uncertain: $(\Sigma SEM - AVS)/f_{OC} > 130$ or $meanSedQC_{TCS}\text{-}Q > 1$

Likely non-toxic: $(\Sigma SEM - AVS)/f_{OC} < 130$ and $meanSedQC_{TCS}\text{-}Q < 1$

Service Layer Credits: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Ketchikan Intl Airport
Ketchikan

N

All Locations Are Approximate
0 50 100 150 200
Feet
WGS 1984 UTM Zone 9N

2002, 2010, 2012, AND 2014 SAMPLE LOCATIONS AND TOXICITY PREDICTIONS

BASE KETCHIKAN, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	09 OCT 2020	D. FLEMING	A-4

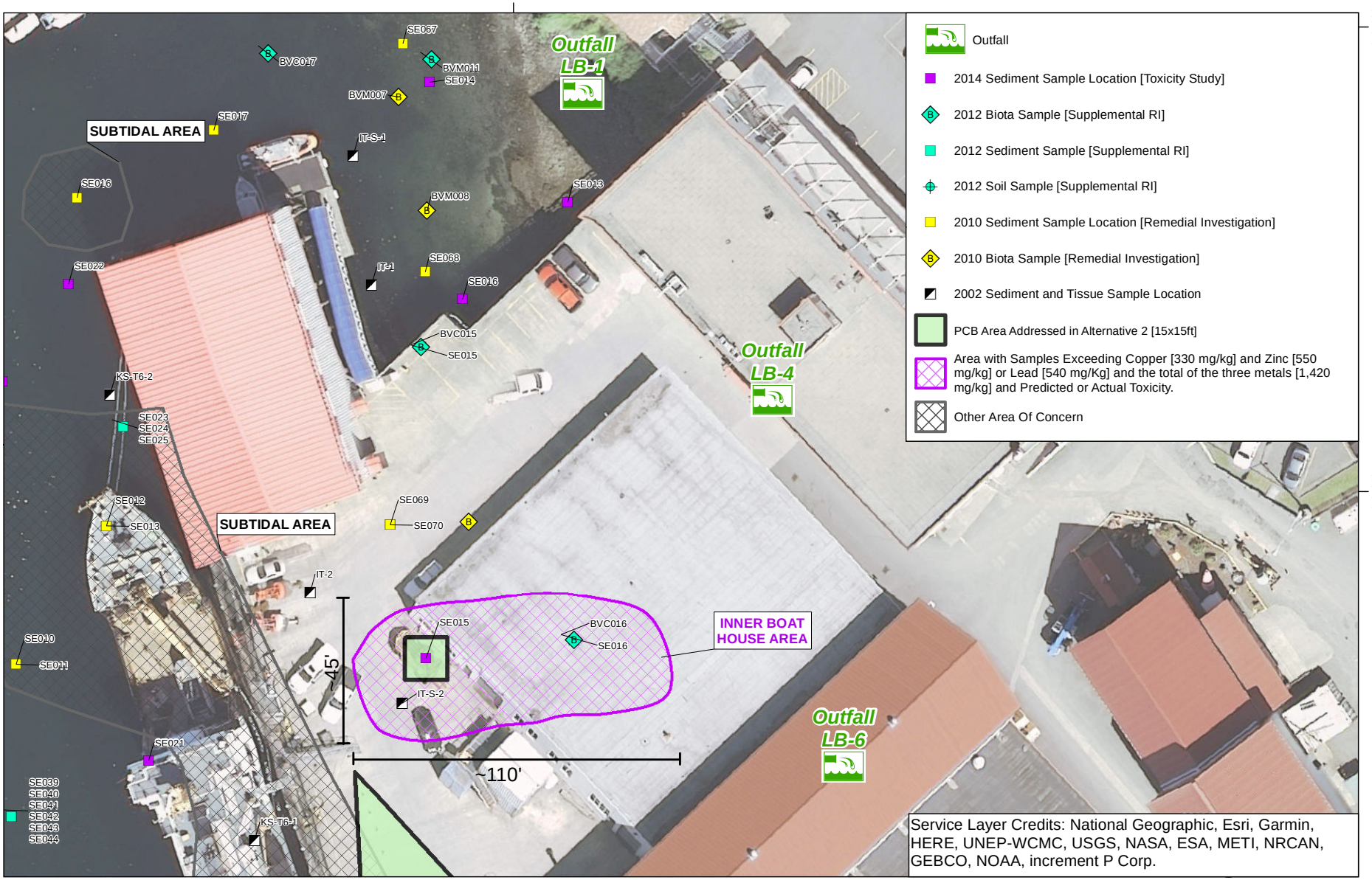
P:\Ketchikan_TO53_2020_ROD\MXD\FigA-4_Toxicity.mxd beatyg

BUOY STORAGE YARD AREA OF CONCERN CONSIDERED FOR ASSESSMENT IN FFS

BASE KETCHIKAN, ALASKA

JACOBS	DATE: 09 OCT 2020	PROJECT MANAGER: D. FLEMING	FIGURE NO: A-5

P:\Ketchikan_TO53_2020_RODM\MXD\FigA-5_BuoyStorageYard_LUC.mxd beatycj



N

All Locations Are Approximate

0 25 50 75 100

Feet

WGS 1984 UTM Zone 9N

INNER BOAT HOUSE AREA OF CONCERN CONSIDERED FOR ASSESSMENT IN FFS

BASE KETCHIKAN, ALASKA

JACOBS	DATE: 09 OCT 2020	PROJECT MANAGER: D. FLEMING	FIGURE NO: A-6

P:\Ketchikan_TO53_2020_RODM\MXD\FigA-6_InnerBoatHouse.mxd beatycj

333479 333494 333509 333525 333540 333555 333570 333585

6134923 6134908 6134892 6134877 6134862 6134847 6134831 6134816 6134801 6134786 6134771

BH09

SO039X

SO036

Outfall LB-2

SO044

~75'

SO047

SE058

SW005

SE059

SE009

Outfall LB-5

Outfall LB-3

SE014

SE013

SO004

SO006

Outfall LB-8

INNER MARINE WAYS AREA

SW003

SE061

SE062

SE010

SE060

SE008

~250'

SO018

SO019

SE006

SE021

SO015

SO014

SO015

SO016

SO017

SE012

IT-S-4

SE011

SE036

SE034

IT-5

SE010

SE009

SE033

SE032

SE006

KS-T4-3

SE005

SE007

IT-4

SE057

SE055

BVC018

SE018

SE008

SE018

KS-T4-2

KS-T3-3

BVM020

SE029

BVC019

SE019

SE054

SE053

SE025

SE031

KS-T4-1

SE022

KS-T3-2

KS-T2-3

SE012

SE028

SE027

SE033

KS-T3-1

SE030

KS-T2-2

SE029

SE024

KS-T2-1

SE026

KS-T1-2

Outfall

2014 Sediment Sample Location [Toxicity Study]

<all other values>

2012 Biota Sample [Supplemental RI]

2010 & 2012 Water Sample [Supplemental RI]

2012 Sediment Sample [Supplemental RI]

2012 Soil Sample [Supplemental RI]

2010 Soil Sample [Remedial Investigation]

2010 Sediment Sample Location [Remedial Investigation]

2010 Biota Sample [Remedial Investigation]

2002 Sediment and Tissue Sample Location

Inner Marine Way Current Soil and Sediment Land Use Control Boundary

Deliniation of Area Discussed in Alternative 3

Area with Samples Exceeding Copper [330 mg/kg] and Zinc [550 mg/kg] or Lead [540 mg/Kg] and the total of the three metals [1,420 mg/kg] and Predicted or Actual Toxicity

