Remedial Investigation Report

Version: Final

Former Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

ME FUDS Site #DO1ME0132 02

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January 2023

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) New England District (CENAE) prepared this Remedial Investigation (RI) Report for the Former Loring Air Force Base (AFB) Laundry Annex located on Central Drive in Presque Isle, Aroostook County, Maine (Site). The Formerly Used Defense Sites (FUDS) property consists of two areas. One area (0.24 acres) is the former dry-cleaning building located on the west side of Central Drive, which for purposes of this RI will be considered the 'Site'. The other area is the former laundry building and steam plant (1.06 acres) the east side of Central Drive. The former laundry building and steam plant has been beneficially re-used by the current property owner and are not eligible for inclusion in the FUDS Program.

The Site comprises an undeveloped portion of a larger 0.46-acre parcel and is located on the west side of Central Drive, next to railroad tracks. The Site previously contained a dry-cleaning building associated with Loring Air Force Base, and currently no buildings are on the Site.

This RI was conducted to assess the results of previous assessments and recent petroleum investigations at the Site to determine the nature and extent of contaminants of potential concern (COPCs) and evaluate the need for additional Site investigations, a feasibility study, and remedial action. The primary objectives of this RI include the following:

1. Prepare a comprehensive conceptual site model (CSM) and risk assessment (RA)
2. Assess the adequacy of site characterization for the purposes of determining if there is risk above CERCLA target action levels
3. Document data are sufficient to achieve a No Further Action (NFA) determination under CERCLA

Additionally, as petroleum releases are not remediated under CERCLA, the 2016 and 2017 petroleum hydrocarbon fraction data collected will be used to evaluate petroleum separately under the Maine Department of Environmental Protection (DEP) petroleum cleanup guidelines: the Maine DEP Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (Maine DEP, 2018) and Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (Maine DEP, 2014).

Based on a review and preliminary risk screening of data collected between 1992 and 2015, data gaps were identified. Further Site sampling conducted in November 2016 and July 2017 identified petroleum impacted subsurface soil in the area beneath the former building. Data were summarized to prepare a CSM for the Site to gain a clear understanding of the potential source areas, COPCs, extent of contamination, migration pathways, and contaminant persistence. Data were also reviewed for completeness with regard to spatial and temporal distribution and monitoring of the Site in accordance with applicable Federal and State regulations/standards/guidelines. Subsurface soil, soil gas, groundwater, culvert surface water and sediment samples were collected and analyzed for Volatile Organic Compounds (VOCs). Surface soil was not sampled and is not included in this RI, since VOCs are unlikely to be present in the surface soil after long time periods (the Laundry Annex ceased operations in 1974), and therefore, there are unlikely to be surface soil exposures. Samples collected in all available media have found neither evidence of a DOD release of VOCs requiring remediation nor a continuing source of contamination. As documented in this RI Report, the Site has been adequately assessed to identify any potential source areas and their extent for the CSM, evaluate risk, and develop a recommendation on the need for further CERCLA action (i.e., Feasibility Study).

Human Health and Screening Level Ecological Risk Assessments (HHRA/SLERA) were performed using data collected in 2016 and 2017, excluding petroleum fractions, to assess the potential human and ecological risks of adverse effects under current and reasonable future land uses. Petroleum fraction results exceed the Maine DEP RAGs; however, remaining elevated concentrations are at depth with at least 2 feet of soil with no evidence of contamination at the surface, which serves to prevent direct contact exposure under current use. An evaluation of petroleum results is included in the Petroleum Assessment Report (included in Appendix D).

The Site is currently undeveloped and unused, and is part of property conveyed to the City of Presque Isle (CoPI) by the United States federal government through the General Services Administration by a quit claim deed on November 25, 1974, as part of a larger parcel. Transfer of the property was subject to restricting the future use of the property for public airport purposes. Property thus transferred cannot be used, leased, sold, salvaged or disposed for other than airport purposes without written consent of the Administer of the Federal Aviation Administration (FAA). The land use is further restricted by Municipal Zoning Ordinance (CoPI, 2019). There are currently no residences in the immediate vicinity, although the Site is near some urban residentially zoned land to the east. Since the Site is located in a Light Industrial Zone, commercial or industrial use is not currently prohibited, but the developable size of the parcel is further limited by a 30 feet front lot setback due to the road right of way (ROW) and a 30-foot rear property line setback. Based on its location (near railroad tracks), small size, and zoning restrictions related to lot size, the Site will not likely be developed, and construction of a commercial/industrial building is not considered a reasonably foreseeable future use. Consequently, in a recent communication to the USACE (August 12, 2020) and contained in Appendix E, the Presque Isle Industrial Council agrees to restrict foreseeable future use of this parcel to its current use as “green space”, parking and snow storage for the adjacent building (Building 306). Based on these future use limitations and on a review of other potential receptors, contaminated media, and exposure pathways, utility workers were the only potentially exposed population evaluated in the HHRA. Furthermore, existing utilities (power poles and stormwater catch basins) are located within the 30-foot road ROW. The expected location of current and future utilities would remain within this ROW. The interpreted extent of petroleum contamination nearest the road is outside the limits of the ROW and therefore maintenance activities for utilities would not be expected to encounter petroleum impacted soils.

The HHRA concluded there were no risks above target action levels for current and reasonably anticipated future use human exposures. The SLERA concluded the Site does not pose an unacceptable risk to ecological receptors and a full baseline ecological risk assessment is not required. Therefore, NFA is recommended for this Site under CERCLA.

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LIST OF ACRONYMS

°F – degrees Fahrenheit
AFB – Air Force Base
AMSL – above mean sea level
bgs – below ground surface
CDC – Center for Disease Control
CENAE – Corp of Engineers New England District
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CFR – Code of Federal Regulations
COPC – contaminant of potential concern (screening based)
CoPI – City of Presque Isle
cPAHs – carcinogenic polycyclic aromatic hydrocarbons
Credere – Credere Associates, LLC
CSM – conceptual site model
cy – cubic yards
DEP – Department of Environmental Protection (Maine)
DERP - Defense Environmental Restoration Program
DO – dissolved oxygen
DoD – Department of Defense
EPA – U.S. Environmental Protection Agency
EPH – Extractable Petroleum Hydrocarbons
ft^2 – square feet
FS – Feasibility Study
FUDS – Formerly Used Defense Site
HHRA – Human Health Risk Assessment
HI – hazard index
LTM – long-term monitoring
MACTEC – MACTEC Engineering and Consulting, Inc.
MassDEP – Massachusetts Department of Environmental Protection
MCL – Maximum Contaminant Level
MEE – Maine Environmental Engineering
MEG – Maximum Exposure Guideline
mg/kg – milligrams per kilogram
MGS – Maine Geological Survey
MyKroWaters – MyKro Waters Environmental Services
NCP – National Oil and Hazardous Substances Pollution Contingency Plan
NFA – No Further Action
NPL – National Priority List
PAH – polycyclic aromatic hydrocarbons
PCB – polychlorinated biphenyls
PCE - tetrachloroethene
PGs – Petroleum Guidelines (Maine DEP)
PID – photoionization detector

ppm_v – parts per million by volume
QA – quality assurance
QAPP – Quality Assurance Project Plan
QC – quality control
RA – risk assessment
RAG – Remedial Action Guideline (Maine DEP)
RI – Remedial Investigation
RSL – Regional Screening Level
R. Weston – Roy F. Weston, Inc.
SAP – Sampling and Analysis Plan
SB – soil boring
SLERA – Screening Level Ecological Risk Assessment
SOW – scope of work
TCE – trichloroethene
TPH-GRO – total petroleum hydrocarbons-gasoline range organics
TPH-DRO – total petroleum hydrocarbons-diesel range organics
µg/L – micrograms per Liter
USACE – U.S. Army Corp of Engineers
USGS – U.S. Geological Survey
UST – underground storage tank
UTM – Universal Transverse Mercator
VOC – volatile organic compounds
VPH – volatile petroleum hydrocarbons
Weston – Weston Solutions, Inc.

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) New England District (CENAE) prepared this Remedial Investigation (RI) report for the Former Loring Air Force Base (AFB) Laundry Annex (Formerly Used Defense Sites [FUDS] project DO1ME0132 02) located on Central Drive in Presque Isle, Aroostook County, Maine (Site).

1.1 PURPOSE OF REPORT

1.1.1 Scope

This RI has been prepared under the Defense Environmental Restoration Program (DERP) for FUDS under the Installation Restoration Hazardous, Toxic, Radioactive Waste (HTRW) program category. The U.S. Department of Defense (DoD) has designated USACE as the lead Executive Agent for DERP-FUDS projects. Work completed under this contract was completed pursuant to the USACE Environmental Quality FUDS Program Policy section 4-4.3 (USACE, 2004) and in compliance with U.S. Environmental Protection Agency (EPA) and USACE guidance for RIs (EPA, 1988 and USACE, 1994).

This RI has been completed in compliance with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC § 9620 et seq.), subsequent Superfund Amendments and Reauthorization Act, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 Code of Federal Regulations [CFR] Part 300). For purposes of this RI as a non-National Priority List (NPL) FUDS, the Maine Department of Environmental Protection (DEP) is the lead regulator (USACE, 2004, Section 1-2.1.2).

This RI has been prepared to assess the cumulative results of previous assessments and monitoring at the Site to determine the nature and extent of contamination, identify contaminants of potential concern (COPCs), and evaluate the need for additional remedial investigation, feasibility study, or remedial action under the CERCLA. Additionally, as the primary contaminant released at the Site is petroleum, the Site will also be evaluated based on the Maine Department of Environmental Protection (DEP) cleanup guidelines.

1.1.2 Statement of Objectives

The primary objectives of this RI include the following:

1. Prepare a comprehensive conceptual site model (CSM) and risk assessment (RA),
2. Assess the adequacy of site characterization for the purposes of determining if there is risk above CERCLA target action levels, and/or
3. Document data are sufficient to achieve a No Further Action (NFA) determination under CERCLA.

Since petroleum is not a CERCLA contaminant, similar objectives will be applied in a separate report for evaluation of petroleum according to the Maine DEP Petroleum Clean-Up Program.

To achieve the above objectives, the following standards were used in evaluating existing data quality and sufficiency:

- EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (EPA, 2020)
- EPA Ecological Soil Screening Levels (EcoSSLs) (various dates); and
- EPA Region 4 Ecological Soil Screening Values (EPA 2018)
- EPA Region III BTAG Freshwater Sediment Screening Benchmarks (EPA 2006), or
- EPA Region 4 Freshwater Sediment Screening Levels for Narcotic Mode of Toxicity, ecological screening values (ESVs) (EPA 2018)

The following manuals and guidelines were used for preparation of this RI:

- Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, October 1988 (EPA, 1988)
- Risk Assessment Guidance for Superfund – Part A: Human Health Evaluations, December 1989 (EPA, 1989)
- Ecological Risk Assessment Guidance for Superfund, June 1997 (EPA, 1997)
- Standard Scopes of Work for Environmental Risk Assessments (USACE, 2012) EP 200-1-5
- Risk Assessment Handbook Volume I: Human Health Evaluation U.S. Army Corps of Engineers (USACE,1999) EM 200-1-4
- Risk Assessment Handbook Volume 2: Environmental Evaluation U.S. Army Corps of Engineers (USACE, 2010) EM 200-1-4
- Conceptual Site Models (USACE 2012) EM 200-1-12
- Environmental Quality - Formerly Used Defense Sites (FUDS) Program Policy, May 10, 2004 (USACE, 2004)

Additionally, the following manuals and guidelines were considered in evaluating data quality and sufficiency:

- Maine DEP Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances, October 19, 2018 (Maine DEP, 2018)
- Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine, May 23, 2014 (Maine DEP, 2014; herein referred to as the Petroleum Guidelines)
- Maine DEP Final Development of Risk-Based Cleanup Levels for Petroleum Hydrocarbons Measured as Diesel Range Organics (DRO) and Gasoline Range Organics

(GRO), Prepared by MACTEC Engineering and Consulting, Inc. (MACTEC), April 2010 (MACTEC, 2010)

Achieving these objectives will aid in achieving FUDS program goals of reducing risk to human health and the environment, implementing final remedies, and moving projects toward milestones (USACE, 2004).

This RI is organized as follows:

- **Section 1** Introduction discusses objectives and background
- **Section 2** Physical Setting presents the topographic, geologic, and hydrologic setting as well as the demographics and land uses of the Site and vicinity
- **Section 3** Nature and Extent of Contamination discusses potential sources, contaminants of potential concern and their distribution in site media
- **Section 4** Contaminant Fate and Transport describes contaminant migration pathways and persistence
- **Section 5** Risk Assessment summarizes evaluates the receptors, exposure pathways and risk to human health and the environment
- **Section 6** Conclusions presents conclusions regarding objectives and recommendations.

Collectively **Sections 1** through **4** present the CSM (with a summary provided in **Section 4.3**) upon which the subsequent risk evaluations and conclusions are based.

1.2 PROJECT BACKGROUND

1.2.1 Current Site Description

The FUDS property consists of two areas. One area (0.24 acres) is the former dry-cleaning building located on the west side of Central Drive, which for purposes of this RI, will be referred as the 'Site'. The other area is the former laundry building and steam plant (1.06 acres) located on the east side of Central Drive.

The Site comprises an undeveloped portion of a larger 0.46-acre parcel identified by the City of Presque Isle (CoPI) as Map 46, Block 35, Lot 11-050 (CoPI, 2020), which is located on the west side of Central Drive. The former Site building was demolished in the early 1980s and associated foundation was removed in 1998; fill and topsoil were added to the Site at this time. The Site is currently undeveloped consisting of a grass covered open space. Four newly installed (2015) flush-mount monitoring wells with concrete pads and one flush-mount monitoring well of unknown origin are also currently present at the Site. Four prior wells were destroyed during foundation removal. A culverted stream crosses under the Site from north to the southwest of the Site. A photo log of current conditions at the Site is included as **Appendix A**.

The former laundry building and steam plant (1.06 acre lot) were located on the east side of Central Drive (current Map 46, Block 35, Lot 1165; CoPI, 2020), hydrologically upgradient of the former dry cleaning building, and are not assessed in this RI because the buildings were beneficially reused by the Maine State Department of Educational and Cultural Services (the current owner) after transfer of ownership (in May 1974) and are not eligible for inclusion under the FUDS program.

The surrounding area comprises the Northern Maine Community College campus and light industrial buildings to the northeast and east, a commercial/industrial building to the southeast, Aroostook Valley Railroad tracks bordering the Site to the southwest, a bulk oil storage tank to the northwest, and the Maine DEP Presque Isle office to the north. The adjoining railroad tracks were constructed to support movement of supplies throughout the AFB and were added sometime after 1935 (USGS, 1935). The area west of the Site, Taxiway Street and Central Drive, is registered with the Maine DEP to have formerly contained approximately 32 underground storage tanks (USTs) associated with the former AFB (Maine DEP, 2018). Location information is limited to building number designations, which in most cases do not correspond to current buildings or building numbers.

A Site Location Plan is provided as **Figure 1**, and a Detailed Site Plan is provided as **Figure 2**.

1.2.2 Site History

Prior to 1941, the Site was an undeveloped portion of the Presque Isle AFB. In 1941, the DoD obtained the property and constructed the dry-cleaning building on the west side of Central Drive, which was part of the Presque Isle AFB at the time. The Site and adjoining parcel east of Central Drive were reassigned as the Loring AFB Laundry Annex in July 1961. The Laundry Annex operated as a laundry facility and serviced 17,000 Air Force personnel and dependents between 1941 and 1974. In 1974, these properties were considered excess/surplus and were disposed to the State of Maine and City of Presque Isle (CENAE, 1992). The dry-cleaning building Site (0.24-acre lot) has been owned by the City of Presque Isle and managed by the Presque Isle Industrial Council since November 25, 1974 (Roy F. Weston Inc. [R. Weston], 1996).

The Site buildings were referred to as Buildings 314 and 315 (Aroostook, 1974). The Site dry cleaning building served as the dry-cleaning facility for the Laundry Annex. The building was demolished in the early 1980s; however, the foundation and an associated UST of unspecified contents remained through 1998 (CENAE, 1992). Based on building plans, it was originally thought two petroleum USTs were present: a 275-gallon and 1,000-gallon UST; however, a June 11, 1994 investigation found only a 100-gallon UST, which was removed on August 3, 1994, from beneath the foundation slab (Maine Environmental Engineering [MEE], 1997). These USTs are registered under Maine DEP Tank ID 18835 (Maine DEP, 2018).

The former laundry building and steam plant (1.06-acre lot) located on the east side of Central Drive are not assessed in this RI because the buildings were beneficially reused by the Maine State Department of Educational and Cultural Services (the current owner) after transfer of ownership (in May 1974) and are not eligible for inclusion under the FUDS program.

Pertinent historical details are depicted on the **Figure 2** Detailed Site Plan.

1.2.3 Previous Environmental Investigations

The following are summaries of previous environmental reports pertinent to the environmental history of the Site. These reports were generally prepared for multiple FUDS sites in Aroostook County; however, only portions pertaining to the Laundry Annex are summarized. Cumulative soil boring logs from these investigations are provided in **Appendix B** for reference.

Loring AFB Laundry Annex Trip Report, August 1992 (CENAE, 1992)

On June 24, 1992, CENAE visited the Site to assess the presence of environmental concerns and need for possible remediation under DERP. The trip report concluded the need for possible remediation associated with what was believed to be two USTs associated with the dry-cleaning building.

Closure Report, MEE, November 1997 (MEE, 1997)

After the 1992 Site visit by CENAE, it was thought a 275-gallon UST and a 1,000-gallon UST were present beneath the dry-cleaning building foundation slab. Investigation beneath the slab revealed only one petroleum UST was present, and upon excavation it was found to be a 100-gallon UST. The location of the UST is depicted on **Figure 2**. The contents of the UST were sampled for volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), and flashpoint to ensure proper handling after removal. On August 3, 1994, approximately 100-gallons of water were removed from the UST and containerized, 5 tons of petroleum impacted soil were stockpiled onsite, and the 100-gallon UST was removed and scrapped offsite.

Analytical results indicated the water within the UST contained xylenes (12 micrograms per liter [µg/L]) and 2-butanone (75 µg/L) and a total PCB concentration of 5.8 µg/L. Methylene chloride and acetone were also detected in the sample and in a laboratory blank sample and were attributed to laboratory contamination. Upon removal from the UST, water was treated onsite; however, the treatment method was not reported. VOC concentrations were below the laboratory reporting limits in the sample collected from the stockpiled soil. Documentation of the soil disposal was not included in MEE's report or reported by Mason Environmental.

Scope of Work, CENAE, April 26, 1996 (CENAE, 1996)

A Scope of Work (SOW) was prepared by CENAE and revised in April 1996. The SOW outlined the work to be completed for the Site, quality assurance (QA)/quality control (QC) procedures, analytical requirements, as well as a brief listing of the comparison criteria at the time. The objective of the investigation was to horizontally and vertically delineate of the extent of residual petroleum impacts surrounding the UST and assess soil gas concentrations associated with dry cleaning operations.

Sampling and Analysis Plan, R. Weston, September 1996 (R. Weston, 1996)

In September 1996, R. Weston prepared a Sampling and Analysis Plan (SAP) in response to CENAE's SOW (Contract number DACW33-94-D-0009, delivery order number 0010, DCN: FUDS-091096-AAAR). The SAP outlined the project status; provided project objectives; detailed field activities, methodologies, analytical requirements, and waste handling procedures; and provided an estimated project schedule.

Site Investigation Report, R. Weston, October 31, 1997 (R. Weston, 1997)

Through 1996 and 1997, R. Weston completed the investigation activities outlined in the SAP to meet the project objectives.

MyKroWaters Environmental Services (MyKroWaters) completed a soil gas and microwell survey at the Site between July 9 and 11, 1996, to provide preliminary data in designing R. Weston's subsurface investigation. Soil gas and groundwater samples were collected with glass syringes and analyzed using an onsite gas chromatograph for vinyl chloride, trans-dichloroethene, cis-dichloroethene, trichloroethene (TCE), tetrachloroethene (PCE), benzene, toluene, ethylbenzene, and xylenes. Results were below the GC unit's detection limits; however, a petroleum signature was present in two samples, and one sample could not be analyzed by the unit due to the presence of a sheen.

Nine (9) soil borings (LASB-1 through LASB-4 and LAMW-1 through LAMW-5) with four (4) completed as monitoring wells (LAMW-1, LAMW-3, LAMW-4, LAMW-5) were advanced into overburden and weathered bedrock by R. Weston on September 27 and 28, 1996. LAMW-2 could not be completed as a monitoring well because groundwater was not encountered. Boring and well locations are depicted on **Figure 2**. Two soil samples were collected from each boring/monitoring well location plus 1 duplicate for a total of 19 soil samples. Samples were analyzed for VOCs by method 8260A, total petroleum hydrocarbons-diesel range organics (TPH-DRO) by method Maine DEP 4.1.25, and pesticides/PCBs by method 8080A/3540B.

Two rounds of groundwater samples were also collected from the four installed monitoring wells (plus one duplicate collected from LAMW-5) on November 1, 1996, and May 31, 1997. Samples were collected via low-flow methodologies and analyzed for VOCs by method 8260A, Total Petroleum Hydrocarbons (TPH)-gasoline range organics (TPH-GRO) by Maine Department of Environmental Protection (DEP) method 4.2.17, TPH-DRO by Maine DEP method 4.1.25, and pesticides/PCBs by method 8080A/8081.

Groundwater analytical results were compared to the Maine Maximum Exposure Guidelines (MEGs) dated 1992 (Maine DHS, 1992), and soil analytical results were compared to the *Maine DEP Procedural Guidelines for Establishing Standards for the Remediation of Oil Contaminated Soil and Groundwater in Maine (Petroleum Guidelines)* dated 1995 (Maine DEP, 1995), and to Maine DEP's RAGs for direct contact residential scenarios dated 1997 (Maine DEP, 1997).

Concentrations of TPH-DRO exceeded or equaled the 10 milligrams per kilogram (mg/kg) Maine Petroleum Guideline in soil samples collected from LASB-1, LASB-3, LASB-4, LAMW-1, LAMW-3, and LAMW-4. Samples from these locations were collected from depths ranging from 6 to 13.5 feet below ground surface (bgs). Elevated photoionization detector (PID) readings were recorded at LASB-2, LASB-3, and LAMW-4.

Groundwater analytical results exceeded the vinyl chloride MEG of 0.15 micrograms per Liter (µg/L) in LAMW-3 (0.8 µg/L) during the second sampling round; the TPH-GRO MEG of 50 µg/L in wells LAMW-3 (as high as 1,400 µg/L) and LAMW-4 (as high as 500 µg/L) in both rounds; and the TPH-DRO MEG of 50 µg/L in wells LAMW-1 (220 µg/L) during the second round, and LAMW-3 (as high as 840 µg/L) and LAMW-4 (as high as 420 µg/L) in both rounds. Groundwater was measured to be 9 to 14 feet bgs. Groundwater elevations were not calculated to assess groundwater flow direction.