Other Area of Concern

Service Layer Credits: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

N

All Locations Are Approximate

0 25 50 75 100

Feet

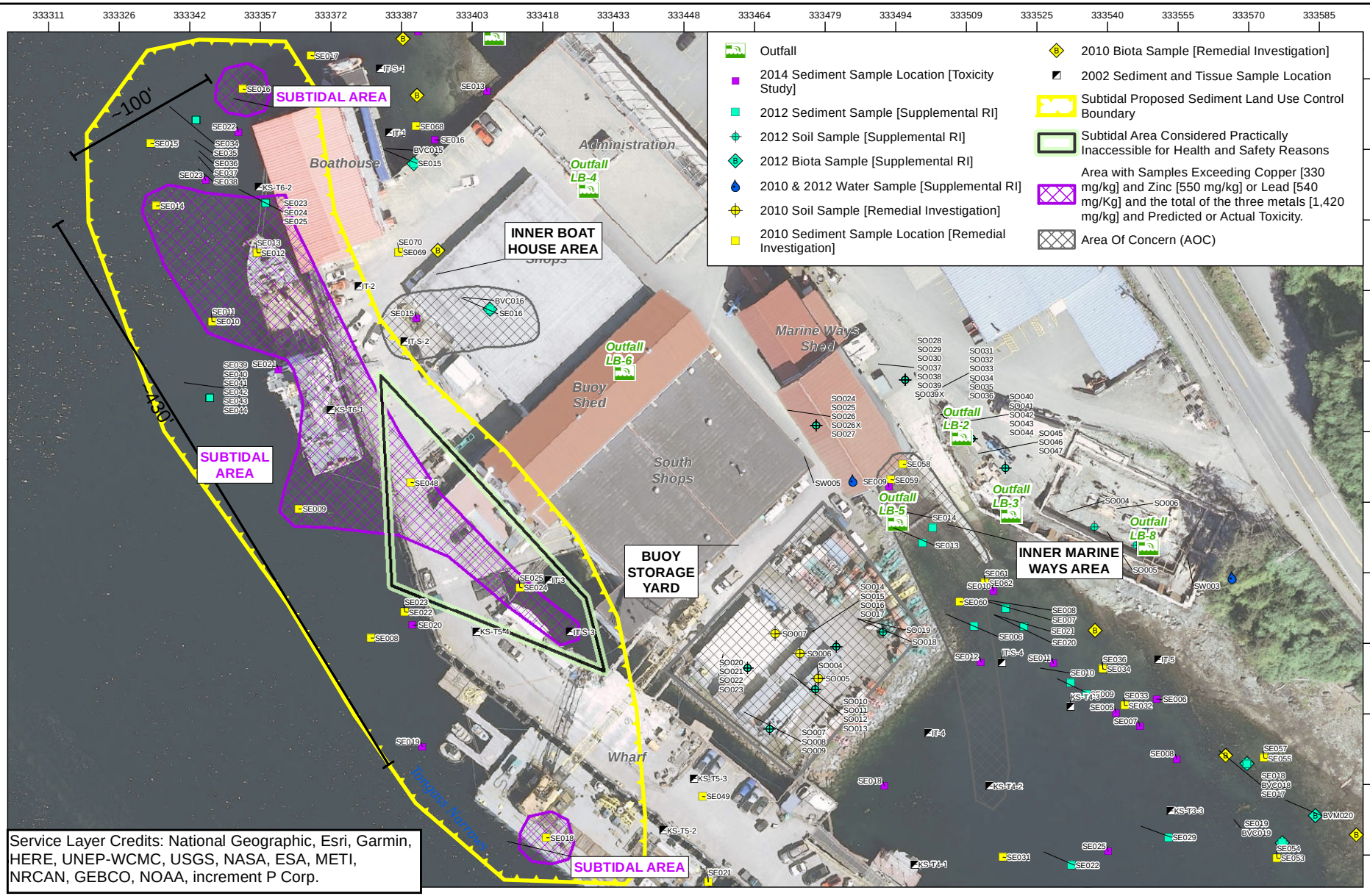
WGS 1984 UTM Zone 9N

INNER MARINE WAYS AREA OF CONCERN CONSIDERED FOR ASSESSMENT IN FFS

BASE KETCHIKAN, ALASKA

JACOBS	DATE: 05 FEB 2021	PROJECT MANAGER: D. FLEMING	FIGURE NO: A-7

P:\Ketchikan_TO53_2020_ROD\MXD\FigA-7_InnerMarineWay_LUC.mxd beatycj



SUBTIDAL AREA OF CONCERN CONSIDERED FOR ASSESSMENT IN FFS

BASE KETCHIKAN, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	09 OCT 2020	D. FLEMING	A-8

P:\Ketchikan_TO53_2020_RODM\MXD\FigA-8_SubtidalArea LUC.mxd beatycj

APPENDIX B

Applicable or Relevant and Appropriate Requirements

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
BASE KETCHIKAN, ALASKA

This appendix presents the potential Applicable or Relevant and Appropriate Requirements (ARARs) for soil and sediment at Base Ketchikan, Alaska. Under the Comprehensive Environmental Response, Compensation, and Liability Act, three types of ARARs are considered:

- Chemical-specific (Table B-1)
- Location-specific (Table B-2)
- Action-specific (Table B-3)

Each ARAR has been assessed based on its applicability to the site and categorized as applicable or relevant and appropriate. In addition, U.S. Environmental Protection Agency guidance documents identify items to be considered (TBC). TBCs are not considered legally enforceable but are evaluated along with ARARs as part of the risk assessment to set protective cleanup level targets.

CHEMICAL-SPECIFIC ARARS

Chemical-specific ARARs provide cleanup values that establish acceptable contaminant concentrations that may remain following a remedial response (Table B-1). The Alaska Administrative Code (AAC) Title 18, Chapter 75, §341, Article 3, *Oil and Hazardous Substances Pollution Control Regulations – Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances,* Method Two soil cleanup criteria [18 AAC 75.341(c) and (d)] – Tables B1 and B2) establish the applicable chemical-specific soil cleanup values (Alaska Department of Environmental Conservation [ADEC] 2018). The buoy storage yard (BSY) is in an industrial area. The ADEC Cleanup Levels Calculator was used to determine the cleanup levels for soil contamination at the BSY to include type of exposure (outdoor worker) and precipitation zone (greater than 40 inches).

ADEC does not currently have any promulgated cleanup levels for contaminated sediments in the State of Alaska other than 18 AAC 75.345(d), which requires that "toxic substances in sediment may not cause, and may not be reasonably expected to cause, a toxic or other deleterious effect on aquatic life" (ADEC 2018). ADEC instead evaluates scenarios on a site-specific basis, with emphasis on the potential for offsite migration and contaminant exposure pathways. Since there are no established or representative standards, a toxicity study, such as the one performed in 2014 combining monitoring of contaminant levels and tracking resulting toxicity, is a viable alternative.

Table B-1
Chemical-Specific ARARs

Regulation	Description	A or RA	Rationale
Clean Water Act (CWA), 33 USC 1313 and 1314 (Sections 303[a][1] and 304[a]). Most recent 304(a) list of recommended water quality criteria, as updated up to issuance of the ROD	CWA §303 requires states to develop water quality standards based on federal water quality criteria to protect existing and attainable use or uses. Under CWA §304(a), EPA develops recommended water quality criteria for water quality programs established by states. Water quality criteria are developed for protecting different groups: one for protection of human health, and one for protection of aquatic life. Both chronic and acute criteria are developed for these groups.	RA	Although no dredging is planned, the selected remedial actions at AOCs 2 and 3 may have an impact on water quality in adjacent marine waters. The following have the potential to occur: • Migration of contaminants into marine waters and • Sediment migration from removal operations.
Alaska Water Quality Standards (WQSs) 18 AAC 70.20	Sets criteria for water quality based on toxicity to aquatic organisms and human health and specifies the degree of degradation that may not be exceeded in a water body as a result of human action. Provides water quality criteria and limits to protect fresh and marine water bodies for such uses as drinking, recreation, and growth and propagation of fish, other aquatic life, and wildlife. Alaska adopts the CWA water quality criteria in the Alaska WQSs.		
Alaska Oil and Other Hazardous Substance Pollution Control regulations (18 AAC 75.340 through 345)	18 AAC 75.340 through 341 governs discharge of oil and hazardous substances and state cleanup requirements, also establishes soil cleanup levels. 18 AAC 75.345(e) requires that toxic substances in sediment may not cause, and may not be reasonably expected to cause, a toxic or other deleterious effect on aquatic life, except as authorized under 18 AAC 70.	A	Cleanup levels and requirements for soil, sediment, and groundwater; methods for determination and application of cleanup levels.
Cleanup Levels for Bulk PCB Remediation Waste (40 CFR 761.61[a][4][i])	Bulk PCB remediation waste includes soils and sediments. The cleanup level for bulk PCB remediation waste in high occupancy areas is ≤1 ppm without further conditions.	A	PCBs have been encountered in soils and sediments at Base Ketchikan and will be remediated.

Notes:
A = applicable
RA = relevant and appropriate
For additional definitions, refer to the Acronyms and Abbreviations section.

LOCATION-SPECIFIC ARARS

Location-specific ARARs are restrictions developed based on the conduct of activities at specific locations (Table A-2). These ARARs may restrict or preclude certain remedial actions, or they may apply only to certain portions of an installation. Location-specific factors that may require identification of ARARs include sensitive habitats, floodplains, wetlands, endangered species habitat, fault locations, and historical or archeological resources.

Table B-2
Location-Specific ARARs

Regulation	Description	A or RA	Rationale
Bald and Golden Eagle Protection Act ([16 USC 668], 50 CFR 22.11, General Requirements)	Protects bald and golden eagles/habitat in the area and provides for permitted activities.	A	Bald eagles have been identified in the project area. A biological assessment may be required for the selected remedial alternatives for AOCs 1, 2, and 3. If the biological assessment shows no impact to eagles or habitat, then formal consultation with USFWS and state agencies is not required. If the biological assessment indicates potential impacts on eagles or habitat, the USCG should formally consult with USFWS and state agencies and may need to obtain a biological opinion on the action from USFWS, depending on informal discussions with USFWS.
Migratory Bird Treaty Act (16 USC 703, Taking, Killing, or Possessing Migratory Birds Unlawful)	Requires that federal agencies examine proposed actions relative to habitat loss or loss of individual migratory birds. Prohibits taking or possession of any migratory bird listed including parts, nests, or products.	A	Almost all birds that are native to Alaska are protected by the Migratory Bird Treaty Act. Considered for possible impacts to birds at Base Ketchikan during remedy implementation. The remedy work plan will address actions to be taken to avoid adverse impacts on migratory birds during remedy construction.
Fish and Wildlife Coordination Act (16 USC 661, et seq., 40 CFR 6.302)	Requires that federal agencies consult with USFWS, NMFS, and state fish and wildlife agencies concerning potential effects on fish and wildlife. Applies to federal and non-federal permitted/licensed water development projects.	A	Excavation activities may have an effect on fish and wildlife in the area. A biological assessment may be required for the selected remedial alternatives for AOCs 1, 2, and 3. If the biological assessment shows no impact to eagles or other species or habitat, then formal consultation with USFWS, NMFS, and state agencies is not required. If the biological assessment indicates potential impacts on eagles or other species or habitat, the USCG should formally consult with USFWS, NMFS, and state agencies and may need to obtain a biological opinion on the action from USFWS, depending on informal discussions with USFWS.