Based on the lack of nearby water supply wells within 2,000 feet of the Site and lack of an exposure pathway for the impacted soil zone (i.e., greater than 6 feet bgs), R. Weston recommended continued biannual monitoring of natural attenuation in groundwater for a period of 5 years.

Addendum to the Sampling and Analysis Plan, R. Weston, June 1999 (R. Weston, 1999a)

R. Weston prepared an addendum to the original September 1996 SAP to detail additional investigation required to further assess petroleum impacted soil and groundwater at the Site. The addendum indicated the formerly installed wells that were recommended for further sampling were destroyed during demolition of the dry-cleaning building foundation. Maine DEP indicated reinstallation and sampling of the wells was not necessary as long as the sediment and surface water within the culverted stream that flows beneath the Site was monitored for COPCs. Therefore, the only additional sampling included in the SAP Addendum was upstream and downstream sediment and surface water samples.

Addendum Site Investigation Report, R. Weston, November 6, 2000 (R. Weston, 2000b)

Sediment and surface water samples were collected from the Site in October 1999 and May 2000. LASED-1 and LASW-1 were collected in the upstream position on the northeast side of Central Drive, and LASED-2 and LASW-2 were collected downstream beyond the southwest Site boundary across the Aroostook Valley Railroad tracks. Samples were submitted for laboratory analyses for VOCs by method 5030B/8260B, TPH-GRO by Maine DEP method 4.2.17, and TPH-DRO by Maine DEP method 4.1.25.

Surface water analytical results were compared to the Maine DEP MEGs dated June 1, 1998 (Maine DHS, 1998), sediment TPH GRO and DRO analytical results were compared to the Maine DEP Petroleum Guidelines (Maine DEP, 2000), and VOC results were compared to Maine DEP's RAGs for direct contact residential and groundwater guidelines scenarios dated 1997 (Maine DEP, 1997).

Concentrations of TPH-DRO exceeded the 10 mg/kg Maine soil Petroleum Guideline in sediment samples from both the upstream and downstream locations during both sampling rounds. Concentrations ranged from 39 to 105 mg/kg in the upstream location to 76 to 220 mg/kg in the downstream location. (Note: These sediment and surface water results were alternatively documented in letter reports to CENAE dated December 28, 1999 [R. Weston, 1999b] for the October 1999 sampling round and July 7, 2000 [R. Weston, 2000a], for the May 2000 sampling round.)

Surface water analytical results exceeded the TPH-DRO MEG of 50 µg/L in the downstream LASW-2 location (150 µg/L) during the May 2000 sampling round; however, the LASW-2 result was qualified as estimated (J). Additionally, the reporting limits for the October 1999 sampling round exceeded the MEG (reporting limits of 110 µg/L compared to the 50 µg/L MEG); therefore, it cannot be determined if TPH-DRO was present above the MEG at that time.

Since DRO concentrations were detected at similar concentrations in both the upstream and downstream sediment locations in both October 1999 and May 2000, R. Weston concluded the former fuel oil UST at the Site was not entirely the source of DRO in sediment. However, since DRO results in surface water exceeded the MEGs only in the downgradient position in May 2000, the Site was presumed by R. Weston to be a partial source. This conclusion is based on a single May 2000 data point since the reporting limits in October 1999 exceeded the MEG. R. Weston recommended two years of biannual surface water and sediment sampling for TPH-DRO to monitor the concentration trends upstream and downstream of the Site. R. Weston maintained their previous conclusion that remediation of identified contamination was not warranted based on lack of drinking water supply wells and location in an industrial zone area and indicated institutional controls may be required to prevent use of the stream for drinking water purposes.

SAP Monitoring Well Installation and Two-Year Long-Term Monitoring, Weston Solutions, Inc, September 2002 (Weston, 2002)

Weston prepared a SAP to outline methodology for a two-year biannual sediment and surface water sampling program at the Site. Samples and associated field QC samples were to be collected from the upstream (LASW-1 and LASED-1) and downstream (LASW-2 and LASED-2) locations in the spring and fall to be analyzed for DRO by Maine DEP method 4.1.25.

Long Term Monitoring Reports, Weston, 2003-2004

The following table summarizes the long-term monitoring (LTM) reports prepared by Weston for sediment and surface water samples collected between fall 2002 and spring 2004. The complete data set is summarized in **Tables 3 and 4**.

LTM Report Date	Sampling Date	DRO Sample Results			
		50 µg/L[1]		10 mg/kg[2]	
		LASW-1	LA-SW-2	LASED-1	LASED-2
June 2003 (Weston, 2003a)	December 4, 2002	50 U	50 U	**40**	**84***
October 2003 (Weston, 2003b)	April 20, 2003	50 U	50 U	**84**	**72***
October 2004 (Weston, 2004)	September 17, 2003	50 U	50 U	**96 J**	**84***
	May 10, 2004	50 U	50 U	**82**	**82***

1 – Maine Department of Human Services, MEGs for Drinking Water, 1992 (Maine revision June 1, 1998; Maine DHS, 1998)
2 – Maine DEP Petroleum Guidelines, Stringent Cleanup Goals, March 2000 (Maine DEP, 2000)
U – Results were below the laboratory reporting limits
J – Results are considered estimated
*Higher of duplicate pairs summarized above where applicable
Bold – Concentrations exceeded the laboratory reporting limits
Results exceed the applicable comparison criteria at the time

Weston recommended sampling be continued (Weston, 2004); however, under a joint decision by CENAE, Maine DEP, and Weston, the surface water and sediment samples were temporarily discontinued from the LTM program, while additional research and investigation of the nature and extent of DRO impacts was conducted as recommended in the revised EPA FUDS guidance (Weston, 2005).

Site Historical Report (Client Draft, never finalized), Weston, January 2009 (Weston, 2009)

Weston prepared a Site Historical Report to document the cumulative work completed at the Site and prepared a conceptual site model to assess the nature and extent of DRO impacts at the Site. The report also included additional research on historical use of the Site and surrounding area to assess for other contributing sources of DRO contamination upgradient of the Site.

Based on the historical data, Weston concluded the following:

- Groundwater and surface water sample analytical results were reportedly below the MEGs at the time; therefore, there was no exposure pathway to COPCs in groundwater. Institutional controls to prevent use of the stream for drinking water were suggested.
- Due to the depth of soil impacts (greater than 6 feet), exposure to impacted soil is limited to the construction worker use scenario, which the analytical results did not exceed. Therefore, there is no exposure pathway to impacted soil under current conditions.
- DRO concentrations in sediment were similarly detected in downstream and upstream locations relative to the Site, and data did not show a tendency of greater concentrations downstream of the Site. Therefore, sediment may partially be impacted by previous Site activities, although the Site does not appear to have been the only local source.
- Based on the above conclusions, additional investigation was not warranted at the Site.

Final Trip Report, AECOM/Battelle, September 29, 2015 (AECOM/Battelle, 2015)

Based on the historical presence of TPH-DRO in soil and groundwater and vinyl chloride in groundwater and lack of bedrock investigation at the Site, additional investigation was conducted in May 2015. Field activities included installation of two bedrock monitoring wells and two overburden/bedrock interface wells, well development, a well survey, and groundwater sampling.

On May 11 and 12, 2015, the boring locations were hand cleared to a depth of 5 feet bgs using a vactor truck. Borings were then advanced within the pre-cleared holes to the overburden/groundwater interface (LAMW-1A and LAMW-5A) or into bedrock (LAMW-3A and LAMW-4A). The wells were developed and located using a GPS unit. On May 15, 2015, groundwater samples were collected from each newly installed well using low-flow methodologies and submitted to Katahdin Analytical for VOCs by EPA Method 8260 and volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) analysis by Massachusetts Department of Environmental Protection (MassDEP) methods.

VOCs xylenes, 1,2,4-trimethylbenzene, 2-butanone, benzene, carbon disulfide, acetone, chloroform, bromodichloromethane and toluene were detected; however, results were below the MCLs and MEGs (comparison criteria at the time) for the respective compounds. Other results were below the laboratory reporting limits. Field screening during well installation did not identify any elevated PID results and soil samples were not collected. Groundwater was measured to be between 8.55 to 35.09 feet bgs in the monitoring wells; however, groundwater elevations were not calculated to assess groundwater flow direction.

Additional Investigation Trip Report, Credere Associates, LLC (Credere), April 21, 2017 (Credere, 2017b)

Credere prepared a SAP/Quality Assurance Project Plan (QAPP), Revision 1 (Credere, 2017a) that outlined work to be completed in specific areas at the Laundry Annex where historical elevated DRO concentrations were detected to obtain soil data using current MassDEP EPH (MassDEP, 2004a) and VPH (MassDEP, 2004b) analytical methods that were adopted by the Maine DEP[1]. This work was completed to assess if additional investigation was needed at the Site or to support a no actionable risk conclusion in a RA. On November 2, 2016, seven (7) soil borings (SBs), LASB-5 through LASB-11, were advanced and subsurface soil samples were collected from greatest observed contamination, historical exceedance intervals, or below observed contamination for vertical delineation. Refusal was encountered between 11 and 20 feet bgs, presumably on bedrock, in all locations.

Low level PID responses were observed between non-detect and 4.8 parts per million by volume (ppmv) in borings LASB-5, LASB-6, LASB-7, LASB-9, and LASB-10; and elevated PID readings were observed as high as 558.5 ppmv in boring LASB-8 and 844.3 ppmv in boring LASB-11, which indicates potential evidence of petroleum release(s). Oleophilic dye tests were performed

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[1] MassDEP EPH and VPH analytical methods were adopted for use in Maine in accordance with the Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine, May 23, 2014 (Maine DEP, 2014), and Remediation Action Guidelines for Sites Contaminated with Hazardous Substances, October 19, 2018 (Maine DEP, 2018).

in the interval of greatest PID response in these two borings and results were slightly positive in LASB-8 and undetected in LASB-11[2].

EPH fractions C_9-C_{18} aliphatics in sample LASB-8 (12-14 feet bgs) were equal to the Maine DEP RAGs and Petroleum Guidelines (PGs). EPH target compound (i.e., polycyclic aromatic hydrocarbon [PAH]) results exceeded the EPA RSLs in samples LASB-5 (6-8 feet bgs), LASB-7 (6-8 and 8-10 feet bgs), LASB-8 (12-14 and 18-20 feet bgs), and LASB-9 (12-14 feet bgs). Naphthalene also exceeded the RSL in samples LASB-8 (12-14 feet bgs) and LASB-11 (6-8 feet bgs) where the greatest concentrations of VPH fractions were detected.

VPH fractions C_9-C_{10} aromatics exceeded the RAGs/PGs in samples LASB-8 (12 to 14 feet bgs) and LASB-11 (6 to 8 feet bgs) and C_9-C_{12} aliphatics exceeded the RAGs/PG in LASB-8 (12-14 feet bgs). VPH target compound(s) exceeded the RSLs in samples LASB-8 (12 to 14 feet bgs; xylenes and naphthalene) and LASB-11-1 (6 to 8 feet bgs; naphthalene only).

Based on these results, a risk screening was completed and indicated actionable risk could be present due to vapor concerns. Therefore, to support the RI, additional soil delineation was necessary.

Additional Investigation Trip Report, Credere, March 1, 2018 (Credere, 2018)

A SAP/QAPP Addendum No. 1 was prepared to outline the additional work needed to delineate the extent of petroleum soil contamination (Credere, 2017c). On July 20, 2017, Credere advanced eight primary soil borings as part of a petroleum soil contamination delineation step-out program (LASB-12 through LASB-19). Initial borings were advanced and if evidence of contamination was encountered (e.g., petroleum odor, PID response greater than 10 ppmv), step-out borings were advanced radially. This was repeated as necessary until the full boring to refusal had no evidence of contamination or a field limitation was encountered (e.g., train tracks along the western edge of the Site [LASB-15 series], drainage culvert to the north [LASB-17 series]). No more than two step-out borings were required for each series. Boring locations are shown on **Figure 2**.

Field screening results indicated elevated PID results at most primary boring locations except LASB-12. Based on field screening results and observations, single step-outs were required at LASB-13, LASB-14, and LASB-19. Two step-outs were required at location series LASB-15, LASB-16, and LASB-17. A step-in boring was needed at LASB-18 to confirm the extent of contamination because no evidence of petroleum was encountered in LASB-18. Of all the borings advanced in July 2017, PID results ranged from 0.0 to 506 ppmv with the highest results beneath the western half of the former building location. Oleophilic dye tests were also conducted at select locations where elevated PID readings were obtained to provide relative correlation between the PID results for heavier weight petroleum products. Where run, oleophilic dye test results were slightly positive in LASB-14, slightly positive to positive in the LASB-15 series, and saturated in LASB-16. No visible free product was observed in any of the soil borings and a petroleum odor

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[2] Per the Maine DEP Compendium of Field Testing of Soil Samples for Gasoline and Fuel Oil, dated October 15, 2012, results for oleophilic dye tests are qualitative and ranked as: 1) saturated, 2) positive, 3) slightly positive, and 4) undetected based on color intensity of dye test; however, saturated is not intended to imply petroleum saturation (Maine DEP, 2012)

was noted in most locations where other evidence (visual and/or by field screening) of petroleum contamination was identified. Lack of consistent oleophilic dye tests and reliance on the PID is inconsistent with Maine DEP's field screening SOP.

Soil samples were then collected generally from predefined depths that corresponded to the next closest sample with elevated concentrations to provide horizontal and vertical delineation. These samples were intended to define clean margins. Two soil samples were collected from LASB-12, LASB-13A, and LASB-14A, and one soil sample was collected from LASB-15B, LASB-17B, LASB-18, and LASB-19A. No soil samples were collected from LASB-16 as the location was represented by prior samples collected from LASB-6.

Analytical results were compared to the EPA RSLs and Maine DEP RAGs and PGs for screening. Only PAHs at depths of 8 to 12 feet bgs in LASB-17B and 9 to 11 feet bgs in LASB-19A were identified to exceed these comparison criteria.

As the current location of the greatest observed contamination is inconsistent with the previously reported location of the former UST, a ground penetrating radar survey was also completed to assess if other previously unknown USTs may still be present. The GPR survey completed in July 2017 identified no anomalies consistent with the historical UST. Therefore, it was concluded the residual petroleum-impacted soil is likely originated from the prior onsite UST.

2. PHYSICAL SETTING

2.1 TOPOGRAPHY

Based on Site observations and the United States Geological Survey (USGS) Topographic Map of the Presque Isle Quadrangle, Maine (USGS, 2014), topography at the Laundry Annex Site is generally flat, and the local area slopes to the southwest towards an engineered drainage area for the former AFB. The Site itself is located on a leveled area and slopes steeply downward across the railroad tracks bordering the Site to the west. The Laundry Annex Site is located at approximately 490 feet above mean sea level (AMSL) at the approximate Universal Transverse Mercator (UTM) coordinates of Zone 19, 573448.70 easting, 5171871.58 northing. An excerpt from the USGS map has been included as **Figure 1**.

2.2 GEOLOGY

2.2.1 Surficial Geology

According to the Maine Geological Survey (MGS) Reconnaissance Surficial Geology map of the Presque Isle Quadrangle, Maine (MGS, 1978), the Site is underlain by glacial till consisting of a heterogeneous mixture of sand, silt, clay and gravel. Generally, native soil observations were consistent with mapped till.

According to Site soil boring logs in prior reports and based on soil observations made at the Site in November 2016 (Credere, 2017b) and July 2017 (Credere, 2018), overburden at the Site consists of topsoil at the surface underlain by fill extending to depths ranging from 1 to 4 feet bgs in the eastern and northern portions of the Site and to 8 or more feet bgs in the western portion of the Site along the railroad tracks. A layer of black ash or coal was observed within the top two feet from the surface in the vicinity of LASB-7 and LASB-9. Fill is underlain by native till (basal till) consisting of silt with varying amounts of clay, sand and gravel, which extends to depths ranging from 10 to 23.5 feet bgs. Below the native till is weathered bedrock and competent bedrock that was encountered between 15 and 25 feet bgs (R. Weston, 1997 and AECOM/Batelle, 2015). Geologic cross sections of two transects, A-A’ and B-B’, shown on **Figure 2** are provided as **Figures 3 and 4**, respectively. Cumulative soil borings logs are provided as **Appendix B**.

2.2.2 Bedrock Geology

According to the MGS Bedrock Geologic Map of Maine (MGS, 1985), bedrock beneath the Site consists of weakly metamorphosed mudstone, limestone and dolostone of the Silurian-age Spragueville Formation. This is consistent with the bedrock type described in previous reports (AECOM/Battelle, 2015).

The shallow bedrock beneath the overburden contact is highly weathered to depths ranging from 0.2 to 7.4 feet into bedrock. Competent bedrock was encountered around 10 feet bgs in the east corner of the former Site building, 15 feet bgs in the central portion of the former Site building, and deeper to the north and west (R. Weston, 1997). The depth to bedrock is consistent with the fill thicknesses (i.e., fill is thicker where bedrock is deeper) indicating historical topography/ground surfaces likely originally sloped downward to the west and northwest and some native till was removed or reworked in the location of the former building. Additionally, depth to refusal was particularly deep in the vicinity of LAMW-4 and LASB-8 (23.5 feet bgs to weathered rock and 20 feet bgs to refusal/assumed bedrock, respectively) indicating a potential low point in the bedrock topography (i.e., a bowl). Generalized geologic cross sections are provided as **Figures 3 and 4** that show the bedrock surface along two transects.

2.3 HYDROLOGY AND HYDROGEOLOGY

2.3.1 Surface Water

The Site is located within a surficial drainage basin of the Aroostook River. The Site is locally influenced by the engineered drainage swales (MGS, 2002) along Central Drive to the northeast and a culvert north of the former Site building that directs flow beneath the Site and outlets west of the Site to a swale that joins the Presque Isle Stream 1.7 miles south of the Site. The Presque Isle Stream flows northeast from this juncture and merges with the Aroostook River north of downtown Presque Isle (1.5 miles northeast of the Site). The culvert originates to the north behind the Maine DEP Regional Office building on the northeast side of Central Drive. The stream originates approximately 0.44 miles northeast in a farm field. Based on a prior GPR survey, the culvert is expected to be within the top 3 feet from the surface.

Based on Site observations, surface water infiltrates the permeable surface or flows overland into the drainage swales and culvert. Surface water in the culverted stream beneath the Site has previously been sampled during both the spring and fall, and it is presumed surface water is present in the culvert/swales year-round.

2.3.2 Groundwater

A complete groundwater survey to assess the groundwater flow direction at the Site was not completed during previous environmental investigations. Depth to groundwater during the two groundwater sampling rounds ranged from 9.28 to 13.93 feet bgs in the fall of 1996 and 9.40 to 14.00 feet bgs in the spring of 1997. It was also reported overburden groundwater was not abundant and the groundwater surface was first encountered within the weathered and/or competent bedrock (R. Weston, 1997). In May 2015 during the AECOM/Battelle investigation, groundwater was encountered at 11.55 and 8.55 feet bgs in overburden/bedrock interface wells LAMW-1A and LAMW-5A, respectively, and at 12.29 and 35.09 feet bgs in bedrock wells LAMW-3A and LAMW-4A (AECOM/Battelle, 2015). Based on these historical depths to water, it appears there may be perched groundwater conditions in the weather bedrock/interface zone that recharges to the deeper aquifer. Based on the limited groundwater data, topography, and nearby surface water bodies, groundwater at the Site is presumed to flow to the southwest toward a small drainage swale that flows south to the Presque Isle Stream.

Review of the MGS Significant Sand and Gravel Aquifer map for the Presque Isle Quadrangle, Maine, indicates the Site does not fall within a mapped significant sand and gravel aquifer (MGS, 2002).

2.4 CLIMATE

The average yearly temperature for the City of Presque Isle, Maine, is 51.5 degrees Fahrenheit (°F) with a peak monthly average of 78°F for July and a low monthly average of 22°F in January. Average rainfall (including snow equivalent) is 35.84 inches per year (U.S. Climate Data, 2015).

2.5 DEMOGRAPHICS AND LAND USE

Aroostook County, in which Presque Isle and the Site are located, has a population density of 10.8 persons per square mile (US Census, 2010). There are no known residences within 1,000 feet of the Site. The surrounding area is occupied primarily by commercial businesses and the Northern Maine Community College and Husson University campuses. Public water is available to these users. The Maine DEP Regional Office is located across central drive to the north at the origination of the culvert that runs beneath the Site. Beyond this adjoining property are farm fields.

The Site is located within the CoPI light industrial (LI) zone and on the border of the industrial (I) zone to the west and an industrial-conditional (I-C) zone across Central Drive to the east; therefore, residential use would not be permitted under current zoning and would be limited to wholesale, retail, and storage business; manufacturing, processing and treatment; research facilities and laboratories; accessory uses and buildings; professional offices; and public utilities including substations, pumping stations, and sewage treatment facilities with special exemptions for municipal and governmental uses (CoPI, 2019).

There are no residences in the immediate vicinity and residential use is not permitted in adjoining zones. There is no current Site building, and future development of the Site, even for the above-listed permitted uses, is not considered reasonable because the small lot size does not meet the minimum required 0.5 acres of land per building. Inquiry with CoPI officials indicates the anticipated future use of the Site would continue to be undeveloped or, possibly, be developed as a parking lot. Documentation of CoPIs agreement to restrict future use of the Site to its current use as green space, parking or snow storage is included in **Appendix E**. Therefore, occupied buildings at the Site are not considered a foreseeable or reasonable future use.

3. NATURE AND EXTENT OF CONTAMINATION

3.1 ENVIRONMENTAL SUMMARY

The Site was formerly a dry-cleaning facility with heating fuel stored in a 100-gallon fuel oil UST located near the eastern corner of the former Site building. The UST was removed in 1994 (MEE, 1997). The subsequent (1996) subsurface investigation (R. Weston 1997) assessed for the presence of VOCs, TPH-GRO and TPH-DRO, PCBs, and pesticides in soil and groundwater and VOCs in soil gas at the Site. Soil gas concentrations of VOCs were below the detection limit of the field instruments. Although no VOCs were detected in the soil gas samples, it should be noted that, for seven of nine analytes, the analytical reporting limits were higher than target screening level concentrations to identify contaminants of potential concern in soil gas for the evaluation of indoor air risks. However, the Municipal Zoning Ordinance (CoPI, 2019) prohibits any construction on the Site, thereby eliminating the need for additional soil gas sampling.

Vinyl chloride in groundwater was found to exceed the 1992 Maine MEG (Maine DHS, 1992; *note: MCLs at the time not referenced in R. Weston, 1997 report*) in the eastern portion of the Site (LAMW-3) during the May 1997 sampling round, and GRO and DRO were found to exceed the 1997 RAGs and 1995/2000 Petroleum Guidelines in the center of the former Site building (LAMW-4), in the vicinity of the former UST (LAMW-3), and southeast of the UST (LAMW-1; R. Weston, 1997). The exact location of the removed UST was not confirmed after it was found, and a second suspected UST was not confirmed. The two possible locations of the former UST are depicted on **Figure 2**. Upon return to the Site for subsequent sampling rounds, it was determined that the monitoring wells had been destroyed during removal of the foundation slab in 1998. Maine DEP did not require new wells be installed and recommended sediment and surface water sampling upgradient and downgradient of the drainage culvert to assess if Site contamination potentially impacted sediment and surface water in the area (R. Weston, 1999).