Table B-2 (Continued)
Location-Specific ARARs

Regulation	Description	A or RA	Rationale
National Historic Preservation Act (16 USC 470 et seq.; 36 CFR 800.13)	Provides for the protection of cultural sites; requires coordination with State Historic Preservation Officer and National Park Service.	TBC	Base Ketchikan was developed in the 1940s, but prior to that the site was utilized to build pilings. Remaining artifacts may be of historical value. No cultural, historic, or archaeological resources were found in previous studies, however, the potential still exists that soil or sediments could contain cultural resources that could be displaced or damaged during remedy implementation. Awareness training will be provided to employees with the potential to encounter any cultural, historic, or archaeological resources. Photographs of all items removed will be taken and will be reviewed by the USCG archaeologist. Additionally, in the event of an inadvertent discovery, the USCG archaeologist will be contacted. The USCG archaeologist would determine if additional consultation is required and whether or not construction activities need to be modified or stopped pending consultation.
Alaska Historic Preservation Act (AS 41.35.090)			

Notes:
A = applicable
RA = relevant and appropriate
TBC = to be considered
For additional definitions, refer to the Acronyms and Abbreviations section.

ACTION-SPECIFIC ARARS

Action-specific ARARs are requirements that apply to specific investigative or remedial actions (Table B-3). Action-specific requirements do not in themselves determine remedial alternatives; they indicate how a selected alternative must be achieved. Action-specific ARARs are refined during remedial design as specific information becomes available.

Table B-3
Action-Specific ARARs

Regulation	Description	A or RA	Rationale
Clean Water Act – §404 [33 USC 1344; 40 CFR 230: §404(b)(1)] 40 CFR 230, Guidelines for Specification of Disposal Sites for Dredged or Fill Material 33 CFR 330, Nationwide General Permit Program USACE Nationwide Permit 38 – Cleanup of Hazardous and Toxic Waste	CWA Section 404 regulates the discharge of dredged or fill material into waters of the U.S. including return flows from such activity. This program is implemented through regulations set forth in the 404(b)(1) guidelines found in 40 CFR Part 230. Specific requirements include: • 40 CFR 230.7 – General Permits may be authorized to address 40 CFR 230 requirements • 40 CFR 230.10 – restrictions on dredged or fill materials discharge • 40 CFR 230 Subpart H, Actions to Minimize Adverse Effects • 40 CFR 230 Subpart J provide the standards and criteria for the use of compensatory mitigation when the response action will result in unavoidable impacts to the aquatic environment	TBC	Dredging is not planned for any of the selected remedies at Base Ketchikan. However, the selected remedies for AOCs 2 and 3 include removing sediment at low-tide only. Additional precautions will be taken to minimize the potential for disturbed sediment to impact the water body; for example, excavating at low tide when no rain is forecast, covering the working face during tidal cycles, putting a silt curtain in the water downstream/around the excavation area. The work plan will address any substantive requirements of USACE Nationwide Permit 38 – Cleanup of Hazardous and Toxic Waste; this will help address the 40 CFR 230 requirements.
Clean Water Act – Storm Water Pollution Prevention Plan [33 USC 1251 – 1376, 40 CFR 125.3(d)] Alaska 2016 Stormwater Construction General Permit (Permit AKR 100000)	Regulates pollutants in discharge of stormwater associated with construction activity (clearing, grading, or excavation) involving the disturbance of 1 acre or more. Requires the preparation of a stormwater pollution prevention plan, implementation of BMPs to minimize the effects of disturbed soil on stormwater, and monitoring of stormwater to demonstrate compliance.	TBC	Although less than 1 acre of surface soils or sediments is expected to be disturbed, BMPs could prevent any significant runoff caused by excavation activities in to the marine environment. The USCG will meet the substantive requirements of the Permit by using BMPs to minimize the potential impact on stormwater from the excavation. Permits are not ARARs because they are considered "administrative" in nature, and ARARs are substantive requirements, per CERCLA Section 121(d) and EPA guidance. On the other hand, the numerical limits that a permittee has to follow are considered "substantive" and must be complied with. In addition, CERCLA sites are exempt from obtaining permits for remediation activities conducted entirely onsite by CERCLA Section 121(e)(1).

Table B-3 (Continued)
Action-Specific ARARs

Regulation	Description	A or RA	Rationale
U.S. Pipeline & Hazardous Materials Safety Administration – Protection of Underground Pipelines from Excavation Activity (49 USC 60101, et seq., 49 CFR 196 & 198) Alaska Damage Prevention Statutes (AS 42.30.400)	Before beginning an excavation, an excavator shall give notice of the proposed excavation to each underground facility operator who has an underground facility in the area of the proposed excavation and request the operator to field mark the location of its underground facility.	A	Excavation activities (defined, per AS 42.30.490(3)(A), as "an activity in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means") are proposed for this site.
Alaska Air Quality Control Regulations, Prohibitions (18 AAC 50.045[d])	A person who causes or permits bulk materials to be handled, transported, or stored, or who engages in an industrial activity or construction project shall take reasonable precautions to prevent fugitive dust from being emitted into the ambient air.	A	Cleanup methods will require the use of heavy machinery and trucks for transporting soil and sediment, there is also a potential for increased particulate matter concentrations in the ambient air from fugitive dust. Reasonable precautions are measures to prevent particulate matter from being emitted into the air. Examples to limit the generation of fugitive dust include spraying down soils with water, installing enclosures around areas from which emissions come, and discontinuing operation under unfavorable weather events such as high winds.
Alaska Solid Waste Management Regulations (18 AAC 60.010(a) – Accumulation, Storage, and Treatment, and 18 AAC 60.015, Transport)	Solid waste must be accumulated and stored in a manner that does not pose a health hazard or have polluted runoff. Solid wastes should be contained during transport and any spills immediately cleaned up.	A	Solid waste and waste associated with remediation will be accumulated and disposed of properly.
Applicability of Hazardous Materials Transportation Regulations to Pre-Transportation Functions (49 CFR 171.1[b])	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material shall be subject to and must comply with all applicable provisions of the Hazardous Materials Transportation Act and Hazardous Materials Regulations at 49 CFR 171 – 180 related to marking, labeling, placarding, packaging, emergency	A	Applicable to AOCs 1, 2, and 3, for the on-site transportation of hazardous materials (potentially arsenic and lead at AOC 1 and arsenic at AOCs 2 and 3). Hazardous materials may be transported from the excavation locations to an offsite landfill. Such transportation may occur on roads that may be considered public roads subject to U.S. Department of Transportation (DOT) hazardous material regulations. Offsite transportation is not subject to ARARs, but to all applicable regulations. As part of work plans to

Table B-3 (Continued)
Action-Specific ARARs

Regulation	Description	A or RA	Rationale
	response, etc.		implement the selected remedy, a disposal plan and hazardous material security plan will be developed to cover storage and transportation requirements for DOT hazardous materials, if waste concentrations and volumes shipped are high enough to be present as a DOT hazardous material.
Hazardous Waste Management Regulations (40 CFR 262)	Establishes the requirements hazardous waste generators. Generators will determine if their waste is hazardous (40 CFR 262.11) A generator may accumulate hazardous waste at the facility provided that: • Waste is placed in containers that comply with 40 CFR 262.17(a) (e.g., container in good condition, labeled with major risk, container is compatible with waste, kept closed, adequate aisle space between containers, weekly inspections, ignitable or reactive waste stored in accordance with International Fire Code, incompatible wastes kept separate, all dangerous wastes and residues removed at closure, and 40 CFR 265 Subparts AA, BB, and CC [air emissions standards]) and • The date upon which accumulation begins is clearly marked and visible for inspection on each container and • Container is marked with the words "hazardous waste." Additional requirements include personnel training, preparedness and prevention, contingency plan and emergency procedures, and emergencies, and general inspections.	A	Soils and sediments that will be generated during remediation will be characterized (e.g., sampled) to determine if they are hazardous waste and will be managed appropriately.

Table B-3 (Continued)
Action-Specific ARARs

Regulation	Description	A or RA	Rationale
Land Disposal Restrictions (40 CFR 279)	Must determine if the hazardous waste has to be treated before being land disposed. This is done by determining if the waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. This determination can be made concurrently with the hazardous waste designation required in 40 CFR 262.11. If the waste is a characteristic hazardous waste, then the underlying hazardous constituents (UHCs) must also be evaluated to determine if the waste also needs to be treated for UHCs (40 CFR 268.9) (UHC treatment standards are found in 40 CFR 268.48).	A	Applicable to characterizing and treating excavated materials slated for off-site disposal, if those materials are determined to be hazardous waste.
PCB Remediation Waste Management (40 CFR 761.61)	Because the remedy requires removal of sediment and soil to specific depths and the maximum PCB concentrations detected in these areas do not exceed 50 mg/kg, no substantive requirements triggered. If additional testing during remedial design identifies soils or sediments at concentrations of 50 mg/kg PCBS, PCB regulations may be applicable for managing dredged material for off-site disposal and listed here: 40 CFR 761.1(b)(5), 40 CFR 761.3, 40 CFR 761.50(a) and (b)(3), 40 CFR 761.61(a)(5) and (b), and 40 CFR 761.65(c)(9)(i)-(iii)	A	Excavation may involve generation and disposal of wastes, such as PCB-containing soil and sediment. PCB decontamination and disposal requirements are Applicable to the disposal of contaminated material, debris, or surface water with PCB contamination if excavated sediment is found to contain 50 mg/kg in concentration. Based on current data, PCB concentrations in excavated sediment at or above 50 mg/kg are not expected, but if found, the cleanup will comply with this standard.