Sample results for upstream and downstream sediment samples collected between October 1999 and May 2004 indicated similar DRO concentrations upstream and downstream of the Site. Surface water concentrations were mostly below the laboratory reporting limits with a single exception of an estimated detected concentration at the downstream sample location in May 2000 (*Note: Data quality of October 1999 samples insufficient to assess if DRO was present at that time*). Therefore, it was concluded the former fuel oil UST at the Site was not entirely the source of DRO in sediment and surface water (Weston, 2004). Sampling associated with the Site was then discontinued from the Loring Maine FUDS monitoring program (Weston, 2005).

An additional investigation was conducted at the Site in May 2015 to assess the current concentrations of TPH-DRO in soil and groundwater, confirm the single previous detection of vinyl chloride in groundwater, and assess migration of contaminants into bedrock. This investigation included installation and sampling of two overburden/bedrock interface monitoring wells and two bedrock monitoring wells. Groundwater analytical results indicated VOCs (including both petroleum compounds and other VOCs) and VPH below the applicable MCLs and MEGs at the time, and no evidence of residual petroleum contamination (i.e., low PID readings and no odors) was noted in the soil boring logs (AECOM/Battelle, 2015). The 2015 sampling event included groundwater collection from four wells and the only two VOCs detected above screening levels were bromodichloromethane (0.61 µg/L detection versus 0.13 µg/L screening level) and chloroform (6.4 µg/L detection versus 0.22 µg/L screening level). The USEPA Regional Screening Levels for both these VOCs are based on residential tap water exposure at a risk of 1 X 10-6 cancer risk. Vinyl chloride was not detected[3] in groundwater in 2015.

A preliminary screening of the historical groundwater and soil data that included VOCs, GRO, DRO, VPH and EPH was done in 2016 and results were compared to available screening values. Maine DEP RAGs/PGs were used to assess petroleum compounds when no EPA screening criteria was established. Results of the screening indicated groundwater concentrations were below screening levels but soil for several PAHs and VOCs exceeded the screening criteria. It was concluded existing soil data did not define the nature and extent of petroleum contamination for an adequate CSM to inform subsequent evaluations on potential exposure to the remaining contaminants.

To fill this data gap and better understand the extent of remaining COPCs for the CSM, a supplemental soil delineation investigation was completed at the Site in November 2016 and July 2017. In November 2016, samples collected from borings LASB-8 and LASB-11 contained concentrations of VPH and EPH petroleum fractions and target compounds (i.e., PAHs) above EPA RSLs and/or the Maine DEP RAGs/PGs. Additionally, several other samples were identified to have PAHs above the screening criteria. Based on these exceedances, a step-out delineation program was implemented in July 2017 to delineate the horizontal and vertical extent of petroleum impacted soil. Soil field screening with a PID and oleophilic dye tests were used to identify evidence of contamination. (Lack of consistent oleophilic dye tests and reliance on the PID is inconsistent with Maine DEP's field screening SOP [Maine DEP, 2012].) Borings were stepped out in 10-foot intervals until the full boring contained less than 10 ppm on the PID, then delineation analytical samples were collected from predefined depths based on previously observed evidence of contamination or analytical results. With the exception of a few PAH target compounds, EPH and VPH petroleum fractions and target compounds were below the Maine DEP RAGs/PGs or RSLs for target compounds and petroleum-impacted soil was considered delineated.

Four COPCs as described below in Section 3.3 were identified for the HHRA and were detected above or equal to residential RSLs at two depths (6-8 feet and 12-14 feet bgs) in 5 borings. Prior investigations and monitoring results are summarized in more detail in **Section 1.2.3**. Cumulative soil, groundwater, sediment, and surface water analytical data is tabulated on **Tables 1 through 4** for detected compounds.

LASB-5, LASB-8 and LASB-11 are located within or within 20 feet of the estimated former USTs tank graves within the former building foundation outline. LASB -7 and LASB are located 15 feet apart in the northeastern portion of the site just outside the former building foundation outline. Boring locations are shown on **Figure 5.**

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[3] It is noted that the detection limit for vinyl chloride (0.5 ug/L) was greater than the EPA tap water RSL (0.019 ug/L); this RSL corresponds to a residential excess lifetime cancer risk (ELCR) of 1 x10^{-6}. However, at an ELCR of 1 x 10^{-4}, the tap water screening level would be 1.9 ug/L, a concentration higher than the detection limit. Thus, although this adds some uncertainty to the analysis, vinyl chloride is not considered a contaminant of concern at the site.

3.2 SOURCE AREAS

Based on the previous investigations conducted at the Site, data indicates a possible petroleum source area was the former 100-gallon fuel oil UST removed from the Site in 1994. The UST removal report indicated soil contamination did not appear to be present; however, the original removal report with actual field data from the UST excavation was not available for review. Therefore, the evidence used to support the original interpretation of no impact is not known. Release from the UST would likely have occurred beginning at 3 to 4 feet bgs.

Based on the nature of known dry cleaning operations at the Site, dry cleaning equipment would also be considered a source. Dry cleaning equipment typically vented to the exterior and solvents accumulated in surface soil beneath the vent; however, no dry cleaning related chemicals have been detected at the Site (i.e., chlorinated VOCs such as PCE), with the exception of a single trace detection of a degradation by–product of PCE, vinyl chloride, at 0.8 µg/L in 1997. Detection of this compound was not replicated in a more recent groundwater sampling event in 2015.

Historical use of the Site and current conditions does not suggest evidence of any surficial release source areas.

3.3 CONTAMINANTS OF POTENTIAL CONCERN

Throughout the history of the Site investigation, contaminants considered COPCs associated with the potential releases included solvents, their degradation products (specifically vinyl chloride), and petroleum constituents (individual CERCLA PAHs and petroleum-based VOCs). Since other CERCLA contaminants were originally detected at the Site and there was a UST removal, a potential petroleum release was evaluated. The EPH and VPH data are evaluated for COPCs in **Appendix D**.

Based on lack of detection above the laboratory reporting limits and/or results below applicable screening criteria, other detected VOCs, PCBs, and pesticides would also not be considered as COPCs. Evaluation of the cumulative data set indicates there are four petroleum related hazardous constituents that were evaluated in the risk assessment and are considered COPCs. The following are constituents for the Site that exceed the CERCLA HHRA screening criteria:

- Xylenes (total)^
- Naphthalene^
- Benzo(a)pyrene*
- Dibenzo(a,h)anthracene*

*Will be herein referred to as the carcinogenic PAHs (cPAHs).
^Will be herein referred to as petroleum COPCs or petroleum

3.4 EXTENT OF CONTAMINATION

3.4.1 Soil and Vadose Zone

Based on the review of the cumulative soil analytical data and field screening results, petroleum (i.e., naphthalene and xylene) impacted soil appears to consolidate around the low point in bedrock at LAMW-4 and LASB-8. By correlating field screening results collected historically and in July 2017 with the PID results and associated elevated analytical results in LASB-8 and LASB-11, the horizontal extent of the petroleum-impacted soil was inferred to extend north to LASB-17B, east to LASB-19A and LASB-5, southeast to LASB-13A, south to LASB-10 and LASB-14A, and west to the Site boundary. The horizontal extent is depicted on **Figure 5** with the associated analytical data and PID results used for the delineation. The extent line is conservatively drawn to the location of clean borings considering both PID results and analytical results. There is uncertainty associated with the western extent of petroleum impacted soil beyond LASB-15B. An additional step out boring could not be advanced due to its proximity and potential impact to the railroad tracks, and this area southwest of the Site remains unassessed. An elevated PID field screening result (500 ppmv) was obtained approximately 2 feet above bedrock refusal in this boring; however, analytical results were below the screening criteria in a soil sample collected from this location. Due to this assessment limitation and this inconsistency, this location (LASB-15B) is conservatively included in the extent of contamination.

Vertically within the delineated horizontal extent (i.e., the extent shown on **Figure 5**), there is approximately 4 feet of soil with no evidence of the presence of petroleum or COPCs (based on lack of visual evidence of contamination and field screening results) at the surface overlying the impacted soil. This is consistent with the anticipated source of the petroleum being the subsurface UST, which would likely have release at least 3 to 4 feet below the surface. Based on field screening and analytical results, impacted soil generally is considered to extend to bedrock. Impacted soil appears to be limited to a thinner interval in LASB-17A and LASB-17B that does not extend to bedrock.

Most cPAHs in soil appear to be unassociated with the volatile petroleum impacted soil or are associated with the trailing end of the plume where degradation or migration of volatile range petroleum has left only persistent cPAHs. Some locations of cPAHs can be associated with the petroleum impacted soil as they correlate with elevated hydrocarbon range concentrations (LASB-8). Other elevated cPAHs trend to the northeastern portion of the former Site building location and beyond the identified petroleum impacted soil extent (LASB-17B, LASB-7, LASB-9, LASB-19A and LASB-5). Due to the relatively low volatile range hydrocarbon fraction concentrations in these locations and a prior 1996 PID reading in LASB-3 of 295 ppm, the volatile concentrations appear to have formerly been in this area and have attenuated (e.g., migrated downgradient to the southwest or biodegraded).

Soil petroleum vapor may have the potential to migrate to indoor air of buildings; however, as there are no current buildings on the Site and due to zoning and the acreage, no building can be permitted at the Site, this is not currently a complete exposure pathway nor is there expected to be one in the future.

3.4.2 Groundwater

Vinyl chloride was detected above the 1992 Maine MEG in monitoring well LAMW-3 in May 1997 at a concentration of 0.8 µg/L, but was not detected above the laboratory reporting limits in any other well or during the recent 2015 groundwater sampling round. This historical concentration is below the current MCL of 2 µg/L but does exceed the current tap water RSL (based on a conservative incremental cancer risk of 1 x 10^{-6}) of 0.019 µg/L. As vinyl chloride was not detected[3] in a more recent groundwater sampling round in 2015, this detection is not considered representative of current Site conditions.

The soil gas survey completed in 1996 did not detect concentrations of vinyl chloride at the Site. Therefore, vinyl chloride concentrations are likely to have diluted or degraded during the 18 years between sampling rounds, and since concentrations were not high enough to impact soil gas in 1996, current exposure to vinyl chloride in groundwater or through soil gas is not considered likely.

Sampling of newly installed wells in May 2015 to assess concentration of petroleum indicated only trace levels of VOCs, and results for EPH and VPH petroleum fractions and target compounds were below the laboratory reporting limits with the exception of toluene (20 µg/L) detected in LAMW-4A which is also below the screening level (tap water RSL of 110 µg/L). Therefore, there are no COPCs for groundwater.

3.4.3 Surface Water and Sediment

Monitoring of surface water and sediment was conducted between 1999 and 2004 for petroleum using DRO and GRO grouped analyses; therefore, individual concentrations of compounds are not known. VOCs were also analyzed in 1999 and 2000, but the compounds detected (2-butanone, acetone, methylene chloride, and styrene) in sediment were attributed to laboratory artifacts and the concentrations were below the MEDEP RAGs at that time. No petroleum related BTEX compounds were detected either upstream or downstream. The monitoring results for GRO/DRO concluded there was limited correlation between the results between upstream and downstream due to similar concentration in the two location. Since the concentrations of GRO and DRO were not correlated to the Site, further evaluation for CERCLA contaminants was not warranted. Therefore, surface water and sediment are not considered impacted media.