Table B-3 (Continued)
Action-Specific ARARs

Regulation	Description	A or RA	Rationale
Alaska Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances (18 AAC 75 Article 3)	Specifies sampling and analysis of soil, surface water, and groundwater resulting from the discharge of oil or a hazardous substance. Specifies soil, surface water, and groundwater cleanup levels resulting from the discharge of oil or a hazardous substance. Specifies ICs for residual soil, surface water, and groundwater left in excess of cleanup levels resulting from a discharge of oil or a hazardous substance.	A	• 18 AAC 75.325 establish required administrative processes and standards to determine the necessity for and degree of cleanup required. • 18 AAC 75.330 lists requirement for interim removal actions. • 18 AAC 75.333 lists qualification requirements for environmental professionals and samplers. • 18 AAC 75.335 lists requirements for how a responsible person shall characterize the extent of hazardous substance contamination at the site. • 18 AAC 75.355 lists requirements for sampling and analysis. • 18 AAC 75.360 lists requirements for cleanup work plans. • 18 AAC 75.370 lists requirements for soil storage and disposal • 18 AAC 75.375 lists requirements for ICs. • 18 AAC 75.380 lists requirements for reporting. The CERCLA process meets these requirements.
Uniform Environmental Covenants Act (AS 46.04.340)	Requires the owner of real property to record a notice of activity and use limitation into the appropriate public land records where a legal impediment prevents creation of an environmental covenant.	A	Residual contamination will remain on site. LUCs are proposed for AOCs 1, 3, and 4.

Notes:
A = applicable
RA = relevant and appropriate
TBC = to be considered
For additional definitions, refer to the Acronyms and Abbreviations section.

APPENDIX C

Conceptual Site Models

Appendix A - Human Health Conceptual Site Model
Scoping Form and Standardized Graphic

Site Name: USCG Base Ketchikan

File Number: 1516.38.011

Completed by: Jacobs Engineering

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Buoy storage and maintenance, hazardous waste storage, sandblasting, and anti-fouling paint

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☒ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☒ Sediment
- ☐ Groundwater
- ☒ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Soil at the BSY contains antimony, arsenic, chromium, copper, lead, thallium, pentachlorophenol, and PCBs.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Soil at the BSY contains arsenic, pentachlorophenol, and PCBs which have the potential to permeate the skin.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☐

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

No groundwater has been encountered at Base Ketchikan, but a determination under 18 AAC 75.350 has not been completed.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☒

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Pyrene, barium, cobalt, copper, iron, lead, manganese, selenium, silver, and zinc have been detected in surface water and/or seeps at Base Ketchikan.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Complete

Comments:

Arsenic, copper, lead, nickel, zinc, and PCBs are present in sediment and have the potential to bioaccumulate.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

PCBs are present in soil and are considered volatile.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

PCBs are present in soil and are considered volatile; however, the locations with PCBs in soil are greater than 100 feet from occupied buildings.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Inhalation of fugitive dust is only potential applicable at AOC 1 BSY.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Sediment at the site is contaminated with arsenic, copper, lead, mercury, nickel, zinc, and PCBs. Arsenic and PCBs can permeate the skin.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: USCG Base Ketchikan

Completed By: Jacobs Engineering

Date Completed: 24 April 2020

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil									
	☑ Migration to subsurface — check soil									
	☐ Migration to groundwater — check groundwater									
	☑ Volatilization — check air									
	☑ Runoff or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☑ Other (list): Fugitive dust									
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil — check soil									
	☐ Migration to groundwater — check groundwater									
	☑ Volatilization — check air									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Ground-water	☐ Direct release to groundwater — check groundwater									
	☐ Volatilization — check air									
	☐ Flow to surface water body — check surface water									
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Surface Water	☐ Direct release to surface water — check surface water									
	☐ Volatilization — check air									
	☐ Sedimentation — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Sediment	☑ Direct release to sediment — check sediment									
	☐ Resuspension, runoff, or erosion — check surface water									
	☑ Uptake by plants or animals — check biota									
	☐ Other (list):									
		☑ soil	☑ Incidental Soil Ingestion	F	C/F	C/F	C/F	C/F	C/F	
			☑ Dermal Absorption of Contaminants from Soil	F	C/F	C/F	C/F	C/F	C/F	
			☑ Inhalation of Fugitive Dust	F	C/F	C/F	C/F	C/F	C/F	
		☐ groundwater	☐ Ingestion of Groundwater							
			☐ Dermal Absorption of Contaminants in Groundwater							
			☐ Inhalation of Volatile Compounds in Tap Water							
		☑ air	☑ Inhalation of Outdoor Air	F	C/F	C/F	C/F	C/F	C/F	
			☐ Inhalation of Indoor Air							
			☑ Inhalation of Fugitive Dust	F	C/F	C/F	C/F	C/F	C/F	
		☑ surface water	☐ Ingestion of Surface Water							
			☑ Dermal Absorption of Contaminants in Surface Water	F	C/F	C/F	C/F	C/F	C/F	
			☐ Inhalation of Volatile Compounds in Tap Water							
		☑ sediment	☑ Direct Contact with Sediment	F	C/F	C/F	C/F	C/F	C/F	
		☑ biota	☑ Ingestion of Wild or Farmed Foods	F	C/F	C/F	C/F	C/F	C/F	

Revised, 10/01/2010

APPENDIX D

Community Participation

USCG Base Ketchikan
Public Comment Period & Public Meeting Notice
Proposed Plan for Base Ketchikan

The U.S. Coast Guard (USCG) and the Alaska Department of Environmental Conservation (ADEC) will hold a Public Meeting to discuss the Focused Feasibility Study and Proposed Plan for the cleanup of contaminated soil and sediment at Base Ketchikan, AK. The Focused Feasibility Study discusses the risks posed by the site and presents the evaluation of cleanup options. The Proposed Plan identifies preferred cleanup alternatives for the public to comment.

The Proposed Plan describes remedial alternatives considered for four areas of concern:
AOC 1: Soil at the Buoy Storage Yard
AOC 2: Intertidal sediment at the Inner Boathouse
AOC 3: Intertidal sediment at the Inner Marine Ways
AOC 4: Subtidal sediment near the pier

USCG and ADEC evaluated the following alternatives for addressing the contaminated soil and sediment at the site. Based on available information, the preferred alternatives proposed for public comment at this time are **bolded** and *italicized*.

AOC 1: Soil at the Buoy Storage Yard
- Limited Polychlorinated Biphenyl (PCB) Removal and Land Use Controls (LUCs)
- Concrete Cap and LUCs
- Gravel Cap and LUCs
- ***Excavation, Onsite Treatment, and Offsite PCB Disposal***
- Excavation, Gravel Fill, and Offsite Disposal

AOC 2: Intertidal sediment at the Inner Boathouse
- PCB Removal and LUCs
- Limited Cap and LUCs
- ***Removal and Offsite Disposal***

AOC 3: Intertidal Sediment at the Inner Marine Ways
- LUCs
- ***Limited Land-Based Excavation, Offsite Disposal, and LUCs***
- Dredging and Limited Land-Based Excavation

AOC 4: Subtidal Sediment near the Pier
- ***LUCs and LTM***
- Limited Removal and Offsite Disposal with LUCs

Although these are the Preferred Alternatives at the present time, USCG and ADEC welcome the public's comments on all of the alternatives listed above. USCG and ADEC will choose the final remedies after the comment period ends and may select any one of the alternatives after taking public comments into account.

Copies of the Focused Feasibility Study and Proposed Plan are available at:

Ketchikan Public Library
1110 Copper Ridge Lane
Ketchikan, AK 99901
(907) 225-3331
Mon-Wed: 10 a.m. – 8 p.m.
Thurs-Sat: 10 a.m. – 6 p.m.
Sunday: 1 – 5 p.m.

The public comment period for the Proposed Plan is:
Wednesday January 22, 2020 through Thursday February 20, 2020

Public Meeting
Tuesday February 4, 2020 from 2:00 – 5:00 p.m.
Ketchikan Public Library
1110 Copper Ridge Lane,
Ketchikan, AK

For further information, additional background documents, or to submit written comments, please contact:

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AFFIDAVIT OF PUBLICATION

STATE OF ALASKA,)
) SS:
Gateway Borough)

Nancy Kaste, being duly sworn says:

That she is representative of the Ketchikan Daily News, a newspaper published at Ketchikan, in said Borough and State, and that the publication of which the annexed is a printed and true copy, was published in said newspaper, commencing on the 20th day of January, 2020 and ending on the 20th day of January, 2020.

Nancy Kaste

Subscribed and sworn to before me this 20th day of January, 2020.

Tena Williams

Notary Public for Alaska

My Commission Expires 01/22/23

Official Seal
Tena Williams
Notary Public-State of Alaska
My Comm. Expires
January 22, 2023

TENA WILLIAMS
STATE OF ALASKA

Sen. Lisa Murkowski, R-Alaska, answers questions from reporters Jan. 10 on Capitol Hill in Washington, D.C.

AP Photo/J. Scott Applewhite, File

Impeachment

Continued from page 1

Congress by blocking witnesses and testimony in the House investigation. Trump has said he did nothing wrong.

Murkowski said a recent Government Accountability Office report that concluded the White House violated federal law by withholding congressionally approved security aid to Ukraine reminded her of last year's debate over Trump's declaration of a border emergency that he invoked to spend more for border barriers than Congress had approved.

During that debate, she said she maintained the president could not take funds congressionally directed to one area and use them to advance his own policies. "Whether it was for the wall or for any other thing, I have been one that has said, 'Congress has a very specific role when it comes to appropriation of funding and that needs to be respected,'" she said.

She said she viewed the GAO report with a "little bit of concern," in part because of the need to respect Congress' appropriation powers.

In a telephone interview Friday with the Anchorage Daily News, Alaska's other Republican U.S. senator, Dan Sullivan, said he supports using the same rules as the impeachment of President Bill Clinton in the 1990s, which Sullivan said would give Trump a "fair and balanced" process. Under those rules, he said, the determination of whether or not to bring witnesses would happen in the second phase.

"I think this is going to be a stark contrast to what happened over in the House where you literally witnessed the most rushed most partisan and unprepared impeachment proceedings in the House in U.S. history," Sullivan said.

Assembly

Continued from page 1

process for gun ranges.

Attached to the agenda item for Monday's meeting is a five-page memorandum from borough Planning Director Richard Harney which provides information on the possible effects of adopting the requested ordinances.

The memo explains that the borough Planning Department mails notice cards, called property owner notifications, to property owners adjacent to rezone request sites. In the City of Ketchikan, PONs are sent to property owners within 600 feet of the subject property; outside the city, they are sent to property owners within 1,200 feet.

The borough clerk's office also sends PONs for rezone applications. The clerk's office PONs are sent to the same property owners as the Planning Department PONs, according to Harney's memo.

The approximate cost for a Planning Department PON is 66 cents, while that cost is about 74 cents for the clerk's office PON, the memo states.

Increasing the radius of notification for gun range rezones would translate to many more PONs.

For the proposed Ward Cove rezone, the Planning Department sent 31 PONs, costing the borough about $20.46. With the increased radius requested by Wade, the Planning Department would have sent 377 PONs at a cost of $248.82.

Harney wrote in his memo that an application fee might be prudent to help cover the cost of notification.

The memo notes that in 2012 the Assembly voted to eliminate application fees for rezones and conditional use permits, "(citing) the minimal amount of revenue generated from the fees, lessening the burden on property owners to obtain permits, and the potential to encourage economic growth as justification for elimination of the fees."

Should the Assembly decide to proceed with Wade's request, borough staff recommend that the Assembly also include application fees in the permitting process for gun ranges.

The Assembly also could vote to separately consider the notification radius increase and the Assembly approval request.

Food truck motions

The Assembly will hold public hearings on two motions regarding food trucks.

Ordinance 1900 would define the term "mobile food vendor" in the Ketchikan Gateway Borough Code and would place limits on how long mobile food vendors can operate in a single location.

Ordinance 1901 would remove the Mobile Building Restricted Overlay Zone from the Central Parking Area. The Central Parking Area includes most of the downtown portion of the City of Ketchikan.

The Planning Commission considered both of these ordinances at its Dec. 10 meeting and forwarded both to the Assembly with a recommendation of denial.

Borough staff have recommended that the Assembly introduce Ordinance 1900-Substitute, the agenda states.

The substitute ordinance would define mobile food vendors and usage conditions. It also would establish standards so that retail mobile buildings like food trucks would not impact surrounding properties.

Meeting information

Monday's Ketchikan Gateway Borough Assembly meeting will begin at 5:30 p.m. in the Assembly chambers at 1900 First Ave. There will be time for public comment at the start of the meeting.

Boat aground

Continued from page 1

The old wooden fishing boat, Prince, now a live-aboard, had oil and fuel on board. As the boat came apart, so did its contents. A refrigerator floated nearby.

Earlier Saturday morning, crews climbed aboard the boat, which was tilted sideways, to see whether they could detach the camper barge from the boat to salvage the property for the owner, but it became clear the camper was holding up the boat.

"Really quickly everything started to shift and they had to jump back off," said Habershaw.

The boat is familiar to the Coast Guard. Habershaw said the owner had problems with anchoring this summer.

Habershaw said he was happy that no lives were in danger and it was a matter of dealing with property. He said the boat would have to be removed piece by piece.

"This can be cleaned up," said Habershaw. "You can't get somebody's life back."

UA tuition

Continued from page 1

$234 while higher level courses would increase from $269 to $282, officials said.

Only three students participated in a meeting scheduled for students to address university officials about the proposal, Caulfield said.

Teacher education, marine biology and science programs and mining and maritime-oriented vocational training are some of the university's most successful programs, university officials said.

"Those are all programs that produce graduates that have the opportunity to go to work in Southeast Alaska," Caulfield said. "There are programs that have smaller enrollments that are nevertheless critical to our mission at UAS. We want to continue to support the language programs and the Northwest art programs so they continue producing excellent graduates."

The university expects to provide a 25% discount on occupational endorsement classes and utilize other methods to help with increased costs, Caulfield said.

Today's Trivia answer:

Agattu, Attu and Kiska islands in Alaska

MEETINGS

"Meetings" is a public service column the Ketchikan Daily News provides for use by individuals and nonprofit organizations to announce meetings that are open to the public. The deadline for copy is 2 p.m. the day before the first day the notice is to be published, with a 2 p.m. Friday deadline for Saturday, Sunday or Monday meetings.

Telephone numbers, fund-raising events and for-profit activities will not be published. The column may not be used to satisfy advertisement of public meetings. When submitting a notice please include the organization name, meeting time, date and location.

MONDAY

Saxman/Ketchikan Senior Center: Closed for Martin Luther King Day.

Out to Lunch Bunch AA: Noon, St. John's Episcopal Church undercroft.

Older blind Alaskans support: 10:30 a.m., Pioneers Home.

TSAS Academic Policy Committee: 4 p.m., school library.

Borough Assembly: 5:30 p.m., Assembly chambers, 1900 First Ave.

Just for Today AA: 5:30 p.m., 1736 Tongass Ave.

Peer to Peer Support Group: 5:30 p.m., The Plaza mall, SAIL office.

Saxman IRA Council: 6 p.m., 2706 S. Tongass Hwy.

American Legion Post #3: 7 p.m., 631 Park Ave.

Just for Today AA: 8 p.m., 1736 Tongass Ave.

TUESDAY

First City Toastmasters: 6:45 a.m., Presbyterian Church, 2711 Second Ave.

Saxman/Ketchikan Senior Center: Noon. Lunch: Baked chicken with biscuit, copper pennies and triple bean salad. 2401 Eagle Ave.

Out to Lunch Bunch AA: Noon, St. John's Episcopal Church undercroft.

Museum Advisory Board: 4:30 p.m., Tongass Historical Museum.

Take Off Pounds Sensibly: 5 p.m., Rendezvous Senior Center. Scales open at 5 p.m. Inspirational meeting at 5:30 p.m.

Sober Sisters AA: 5:30 p.m. Ketchikan Pioneer Home, First Floor Conference Room. 171 Bryant St.

WISH board: 5:30 p.m., iRock, 2106 Tongass Ave. #101

Fraternal Order of Eagles: 7 p.m., lodge, 7 Creek St.

Craig AA: 7 p.m., Craig Presbyterian Church.

Just for Today AA: 8 p.m., 1736 Tongass Ave.

NA Never Alone Group: 8 p.m., St. John's Episcopal Church undercroft.

Emery Richard "Bud" Hurley

Emery Richard "Bud" Hurley, 88, died on Dec. 21, 2019, in Ketchikan.

He was born on Aug. 9, 1931, in Riverside, California.

He graduated from Sequim High School in Washington in 1951.

From June 1951 to 1955, Mr. Hurley served in the U.S. Navy on the USS Electron during the Korean War.

He married Hannah Nathan on Jan. 9, 1959, in Chicago.

He graduated from DeVry Technical Institute in Illinois in 1962. In 1963, he graduated the Federal Aviation Academy in Oklahoma.

Mr. Hurley resided in the Ketchikan and Metlakatla area for 47 years.

He worked as an electronics technician and retired from the Federal Aviation Administration in 1988.

"His position with the FAA took him and his family to many beautiful places in Alaska, including Bettles, Galena, Gustavus, Yakutat, Annette Island and Ketchikan," his family writes.

"After retiring, he took a position as a greeter at Walmart in Ketchikan when it first opened," his family writes. "He enjoyed visiting with everyone."

Mr. Hurley enjoyed fishing.

He was a lifetime member of Veterans of Foreign Wars and the National Rifle Association. He was also a member of the Fraternal Order of Eagles.

Mr. Hurley was preceded in death by his wife, Hannah.

He is survived by his son, Jon, Jon's wife, Brenda, and their children, Michael and Allie, of Ketchikan; son, Richard, Richard's wife, Rachel, and their child, Camrin, of Rockport, Washington; brother, Russ Wyatt of Sequim, Washington; and sisters, Martha Hugli of Anthem, Arizona, and Kay Wyatt of Port Angeles, Washington.

USCG Base Ketchikan
Public Comment Period & Public Meeting Notice
Proposed Plan for Base Ketchikan

The U.S. Coast Guard (USCG) and the Alaska Department of Environmental Conservation (ADEC) will hold a Public Meeting to discuss the Focused Feasibility Study and Proposed Plan for the cleanup of contaminated soil and sediment at Base Ketchikan, AK. The Focused Feasibility Study discusses the risks posed by the site and presents the evaluation of cleanup options. The Proposed Plan identifies preferred cleanup alternatives for the public to comment.

The Proposed Plan describes remedial alternatives considered for four areas of concern:
AOC 1: Soil at the Buoy Storage Yard
AOC 2: Intertidal sediment at the Inner Boathouse
AOC 3: Intertidal sediment at the Inner Marine Ways
AOC 4: Subtidal sediment near the pier

USCG and ADEC evaluated the following alternatives for addressing the contaminated soil and sediment at the site. Based on available information, the preferred alternatives proposed for public comment at this time are **bolded** and *italicized*.

AOC 1: Soil at the Buoy Storage Yard
- Limited Polychlorinated Biphenyl (PCB) Removal and Land Use Controls (LUCs)
- Concrete Cap and LUCs
- Gravel Cap and LUCs
- ***Excavation, Onsite Treatment, and Offsite PCB Disposal***
- Excavation, Gravel Fill, and Offsite Disposal

AOC 2: Intertidal sediment at the Inner Boathouse
- PCB Removal and LUCs
- Limited Cap and LUCs
- ***Removal and Offsite Disposal***

AOC 3: Intertidal Sediment at the Inner Marine Ways
- LUCs
- ***Limited Land-Based Excavation, Offsite Disposal, and LUCs***
- Dredging and Limited Land-Based Excavation

AOC 4: Subtidal Sediment near the Pier
- ***LUCs and LTM***
- Limited Removal and Offsite Disposal with LUCs

Although these are the Preferred Alternatives at the present time, USCG and ADEC welcome the public's comments on all of the alternatives listed above. USCG and ADEC will choose the final remedies after the comment period ends and may select any one of the alternatives after taking public comments into account.