4. CONTAMINANT FATE AND TRANSPORT AND CONCEPTUAL SITE MODEL

4.1 MIGRATION PATHWAYS AND CONTAMINANT MIGRATION

Based on the data available for the Site, petroleum compounds and most related COPCs appear to have been associated with releases from the UST and migrated slowly through the fine-grained overburden from the former tank westward. PAHs including cPAHs may also be contributed by atmospheric deposition from combustion of fossil fuels, including diesel, and transported as volatiles (light molecular weight fractions) and particulate matter (heavy weight fractions) in the atmosphere. As discussed in **Section 2.2.2** and shown on **Figures 3** and **4**, based on the fill thicknesses at the Site, a relatively flat contact is present beneath the former Site building between the surficial fill material and the native till. This contact may have facilitated lateral movement over the short distances that have occurred (approximately 60 feet).

Given the depth of perched groundwater below the fill and native soil intervals and near the bedrock interface, the initial migration of a release from the 100-gallon UST was likely influenced by overburden geology. COPCs and associated petroleum constituents likely migrated in overburden preferentially through granular fill at the surface spreading out over the relatively flat silty native soil interface and then downward into the soil column. After building demolition, precipitation infiltrating down through the silty native soil carried dissolved constituents toward the water table, where they partitioned to soil organic matter along that migration pathway, and or were retained by capillary forces including diffusion into fine grained soils. Historical DRO concentrations did not show an apparent decreasing trend between the source area (LAMW-3) and downgradient of the plume (LAMW-4, LASB-1, and LASB-3), indicating a mature plume had apparently been established by the time the Site was assessed in 1996.

The perched groundwater near the bedrock interface would be influenced by precipitation and groundwater rise and fall relatively quickly. Non-aqueous phase product that would have been percolating down through the finer grained silt, and or fractured till would have been continually smeared by this rising and falling perched water and eventually sorbed to the fine-grained material.

As the Site has been mostly undisturbed since 1998, vapor from the sorbed petroleum including xylenes and naphthalene may have remained in the fine-grained soil pore space as evidenced by the relatively high PID readings and corresponding limited analytical concentrations in some locations (e.g., LASB-15B). Much of this mass may not be mobile due to the fine-grained nature of the soil.

As discussed previously, vinyl chloride was detected in one well just above the reporting limit and above the RSL (detected at 0.8 µg/L relative to 0.5 µg/L reporting limit; 0.019 µg/L RSL) during one sampling round, yet typical associated chlorinated solvent compounds (i.e., TCE, PCE, cis-1,2-dichloroethene) were not detected in groundwater; therefore, this detection is considered an anomaly and migration cannot be assessed. The fate of such limited concentrations of vinyl chloride would be subject to dilution, volatilization and aerobic degradation in the overlying vadose zone.

4.2 CONTAMINANT PERSISTENCE

Vinyl chloride can be difficult to treat if widespread in groundwater; however, small quantities can volatilize quickly and degrade rapidly in vapor form. Therefore, the low levels of vinyl chloride below the MCL detected in groundwater in 1997 did not persist at the Site based on no subsequent detected results above the reporting limits for groundwater sampling in 2015.

The environmental fate of COPCs naphthalene and xylenes are related to petroleum which degrades relatively rapidly under aerobic conditions. Despite the change in analytical methods, the detected petroleum compounds in groundwater from 1996 and 1997 appear to have degraded to below laboratory detection limits with exception of toluene prior to the 2015 sampling round. Since the plume appeared mature at the time of assessment, degradation was likely already actively occurring in 1996 and 1997. Dissolved oxygen (DO) was lower in 1996 and 1997 and increased by 2015, most notably in LAMW-3/LAMW-3A where the greatest concentrations of petroleum were historically detected in groundwater. Petroleum in groundwater was likely aerobically degraded to below detectable levels sometime after 1997 allowing oxygen levels to rebound by 2015. Historical DO concentrations obtained from prior groundwater sampling logs are summarized below for comparison:

Well (1996)/ Replacement Well (2015)	DO Concentration (mg/L)	
	1996/1997	2015
LAMW-1/LAMW-1A	4.5/3.4	7.51
LAMW-3/LAMW-3A	2.0/4.2	10.81
LAMW-4	1.4/1.2	NA
LAMW-4A	NA	11.02
LAMW-5/LAMW-5A	2.4/5.6	4.05

Remaining petroleum concentrations (naphthalene and xylene) in soil persist primarily around LAMW-4, LASB-8 and LASB-11.

In comparison to other PAHs (such as naphthalene), cPAHs are high molecular weight compounds with low solubility, low vapor pressures and high organic carbon partitioning coefficients. Consequently benzo(a)pyrene and dibenzo(a,h)anthracene will partition preferentially to soil compared to water and air (soil gas) and are not readily biodegraded. The half-life for benzo(a)pyrene may be 200 times longer than for naphthalene according to ATSDR/CDC toxicity profiles (https://www.atsdr.cdc.gov/toxprofiledocs/index.html). Environmentally persistent cPAHs are present in soil both within the defined extent of volatile petroleum contaminated soil and beyond the northeastern extent; however, they are at concentrations that do not present risk to human health given their depth and limited potential for exposure. As these persistent cPAHs are inferred to have been from migration of the historical plume northeast of the current extent, similar PAHs are likely to persist in the current plume area if the petroleum is left to naturally degrade over time.

4.3 CONCEPTUAL SITE MODEL SUMMARY

The Conceptual Site Model (CSM) considers previously summarized information including current Site conditions and Site history related to historical sources and mode of release of contamination (Section 1.2), Site physical characteristics and land uses (Section 2) and the nature and extent of contamination (Section 3). These aspects of the Site coupled with consideration of contaminant fate and transport as discussed in Sections 4.1 and 4.2 above constitute the CSM.

In summary, a release of petroleum occurred from an UST that migrated vertically along preferential pathways in soil due to lack of significant overburden groundwater. Petroleum COPCs (xylenes and naphthalene) and cPAHs (benzo(a)pyrene and dibenzo(a,h)anthracene) are present at depths below accessible soil. The nature and extent of contamination as described in Section 3 is consistent with the geology, hydrogeology, Site topography and history of petroleum use, storage, and potential release mechanisms. The extent of COPC impacted soil has been adequately delineated to evaluated risk to human health.

Groundwater is not impacted by Site constituents at concentrations that would constitute a concern. With respect to sources of hazardous constituents as defined under CERCLA, there is limited evidence of use of chlorinated solvents as dry cleaning agents such as PCE, which had been in use since the 1930s. Having only a singular detection of vinyl chloride, a PCE biodegradation by-product, suggests limited use of dry-cleaning agents in the history of the Site. Vinyl chloride is no longer present at detectable concentrations based on the most recent sampling round in 2015. Vinyl chloride is known to readily degraded under aerobic conditions including those found in the vadose zone soil (Patterson et.al, 2013).

Based on the currently understood nature and extent, and since the reasonably anticipated future land use at the Site is limited to undeveloped or parking lot use, receptors to contaminants would be limited to those that encounter subsurface soil such as utility workers. These receptors would be exposed to COPCs via inhalation of vapors or uptake of dust in open trenches, direct dermal contact with the contaminated soil, and through incidental ingestion. The current utilities are located within the road ROW and presumably future utilities would also use this existing ROW. Soils impacted by COPCs and petroleum are outside of this ROW which reduces the likelihood of future exposures to utility workers. A CSM flow chart depicting the complete CSM is provided as **Figure 6**.

5. RISK ASSESSMENT

Human Health and Screening Level Ecological Risk Assessments (HHRA/SLERA) were conducted.

The HHRA evaluated the potential risk of adverse cancer and non-cancer human health effects humans at the Site in accordance with *Environmental Quality - Risk Assessment Handbook Volume I: Human Health Evaluations* (USACE, 1999) and *Risk Assessment Guidance for Superfund – Part A: Human Health Evaluations* (EPA, 1989).

The SLERA evaluates the potential risk to ecological receptors at the Site in accordance with the ecological guidance, *Ecological Risk Assessment Guidance for Superfund* (EPA, 1997) and Standard Scopes of Work for Environmental Risk Assessments (USACE, 2016).

The following subsections present the results summary of the HHRA completed for the Site based on data presented in **Appendix C**, along with the complete HHRA.

5.1 HHRA CONCLUSIONS

An HHRA and SLERA were conducted for the Loring AFB Laundry Annex Site in Presque Isle, Maine, using site-specific data and USACE and EPA risk assessment guidance.

The Site is currently undeveloped and unused. There are currently no residences in the immediate vicinity, although the Site is near some urban residentially-zoned land to the east. Since the Site is located in a Light Industrial Zone, commercial or industrial use is not currently prohibited. However, based on its location (near railroad tracks), small size, and zoning restrictions related to lot size, the Site will not likely be developed, and construction of a commercial/industrial building is not considered a reasonably foreseeable future use. Its only other potential foreseeable future use could be as a parking lot. Based on these future use limitations and on a review of other potential receptors, contaminated media, and exposure pathways, utility workers were the only potentially exposed population evaluated in the HHRA. The agreement with the CoPI to restrict future use of the Site to its current use is included in **Appendix E**.

The utility worker receptor group was assessed for exposure to COPCs through soil ingestion, soil dermal contact, outdoor inhalation of entrained soil particles, and outdoor inhalation of volatile COPCs from soil. The COPCs selected for the HHRA were xylenes, naphthalene, benzo(a)pyrene, and dibenzo(a,h)anthracene.

Quantitative results of the HHRA are summarized below:

EXHIBIT 5
HUMAN HEALTH RISK ASSESSMENT SUMMARY

Receptor Group	Non-carcinogenic Hazard Index	Excess Lifetime Cancer Risk
Current/Future Site Uses		
Utility Workers	0.2	4 x 10^{-9}

The calculated Hazard Index (HI) for utility workers is below the maximum acceptable HI of 1 and calculated cancer risks are below the maximum acceptable CERCLA cancer risk of $1x10^{-4}$. Therefore, the Site does not pose an unacceptable risk to human health for utility workers.

5.2 SLERA CONCLUSIONS

According to the EPA's Ecological Risk Assessment Guidance (1997), an ecological risk assessment (ERA) refers to a qualitative and/or quantitative appraisal of the actual or potential impacts of contaminants from a hazardous waste site on plants and animals other than humans and domesticated species. A risk does not exist unless: (1) the stressor has the ability to cause one or more adverse effects, and it co-occurs with or contacts an ecological component long enough and at a sufficient intensity to elicit the identified adverse effects.

The SLERA addressed the first two steps of the eight-step scheme presented in the guidance, which include the following:

- Step 1: Screening Level – Problem Formulation and Ecological Effects Evaluation
- Step 2: Screening Level – Preliminary Exposure Estimates and Risk Calculations

Because sampling results were below ecological screening values, not in a biologically relevant zone, or not indicative of a Site related source, the SLERA concluded that the Site does not pose an unacceptable risk to ecological receptors, and a full baseline ecological risk assessment is not required.

5.3 PETROLEUM ASSESSMENT

Petroleum results evaluated historically as GRO and DRO grouped analyses and more recently as EPH and VPH petroleum fractions were assessed separately, and the Petroleum Assessment Report is included as **Appendix D**.

6. SUMMARY AND CONCLUSIONS

6.1 SUMMARY

6.1.1 Nature and Extent of Contamination

Based on the review of the cumulative soil analytical data and field screening results, naphthalene and xylene impacted soil appears to consolidate around the low point at bedrock. The horizontal extent is depicted on **Figure 5**. Vertically within the delineated horizontal extent, there is approximately 4 feet of soil with no evidence of the presence of COPCs at the surface overlying the impacted soil in the 6 to 8 feet and 12 to 14 foot bgs range.

Most cPAHs in soil appear to be unassociated with the current volatile impacted soil (i.e., naphthalene and xylenes) or are associated with the trailing end of the plume, where degradation or migration of volatile range petroleum has left only persistent PAHs.

Groundwater, sediment and surface water at or near the Site have COPC concentrations below screening levels or are considered representative of local background conditions. Therefore, these media are not considered impacted by DoD activity.

6.1.2 Fate and Transport

Based on the data available for the Site, past migration of COPCs was likely influenced by overburden geology with slow migration rates through the fine-grained overburden from the former tank westward. Ultimately, the lower molecular weight compounds, xylenes and naphthalene, will attenuate by biological degradation and volatilization to soil gas and to a lesser extent pore water. The higher molecular weight cPAHs will be persistent in soil with very low attenuation rates from biological degradation, volatilization or solubilization. Based on monitoring data, COPCs in soil pose no risk to groundwater.

6.1.3 CERCLA Risk Assessment

An HHRA and SLERA were conducted for the Loring AFB Laundry Annex Site in Presque Isle, Maine, using site-specific data and USACE and EPA risk assessment guidance.

The HHRA assessed potential health risks posed to one receptor group: utility workers. The utility worker receptor group was assessed for exposure to COPCs through soil ingestion, soil dermal contact, outdoor inhalation of entrained soil particles, and outdoor inhalation of volatile COPCs from soil. The COPCs were xylenes, naphthalene, benzo(a)pyrene, and dibenzo(a,h)anthracene.

The calculated HI for utility workers is below the maximum acceptable HI of 1 and calculated cancer risks are below the maximum acceptable CERCLA cancer risk of $1x10^{-4}$. Therefore, the Site does not pose an unacceptable risk to human health for utility workers.

Future residential or commercial/industrial use of the Site was not assessed because the location (next to railroad tracks), size, and zoning restrictions, the foreseeable future use is undeveloped (or potentially used as a parking lot, which would by nature further reduce the exposure potential to users).

The SLERA concluded that the Site does not pose an unacceptable risk to ecological receptors and that a full baseline ecological risk assessment is not required.

6.1.4 Petroleum Assessment

Petroleum results evaluated historically as GRO and DRO grouped analyses and more recently as EPH and VPH petroleum fractions were assessed as part of a separate Petroleum Assessment Report included as **Appendix D**. Conclusions and recommendations made in the Petroleum Assessment Report are outside the scope and authority of CERCLA and are assessed in accordance with State guidelines.

6.2 CONCLUSIONS

6.2.1 Achievement of Objective

The primary objectives of this RI include the following:

1. Prepare a CSM and RA
2. Assess the adequacy of site characterization for the purposes of determining if there is risk above CERCLA target action levels
3. Document data are sufficient to achieve a NFA determination under CERCLA.

Based on a review and preliminary risk screening of the historical results, data gaps were identified. Further assessment in November 2016 and July 2017 identified a petroleum impacted soil plume that occupied the area beneath the former building. Cumulative data were comprehensively summarized to prepare a CSM for the Site to gain a clear understanding of the source areas, COPCs, extent of petroleum contamination, migration pathways, and contaminant persistence. Subsurface soil, soil gas, groundwater, culvert surface water and sediment samples were collected and analyzed for VOCs. Surface soil was not sampled and is not included in this RI, since VOCs are unlikely to be present in the surface soil after long time periods (the Laundry Annex ceased operations in 1974), and therefore, there are unlikely to be surface soil exposures. Samples collected in all available media have found neither evidence of a DOD release of VOCs requiring remediation nor a continuing source of contamination. Data were also reviewed for completeness with regard to spatial and temporal assessment and monitoring of the Site in accordance with applicable Federal and State regulations/standards/guidelines as summarized in **Section 1.1.2**. The Site has been assessed to adequately identify source areas and their extent and evaluate risk in order to best assess the need for a subsequent Feasibility Study (FS).

A HHRA/SLERA was performed to assess the risk of exposure to current and future reasonable land uses. The Site is currently undeveloped and unused, and based on review of local ordnance and Site conditions, reasonable future land use was considered limited to undeveloped or parking lot use, which results in exposure to only utility workers. The HHRA results demonstrated there were no risks above target action levels for current and reasonably anticipated future use human exposures. The SLERA indicated the Site does not pose an unacceptable risk to ecological receptors and a full baseline ecological risk assessment is not required.

The remaining petroleum contamination is evaluated in the Petroleum Assessment Report (included as Appendix D). There is a potentially unacceptable risk of human exposure to petroleum hydrocarbons, as identified in Appendix D, because there is an exceedance of the construction worker RAGs (Maine DEP, 2018a) in subsurface soil. However, this future exposure potential is restricted under CoPI zoning restrictions that limit the Site use to green space, parking and snow storage. Therefore, the Army proposes that NFA under CERCLA is appropriate for this Formerly Used Defense Site.

6.2.2 Recommendations

The HHRA and SLERA conclude there is no actionable risk to human health or the environment for the Site under CERCLA. Therefore, No Further Action (NFA) is recommended, so a NFA Proposed Plan and Decision Document should be completed to close out the Site in the HTRW FUDS Program.

The Petroleum Assessment Report also concludes NFA is recommended for the residual petroleum contamination since future exposure potential is restricted under current CoPI zoning restrictions.

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FIGURES

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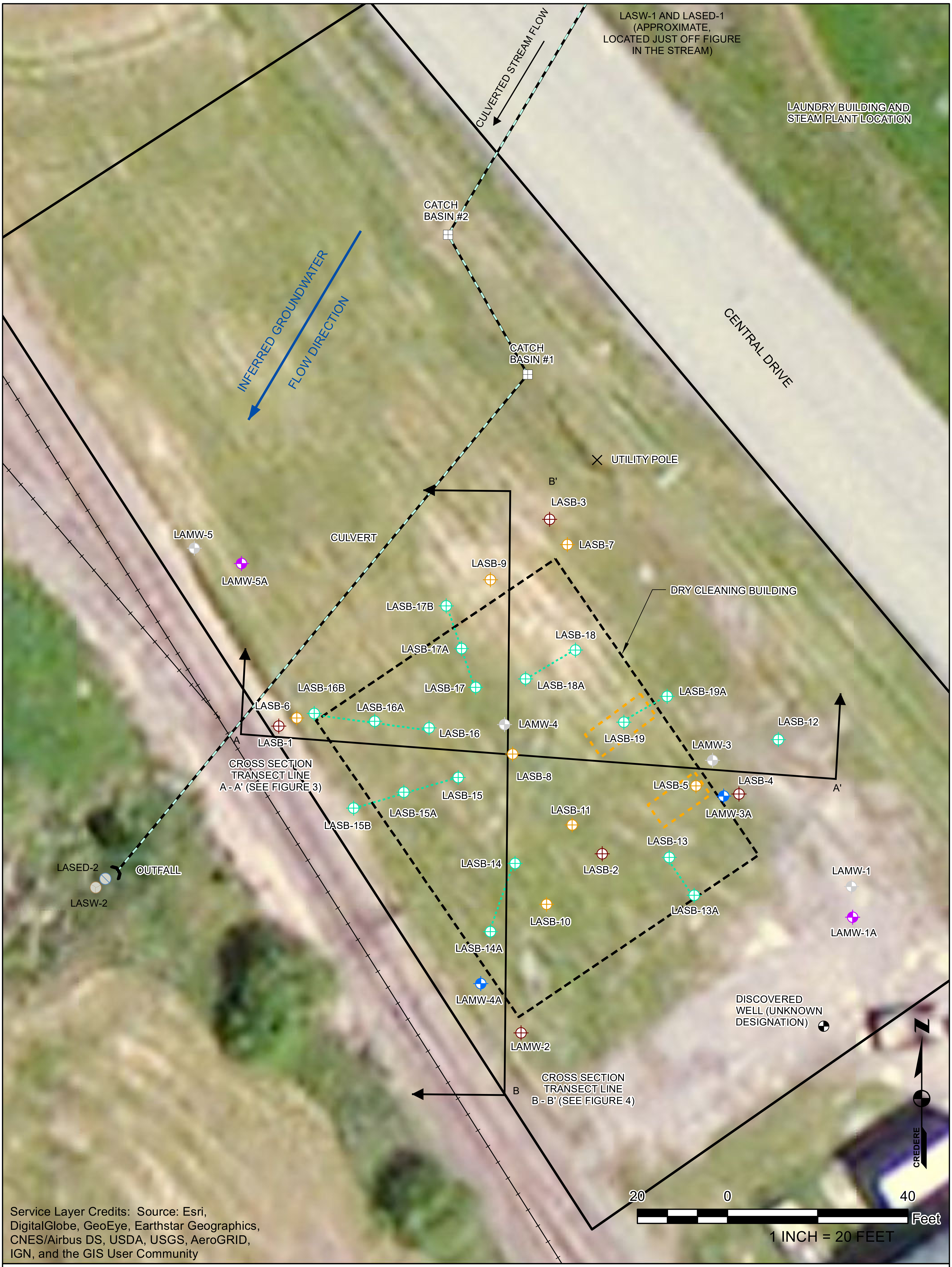
FIGURE 1
LAUNDRY ANNEX LOCATION PLAN

LORING AFB LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

1,000 0 2,000
Feet
1 INCH = 2,000 FEET

Topographic Map Data Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\Figure 1 - LAUNDRY ANNEX LOCATION PLAN.mxd



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

NOTES
1. EXISTING CONDITIONS AND FEATURES SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON INFORMATION OBTAINED FROM BASE PLAN CONTAINED IN THE SEPTEMBER 2015 FINAL TRIP REPORT BY BATTELLE AND AECOM, THE OCTOBER 1997 SITE INVESTIGATION REPORT BY ROY F. WESTON, FIELD WORK PERFORMED ON NOV. 2, 2016, AND JULY 20, 2017.

DRAWN BY: **MAK/SCG**	DATE: **08/10/2020**
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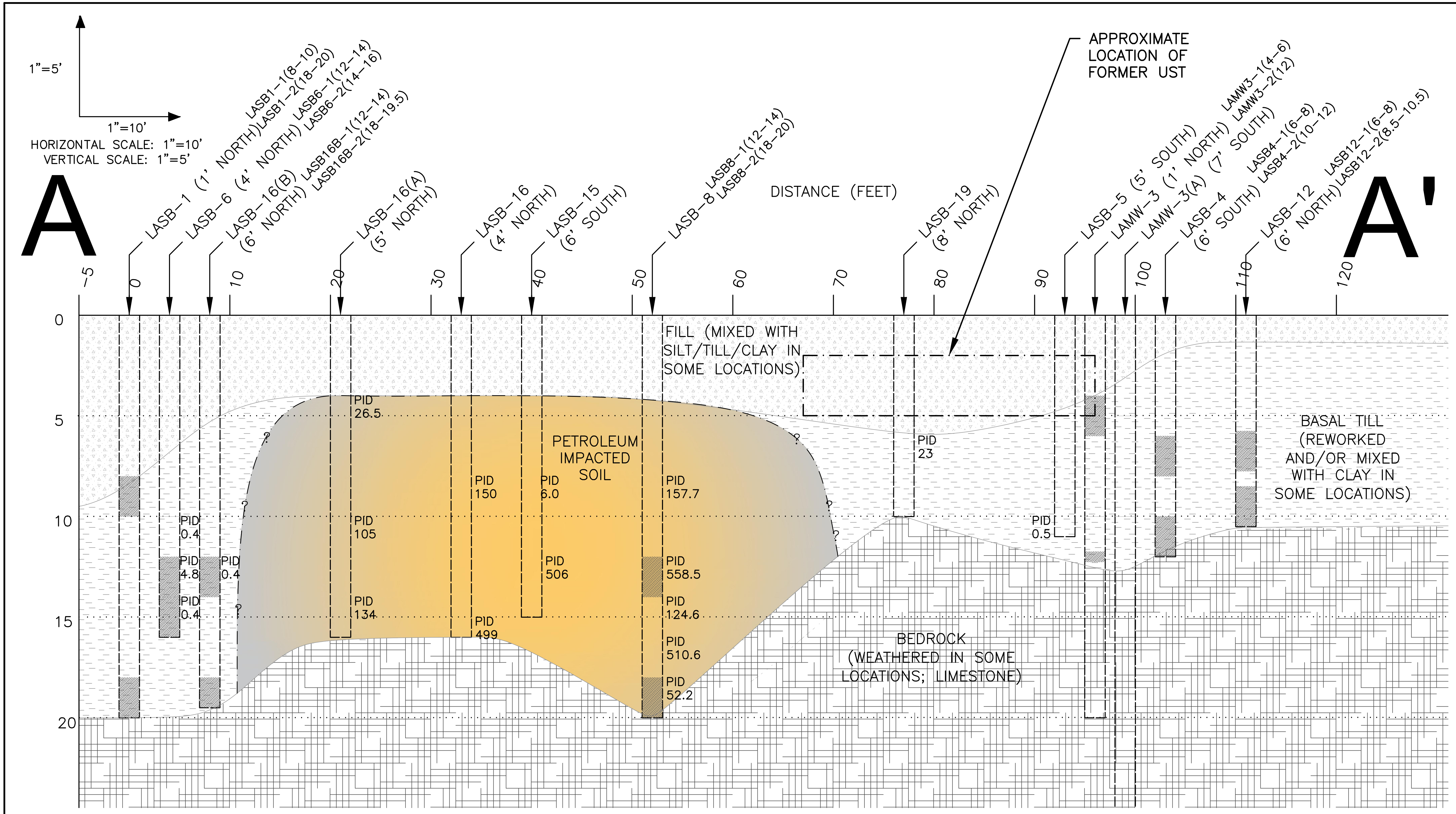
FIGURE 2
LAUNDRY ANNEX DETAILED SITE PLAN