Copies of the Focused Feasibility Study and Proposed Plan are available at:

Ketchikan Public Library
1110 Copper Ridge Lane
Ketchikan, AK 99901
(907) 225-3331
Mon-Wed: 10 a.m. – 8 p.m.
Thurs-Sat: 10 a.m. – 6 p.m.
Sunday: 1 – 5 p.m.

The public comment period for the Proposed Plan is:
Wednesday January 22, 2020 through Thursday February 20, 2020

Public Meeting
Tuesday February 4, 2020 from 2:00 – 5:00 p.m.
Ketchikan Public Library
1110 Copper Ridge Lane, Ketchikan, AK

For further information, additional background documents, or to submit written comments, please contact:
Chris Rose
Environmental Protection Specialist
USCG Civil Engineering Unit Juneau
Environmental Branch
P.O. Box 25517
Juneau, AK 99802-5517
(907) 463-2421
chris.a.rose@uscg.mil

www.ketchikandailynews.com

RE-ELECT Judy Leask
GUTHRIE
KIC Tribal Council
Paid for by Judy Leask Guthrie, PO Box 8182 Ketchikan, AK 99901

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Ketchikan INDIAN COMMUNITY
TRIBAL COUNCIL REGULAR MEETING
JANUARY 23, 2020 AT 5:30PM
Annual Membership Meeting, Jan. 20 at Ted Ferry Civic Center
Doors Open at 10:00 AM
KIC Elections, Jan. 20 at Ted Ferry Civic Center
From 8:00 AM to 8:00 PM
KIC Open House, Jan. 27, All buildings all day
Swearing in and Canvasing the Election, Jan. 28 at 5:30 PM
Administrative offices and tribal health clinic
CLOSED Jan. 20th for Martin Luther King Day

A COMPLETE AGENDA PACKET IS AVAILABLE FOR REVIEW ON THE CITY'S WEB SITE AT http://www.ktn-ak.us/current-agendas-and-minuies. THE MEETING IS TELEVISED WHERE LOCAL PROGRAMMING IS AVAILABLE.

CITY OF KETCHIKAN
REGULAR CITY COUNCIL MEETING
January 23, 2020 7:00 P.M.
AGENDA

1. CALL TO ORDER
2. ROLL CALL
Please Rise for the Pledge of Allegiance
3. COMMUNICATIONS
a. Mayoral Proclamation – Ketchikan Fishing Industry Week
4. PERSONS TO BE HEARD
5. CONSENT AGENDA
a. General Government
(1) Approval of Minutes – Special City Council Meeting of December 11, 2019 and Regular City Council Meeting of January 2, 2020
(2) Exempting the Procurement of Police Department Annual Licensing and Maintenance Support for Body Worn Cameras and Digital Evidence Storage from the Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – Axon Enterprises, Inc.
(3) Exempting the Procurement of the Annual Records Management System and Computer Aided Dispatch Software Licensing and Maintenance Support from Huber & Associates, Inc. for the Police Department from the Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code
(4) Exempting the Procurement of Wastewater Division SCADA and Pump Station Control Systems from Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – Boreal Controls, Inc.
(5) Exempting the Procurement of Annual Dispatch Center Hardware/Software Maintenance Services from Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – ProComm Alaska LLC
(6) Liquor License Renewal Applications – Inn at Creek Street, LLC d/b/a New York Hotel & Cafe, Victor Klose d/b/a Totem Bar, Victor Klose d/b/a Totem Liquor Store; and American Legion Post #3 d/b/a American Legion Post #3
b. Ketchikan Public Utilities
(1) Exempting the Procurement of Programming Content for KPU TV from the Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – National Cable Television Cooperative and Vubiquity, Inc.
(2) Exempting the Procurement of Email, Network Monitoring and Customer Support Services for the Telecommunications Division from Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – NeoNova
(3) Exempting the Procurement of Video Transport Services for the Telecommunications Division from the Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – GCI
(4) Exempting the Procurement of Veramatrix Encryption Annual Maintenance and Support Services for the Telecommunications Division from the Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – Dascom Systems Group
6. UNFINISHED BUSINESS
a. General Government
(1) Appointments to Boards and Commissions – Mayor Sivertsen
b. Ketchikan Public Utilities
7. NEW BUSINESS
a. General Government
(1) Resolution No. 20-2765 – Recognizing "Mickey" Robbins for his Years of Service on the Port and Harbors Advisory Board
(2) Discussion of Periodic Public Updates from the PeaceHealth Ketchikan Medical Center Community Health Board – Councilmember Flora
(3) Rescinding September 25, 2019 Designation of a Screening Committee to Evaluate the Request for Proposals (RFP) for the Reconfiguration of the Port of Ketchikan and Uplands Improvements and Designating the Mayor and City Council as the Reviewing Authority that will Make a Final Determination Regarding any Proposals that May be Received as a Result of the RFP Process
(4) Purchase of Real Property Located at 2813 Tongass Avenue (Former Bar Harbor Restaurant)
(5) Exempting the Procurement of a Wastewater Division Utility Truck from the Competitive Bidding/Written Quotation Requirements of the Ketchikan Municipal Code – National Auto Fleet Group
(6) Budget Transfer – Ketchikan Pedestrian Safety and Crosswalk Awareness Campaign
(7) Resolution No. 20-2766 – Expressing Sympathy to the Family of Llwellyn "Lew" Williams III Recognizing His Service to the City of Ketchikan and Ketchikan Public Utilities
b. Ketchikan Public Utilities
8. VOUCHERS
9. MANAGER'S REPORTS
a. General Government
(1) Schedule of General Government and KPU Appropriated Reserves Through the City Council Meeting of December 19, 2019
(2) Draft 2020 Cruise Ship Schedule and Berth Assignments
(3) Update on Effort to Rescind Title V Permit Condition for Ambient Air Quality Monitoring at the Bailey Power Plant
b. Ketchikan Public Utilities
(1) Project Status Reports of the KPU Operating Divisions – December 2019
(2) 2020 Broadcast Surcharge Fee Increase
10. CITY CLERK'S FILE
11. CITY ATTORNEY'S FILE
(a) Report of Significant Activities for the Month of December 2019 – Office of the City Attorney
12. FUTURE AGENDA ITEMS
13. MAYOR AND COUNCIL COMMENTS
14. OTHER NEW BUSINESS
15. EXECUTIVE SESSION
a. General Government
b. Ketchikan Public Utilities
(1) Discussion of Negotiation Strategies Relative to the City's Request to Reopen the Current Collective Bargaining Agreements between the City of Ketchikan and the International Brotherhood of Electrical Workers, Local 1547 to Address Issues Associated with Journeyman Lineman Retention and the I.B.E.W. Employer/Employee Retirement Plan Contribution Rates
(2) Alaska Department of Environmental Conservation Notice of Requirement to Install Filtration Due to Failure to Meet Filtration Avoidance Criteria
16. ADJOURNMENT

AFFIDAVIT OF PUBLICATION

STATE OF ALASKA,)
) SS:
Gateway Borough)

Nancy Kaste, being duly sworn says:

That she is representative of the Ketchikan Daily News, a newspaper published at Ketchikan, in said Borough and State, and that the publication of which the annexed is a printed and true copy, was published in said newspaper, commencing on the 1st day of February, 2020 and ending on the 1st day of February, 2020.

Nancy Kaste

Subscribed and sworn to before me this 1st day of February, 2020.

Tena Williams

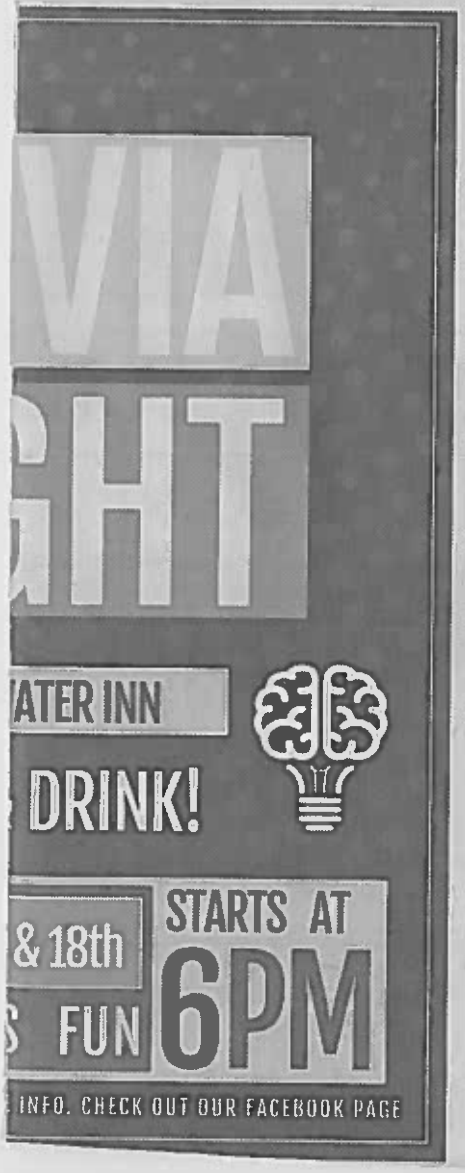
Notary Public for Alaska

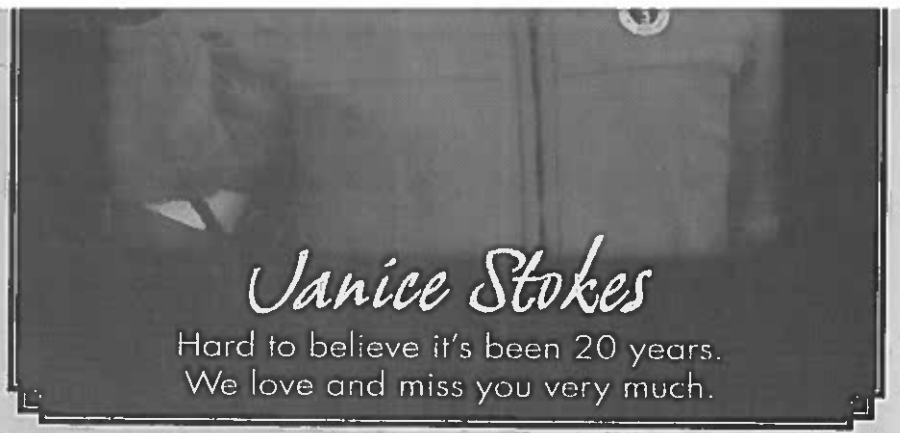
My Commission Expires 01/22/23

Official Seal
Tena Williams
Notary Public-State of Alaska
My Comm. Expires
January 22, 2023

00 First Ave.
Public comment on marijuana regulations will be allowed in the work session. Comment also will be allowed at the beginning of Monday's meeting during the period for public comment.
The agenda item for the work session, with links to the Planning Department report, can be found at https://bit.ly/3b0ZtaL.

Just for Today AA: 5:30 p.m., 1736 Tongass Ave.
Shrimp Subcommittee of Ketchikan Fish and Game Advisory Committee: 5:30 p.m., ADF&G office conference room, 2030 Sealevel Drive.
Peer to Peer Support Group: 5:30 p.m., The Plaza mall, SAIL office.
Pioneers of Alaska, Men's Igloo 16 and Women's Igloo 7: 6:30 p.m., Pioneer Hall, 314 Pioneer Alley.
American Legion Post #3: 7 p.m., 631 Park Ave.
Just for Today AA: 8 p.m., 1736 Tongass Ave.





USCG Base Ketchikan
Public Comment Period & Public Meeting Notice
Proposed Plan for Base Ketchikan

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AOC 4: Subtidal sediment near the pier

USCG and ADEC evaluated the following alternatives for addressing the contaminated soil and sediment at the site. Based on available information, the preferred alternatives proposed for public comment at this time are **bolded** and ***italicized***.

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- Gravel Cap and LUCs
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- Excavation, Gravel Fill, and Offsite Disposal

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- PCB Removal and LUCs
- Limited Cap and LUCs
- ***Removal and Offsite Disposal***

AOC 3: Intertidal Sediment at the Inner Marine Ways
- LUCs
- ***Limited Land-Based Excavation, Offsite Disposal, and LUCs***
- Dredging and Limited Land-Based Excavation

AOC 4: Subtidal Sediment near the Pier
- ***LUCs and LTM***
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Although these are the Preferred Alternatives at the present time, USCG and ADEC welcome the public's comments on all of the alternatives listed above. USCG and ADEC will choose the final remedies after the comment period ends and may select any one of the alternatives after taking public comments into account.

Copies of the Focused Feasibility Study and Proposed Plan are available at:

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Ketchikan, AK 99901
(907) 225-3331
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Tuesday February 4, 2020 from 2:00 – 5:00 p.m.
Ketchikan Public Library
1110 Copper Ridge Lane, Ketchikan, AK

For further information, additional background documents, or to submit written comments, please contact:
Chris Rose
Environmental Protection Specialist
USCG Civil Engineering Unit Juneau
Environmental Branch
P.O. Box 25517
Juneau, AK 99802-5517
(907) 463-2421
chris.a.rose@uscg.mil

ıfter fight on school grounds

ally at the hearing uld very well turn it

ranch of military, he er.

y, Ketchikan district at- ednesday that Fernan- ager he fought met on the fight and became ana concentrate sale. unches exchanged and up later, according to

vening at Dudley Field unds, both bringing rs aged 14 to 17 were lexie fought with the rijuana concentrate to

the fight, Fernandez-Alexie allegedly brandished a .380 Ruger handgun before passing it off to a 17-year-old, according to the Ketchikan Police Department probable cause statement.

No injuries beyond a few scrapes and bumps around the body and hands were sustained by either person during the fight, KPD Deputy Chief Eric Mattson said soon after the incident.

"There wasn't even a black eye from any strike to the face," said Mattson back in September, "It was more of a kind of a sparring, wrestling, trying to grab neck and head kind of match."

Mattson said that the fight lasted a few minutes and they went two rounds, taking a break in between.

During the second round, the 17-year-old pulled the gun out to stop the fight and a 14-year-old picked up a rock to defend the 15-year-old in the fight, according statements made to police and reflected in the probable cause statement.

Fernandez-Alexie then got the gun back from the 17-year-old, and some of the teenagers took off running.

According to police documents, one of the teenagers said, "After the fight, the defendant chased (the) group away while the gun was pointed at them, (the teenager) said he was afraid, and he was ducking behind cars as they ran away."

None of the teenagers present were Kayhi students, according to the KPD. The charges for the other teenagers involved were handled by juvenile probation, according to KPD.

During sentencing comments Wednesday, McGillicuddy said that hopefully, with the agreement, Fernandez-Alexie would "launch himself on a productive path moving forward."

e of heroin

he Class B felony and zero to two years for the Class C felony.

Presiding Ketchikan Magistrate Judge Amanda Schulz set the bail at $20,000 — a $15,000 cash performance bond and a $5,000 cash appearance bond.

Schulz acknowledged that Langstaff did not have a lawyer representing him in court Tuesday to argue the bail.

She said if he was unable to post bail in 48 hours, he had a right to schedule a bail hearing.

Langstaff declined a court-appointed attorney and said he'd like to hire his own.

When commenting on the bail before it was set, he said he hasn't had an issue showing up to court appointments in the past.

Schulz set an attorney status hearing on Feb. 5 and a preliminary hearing on Feb. 7.

Continued from page A-1

unity should look like" is italicized. Included with the agenda item is a 12-ge Planning Department memorandum at examines five aspects of the marijuana dustry: its history, the borough's regula- ons on the industry, economic drivers, so- al drivers, and how the industry and gulations in the borough compare to her Alaska communities.

Monday's Assembly meeting begins at

CORRECTION

Regarding the "Search yields weapons, drugs" story published in the Jan. 30, 2020, edition of the Ketchikan Daily News, Herman Joseph Brown III, was charged with a Class C felony for misconduct involving a weapon in the third degree; and misconduct involving a controlled substance in the fourth degree, a Class C felony.

WISH Annual Meeting
Tuesday, February 18, 2020
5:30 pm at IRock
2106 Tongass Ave, Suite #101

To be eligible for nominations and/or to vote you must be a current member of WISH. Membership dues may be paid on the day of the meeting.

APPENDIX E

Response to Comments

REVIEW COMMENTS				
PROJECT: USCG Ketchikan Base			**DOCUMENT:** Draft Record of Decision	
DATE: 1/12/21	**REVIEWER: Michael Hooper**		**PHONE:** (907) 907-451-5174	
Item No.	**Location (page, par., sen.)**	**ADEC COMMENTS (1/14/2021)**	**USCG Response (2/4/21)**	**ADEC Response (2/18/21)**
1.	General; total cumulative risk	Following remedial actions at AOC 1 or any location where contamination remains in soil, any contaminants detected above 10% of the cleanup level should be used to calculate cumulative risk according to ADEC's *Procedures for calculating cumulative risk.*[1]	Agree – although arsenic will exist at AOC 1 in concentrations that may exceed the cleanup level, the eco-bond will immobilize the arsenic. All other contaminants detected will be used to calculate cumulative risk remaining on site. This is reflected in text added at ADEC request in the FS in section 2.5.7 and in 2.8 RAOs "Cleanup levels must meet the cumulative risk requirements of 1×10^{-5} and a Hazard Index equal to 1 (ADEC 2018)." See comment response #6 for specific changes to the sampling protocol for AOC 1 in Sections 2.9.1.5 and 2.12.2.1 to ensure data is available for this calculation.	Accepted
2.	General; Land Use Controls	Because land use controls are necessary to ensure the selected remedy is protective of human health and the environment, prior to closure a notice of activity and use limitation will need to be placed on the property to ensure that land use controls are maintained and that property is not developed for use that would lead to unacceptable risk.	Accept. Each remedy indicates there are use limitations. This text will be revised as described below. BSY AOC 1 use limitations are described on page 2-74. The 3rd sub-heading to the 5th bullet on the page (LUCs) will be updated to read: "Maintaining records with the USCG Environmental Program Environmental Liabilities database of record and within the master planning documents that will…" Also the similar text on Marine Ways page 2-77, 3rd subheading to the 2nd bullet will be revised in the same way. Also the similar text on Subtidal page 2-78, 3rd sub-heading to the 5th bullet will be revised the same way. The text on page 2-4 referring to LUCs are in reference to already in place LUCs for the Marine Ways documented in as 2013 letter (USCG 2013) so this text will remain as written.	Accepted
3.	pg 1-4; AOC 2 and 3.	"Sampling sediment and dewatered liquid for waste characterization" please revise this to say waste characterization and management. Dewatering liquid from disturbed sediment will need to be properly managed based on contaminant concentrations.	Agree. Add "and management" on page 1-4 AOC 2 last bullet and AOC 3 6th bullet. Also added to pages 2-45 Alternative 4; 2-46 [Note: 2/19/21 this is -47 in final] Alternative 3; 2-47 Alternative 4; 2-49 Alternative 3; 2-75 Inner boathouse remedy; and 2-76 Inner marine ways remedy.	Accepted
4.	pg 1-7; Authorizing Signatures	The final document will be signed by Contaminated Sites Program Manager Stephanie Buss. Please delete Bill O'Connell and replace with Stephanie Buss.	Agree. Will delete and replace with Stephanie Buss.	Accepted

REVIEW COMMENTS				
PROJECT: USCG Ketchikan Base			**DOCUMENT:** Draft Record of Decision	
DATE: 1/12/21	**REVIEWER: Michael Hooper**		**PHONE:** (907) 907-451-5174	
Item No.	**Location (page, par., sen.)**	**ADEC COMMENTS (1/14/2021)**	**USCG Response (2/4/21)**	**ADEC Response (2/18/21)**
5.	pg 2-9; Sediment Dynamics.	This section describes movement of sediment in the general area of Ketchikan. Are these sediment transport dynamics expected to move contaminated sediment and impact the remedial actions?	The sediment dynamics are expected to have contributed to the movement of sediment from the suspected source at the marine railways and the debris off of the pier during past use and disposal practices. The proposed remedies remove intertidal sediment and therefore no impact to the remedial action is anticipated. The subtidal sediment is subject to movement throughout the Tongass Narrows but does not change the remedial action selected for AOC4.	Accepted - Thank you for the additional information.
6.	pg 2-15; Table 2-4	In addition to arsenic and PCBs in excess of the cleanup level this table shows antimony and lead are present at 25% and 87% of their respective alternative cleanup levels. Total cumulative risk should be evaluated. See comment 1.	Agree. Total cumulative risk would be evaluated following remedial actions. Speaking specifically to the noted antimony and lead results, only one location, 12KTN-BSU-SO-016, returned the highest results. The next highest antimony result was 12.3 mg/kg and no other soil sample exceeded 400 mg/kg lead. Because 12KTN-BSU-SO-016 is also the location of the highest PCB result, the remedy removing PCBs will likely remove these highest antimony and lead results as well. To allow calculation of a final cumulative risk result, the sampling text was updated for AOC 1 in Sections 2.9.1.5 and 2.12.2.1 as follows: "Post-application samples would be collected after stabilization and analyzed for total arsenic and <u>other metals</u> <u>in soil</u> and <u>total</u> metals after performing the toxicity characteristic leaching procedure (TCLP). This will allow for a final cumulative risk calculation." [Note 2/19/21: underlined text was added to clarify wording in the final.]	Accepted
7.	pg 2-25; Groundwater use	As each AOC is located in an intertidal zone and no aquifer is expected to exist, migration to groundwater is not considered a complete pathway and a groundwater use determination is not necessary.	Agree. This text is intended for the "onshore" area of concern AOC1. The mention of a groundwater use determination here is due to history of discussions back and forth about one over time and is carried over from agreements made during the writing of the FS. Text in this section will be updated to read "Actual groundwater has not been observed during any of the <u>soil or upland</u> site investigations."	Accepted – Thank you for the background on this.

REVIEW COMMENTS				
PROJECT: USCG Ketchikan Base			**DOCUMENT:** Draft Record of Decision	
DATE: 1/12/21	**REVIEWER: Michael Hooper**		**PHONE:** (907) 907-451-5174	
Item No.	**Location (page, par., sen.)**	**ADEC COMMENTS (1/14/2021)**	**USCG Response (2/4/21)**	**ADEC Response (2/18/21)**
8.	pg 2-27; Table 9	Please add a reference for this PCB cleanup level and a brief description of how the normalized concentration is calculated in the text following this table.	Agree. The cleanup criteria in the table 2-9 will be clarified as follows: "1 mg/kg for human exposure 65 mg/kg normalized for organic carbon for ecological exposure[1]" The footnote will be revised to: "[1]The sediment cleanup level for protection of ecological risk is derived from Washington Sediment cleanup criteria (Washington Administrative Code 173-204-560 Table III Marine Sediment Cleanup Objectives) as presented in USACE 2018 and is normalized for organic carbon content. The dry weight concentration in a sample is divided by the decimal fraction representing the percent total organic carbon content of the sediment to account for the association with organic carbon and is then compared to this cleanup level." Table 2-5 (page 2-18) will update footnote 3 to note that the cleanup levels presented are 1 or 0.28 mg/kg because the intertidal sediment is accessible to human and ecological receptors: "The PCB cleanup level for human exposure is 1 mg/kg. For ecological exposure the cleanup level is normalized for total organic carbon by multiplying the dry weight concentration by the decimal fraction representing the percent total organic carbon content of the sediment to account for association with organic carbon (USACE 2018). The fraction of organic carbon at this location is 0.00427 grams per gram (g/g) and the average across Base Ketchikan is 0.01528 g/g." Table 2-7 (page 2-23) will update footnote 3 to note that the 1 mg/kg presented is the normalized cleanup level for that location because when the average sitewide foc of 0.01528 is applied, the cleanup level is calculated as 1 mg/kg: "The PCB cleanup level is normalized for total organic carbon by multiplying the dry weight concentration by the decimal fraction representing the percent total organic carbon content of the sediment to account for association with organic carbon (USACE 2018). The average fraction of organic carbon average across Base Ketchikan is 0.01528 g/g."	Accepted

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9.	pg 2-32; Paragraph 2	"They also have extensive abundance and diversity. Globally it is estimated that there are more than 7,000 species of echinoderms (Mulcrone 2005), 10,000 species of marine polychaetes (Myers 2001), 20,000 species of bivalves, and 70,000 species of gastropods (Haszprunar 2001). From the population and community perspective, potential impacts to the benthic invertebrate populations living in the subtidal sediment AOC would be indistinguishable from natural causes such as predation." The global biodiversity of benthic invertebrates is seemingly not relevant to the site and does not support the claim in the final sentence. Please revise or remove.	Agree. This text from the weight of evidence evaluation document (USACE 2019) is distracting from the point in this ROD. The text will be deleted and only the final sentence will remain.	Accepted
10.	pg 2-34; RAOs.	Please add an RAO along the lines of "prevent human exposure to soil contamination exceeding risk standards for metals." See comment 1	Agree. The following will be added as a second bullet: "• Prevent human exposure to soil contamination exceeding cumulative risk standards for metals for industrial land use."	Accepted
11.	pg 2-70. Selected Remedies	For each AOC that will implement land use controls please include that those controls will be maintained through a notice of activity and use limitation on the property.	Agree. Text on page 2-71 will be revised to: "The selected remedies are protective of HHE because exposure to PCBs and heavy metals is either eliminated by removal or will be controlled through LUCs, inspections, and/or prompt maintenance of any protective cap deficiencies. LUCs are maintained through notice of activity and use limitations on the property." Specific LUCs related to the buoy storage yard on Page 2-74, Inner Marine Ways on page 2-77 and Subtidal sediment on page 2-78 already include maintaining records with SILC real property (to be revised to USCG Environmental Program Environmental Liabilities database of record per comment response #2) to limit use and preventing disturbance without written consent of the ADEC. The applicable bullet in each section will be modified to: "… without written approval of the ADEC through a notice of activity."	Accepted
12.	pg 2-74; Bullet point 2	Please revise to say arsenic and other metals.	Agree. The text will be revised to "arsenic and other metals".	Accepted

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13.	pg 2-74; Bullet point 2	Prior to treatment soils should be screened for metals to ensure all contaminated soil is treated and confirmation soil samples should also be collected pre-treatment from both impacted and unimpacted underlying soil. Soil samples should be analyzed for metals for comparison to the alternative cleanup levels.	Review. A bulleted step will be added to the remedy description in section 2.12.2.1 page 2-74 and 2.9.1.5 page 2-43 to bring additional details from the FS to this ROD: • The gravel fill present onsite would then be excavated to approximately 4 feet, where concrete riprap boulders characterize the BSY foundation. Previous data indicate the depth and lateral distance of the excavation would be determined by arsenic, but confirmation sampling at the extent of the excavation would include total metals. No other alternative cleanup levels are proposed for soil in this ROD, but the statement regarding cumulative risk calculation for all metals has been added as requested. The cumulative risk would be calculated for the industrial land use scenario proposed.	Accepted
14.	pg 2-77 ;	Following these activities, cleanup will be complete and the site will receive a designation of "Construction Complete" under CERCLA, and "Cleanup Complete – Institutional Controls" under 18 AAC 75. Please revise this sentence to say something along the lines of "Following these activities, if properly implemented and no additional environmental concerns are discovered, …" Revise throughout the document.	Agree. The text will be revised to: "Following these activities, if properly implemented and no additional environmental concerns are discovered, cleanup will be complete and the site will receive a designation of…" Revisions were also made to pages 2-75; 2-76; and 2-79.	Accepted
15.	Conceptual site model	Ingestion of surface water should be considered a complete pathway as incidental ingestion during recreational or subsistence activities is possible. This exposure pathway is controlled through land use controls but should still be listed as complete for CSM purposes.	The potentially affected surface water body is marine/saltwater. We did not consider that pathway complete for ingestion, only dermal absorption at the shoreline. Should we add a note to the CSM regarding marine surface water? The original RI sampled seeps related to other possible sites at Base Ketchikan, but none were considered for the FS.	Accepted - After discussion with management we will accept this response and not request changes to the CSM.
16.		-end of comments-		

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17.	Table B-3	An additional comment was received by email from Jennifer Currie via Michael Hooper on 28 January 2021. "Table B-3 lists the Uniform Environmental Covenants Act (UECA) as a Relevant and Appropriate requirement, please change this to an Applicable requirement or provide justification. UECA would seem to be directly applicable in this situation."	Accepted. The USCG accepts the change to Applicable with the understanding that in the absence of USCG policy regarding UECA any decision regarding implementation of UECA is on a case-by-case until a USCG policy is in place. The Base is under the control of the Coast Guard, and there is no plan to deactivate the Base. Maintaining records with the USCG Environmental Program Environmental Liabilities database of record and within the master planning documents currently provides the same level of control for a contaminated site as a Uniform Environmental Covenant.	Accepted Though ADEC disagrees with the second paragraph of this response. Those mechanisms can be changed by the USCG without notice to DEC. A Notice of Activity and Use Limitation is recorded in the property records off base.

1. Technical guidance accessible at http://dec.alaska.gov/spar/csp/guidance-forms/