FORMER LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

⊕ SOIL BORING (CREDERE, JULY 2017)
⊕ SOIL BORING (CREDERE, NOVEMBER 2016)
⊕ BEDROCK WELL INSTALLED IN 2015
⊕ OVERBURDEN/BEDROCK INTERFACE WELL INSTALLED IN 2015
⊕ HISTORICAL SOIL BORING (WESTON, 1996)
◐ MONITORING .WELL DISCOVERED IN 2015
⊕ ABANDONED MONITORING WELLS (INSTALLED BY WESTON, 1996)
⊘ SEDIMENT SAMPLE LOCATION
⊞ CATCH BASIN
OUTFALL
┼ RAILROAD
▭ SUSPECTED FORMER LOCATIONS OF 100-GALLON UST
▭ DRY CLEANING BUILDING
— APPROX. SITE BOUNDARY
CULVERT
STEPOUT/IN PATHWAY
● SURFACE WATER SAMPLE LOCATION

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\FIGURE 2 - LAUNDRY ANNEX_RI_2020.mxd



NOTES

1. THE GEOLOGIC SECTION IS AN INTERPRETIVE SIMPLIFICATION OF THE SUBSOIL ENCOUNTERED BASED ON EXPLORATIONS AT THE SITE. BEDROCK DEPTHS ARE BASED ON REFUSAL OF NEARBY EXPLORATIONS.
2. SOIL BORINGS LASB–5 THROUGH LASB–11 AND LASB–12 THROUGH LASB–19 WERE ADVANCED BY COUNTY ENVIRONMENTAL ENGINEERS OF CARIBOU, MAINE, USING A GEOPROBE AND LOGGED BY CREDERE PERSONNEL IN NOVEMBER 2016 AND JULY 2017.
3. SOIL BORINGS/MONITORING WELLS LAMW–1A, LASB/MW–4A, AND LAMW/5A WERE ADVANCED USING SONIC DRILLING AND LOGGED BY AECOM IN MAY 2015.
4. HISTORICAL SOIL BORINGS/MONITORING WELLS LASB/MW–1 THROUGH LASB/MW–4 WERE ADVANCED BY MAINE TEST BORINGS OF BREWER, ME, USING HOLLOW STEM AUGERS AND LOGGED BY WESTON IN 1996.
5. HISTORICAL PID READINGS WERE NOT INCLUDED IF INCONSISTENT WITH CURRENT 2016–2017 OBSERVATIONS AT THE SITE.
6. PETROLEUM IMPACTED SOIL EXTENT BASED ON AN INTERPRETIVE COMBINATION OF PID AND LABORATORY RESULTS.

EXPLORATION NOMINCLATURE

LASB–16(B) (6'NORTH)	EXPLORATION ID (OFFSET)
LASB–16B–1(12–14) LASB–16B–2(18–19.5)	SAMPLE ID (DEPTH INTERVAL) SAMPLE ID (DEPTH INTERVAL)
PID 499	LIMITS OF RESIDUAL IMPACTED SOIL AND CURRENT PID MAX IN ppm
▨	SAMPLE INTERVAL

GRAPHIC SCALE

10 5 0 10

1 inch = 10 ft.

FIGURE 3
GEOLOGIC CROSS-SECTION - WEST TO EAST LINE A-A'

LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

DRAWN BY: MTG	DATE: 02/13/2018
CHECKED BY: ASD/RSV	PROJECT: 15001301

CREDERE ASSOCIATES, LLC
776 MAIN STREET
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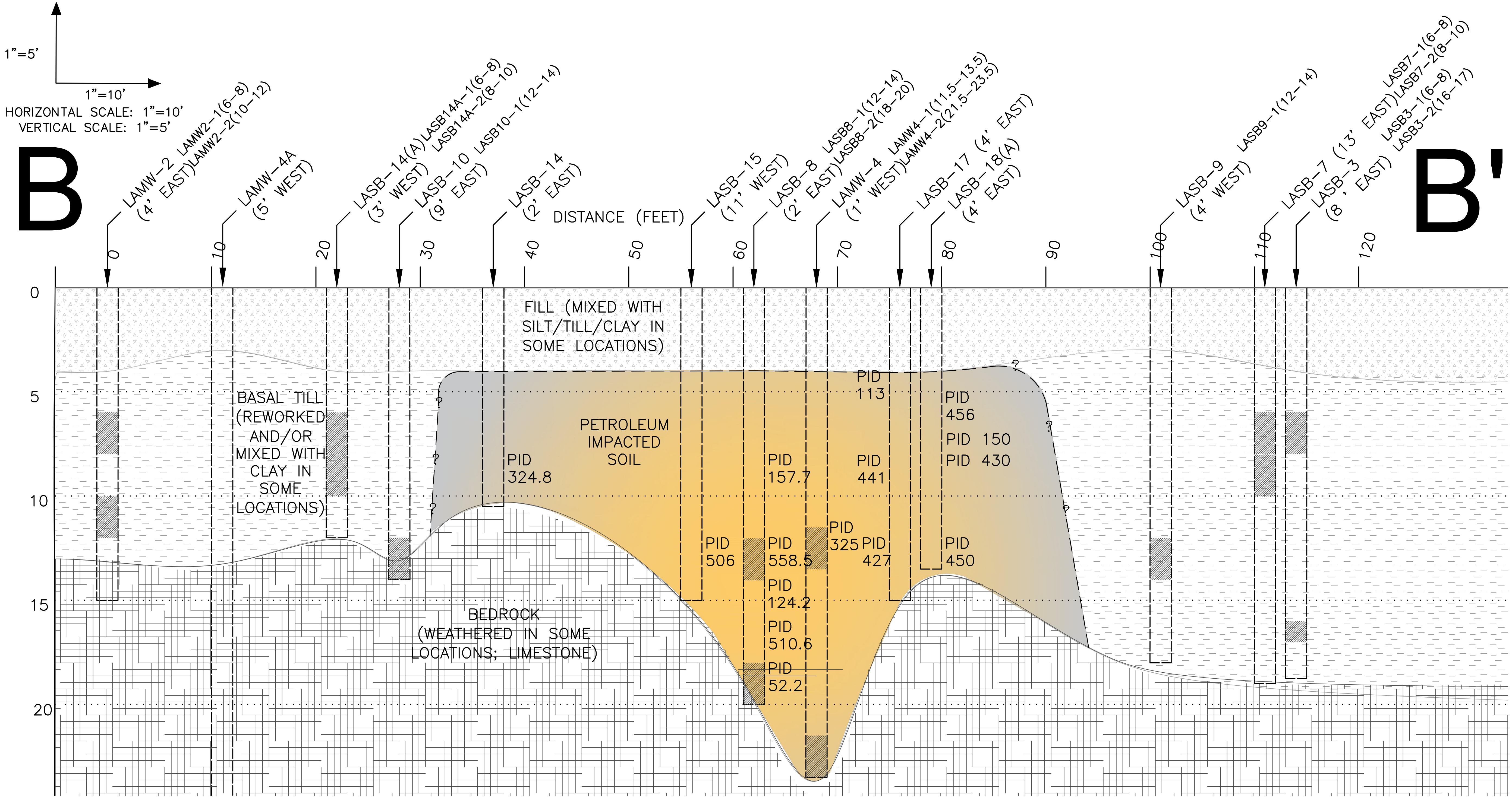
J:\CREDERE\15001301 USACE Loring FUDS RI-RA\Sections.dwg plot date: 7/15/2020 10:30 AM



NOTES

1. THE GEOLOGIC SECTION IS AN INTERPRETIVE SIMPLIFICATION OF THE SUBSOIL ENCOUNTERED BASED ON EXPLORATIONS AT THE SITE. BEDROCK DEPTHS ARE BASED ON REFUSAL OF NEARBY EXPLORATIONS.
2. SOIL BORINGS LASB–5 THROUGH LASB–11 AND LASB–12 THROUGH LASB–19 WERE ADVANCED BY COUNTY ENVIRONMENTAL ENGINEERS OF CARIBOU, MAINE, USING A GEOPROBE AND LOGGED BY CREDERE PERSONNEL IN NOVEMBER 2016 AND JULY 2017.
3. SOIL BORINGS/MONITORING WELLS LAMW–1A, LASB/MW–4A, AND LAMW/5A WERE ADVANCED USING SONIC DRILLING AND LOGGED BY AECOM IN MAY 2015.
4. HISTORICAL SOIL BORINGS/MONITORING WELLS LASB/MW–1 THROUGH LASB/MW–4 WERE ADVANCED BY MAINE TEST BORINGS OF BREWER, ME, USING HOLLOW STEM AUGERS AND LOGGED BY WESTON IN 1996.
5. HISTORICAL PID READINGS WERE NOT INCLUDED IF INCONSISTENT WITH CURRENT 2016–2017 OBSERVATIONS AT THE SITE.
6. PETROLEUM IMPACTED SOIL EXTENT BASED ON AN INTERPRETIVE COMBINATION OF PID AND LABORATORY RESULTS.

EXPLORATION NOMINCLATURE

LASB–16(B) (6'NORTH)	EXPLORATION ID (OFFSET)
LASB–16B–1(12–14)	SAMPLE ID (DEPTH INTERVAL)
LASB–16B–2(18–19.5)	SAMPLE ID (DEPTH INTERVAL)
PID 499	LIMITS OF RESIDUAL IMPACTED SOIL AND CURRENT PID MAX IN ppm
▨	SAMPLE INTERVAL

FIGURE 4
GEOLOGIC CROSS-SECTION - SOUTH TO NORTH (B-B')

LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

GRAPHIC SCALE
10 5 0 10
1 inch = 10 ft.

DRAWN BY: MTG
CHECKED BY: ASD/RSV
DATE: 02/13/2018
PROJECT: 15001301

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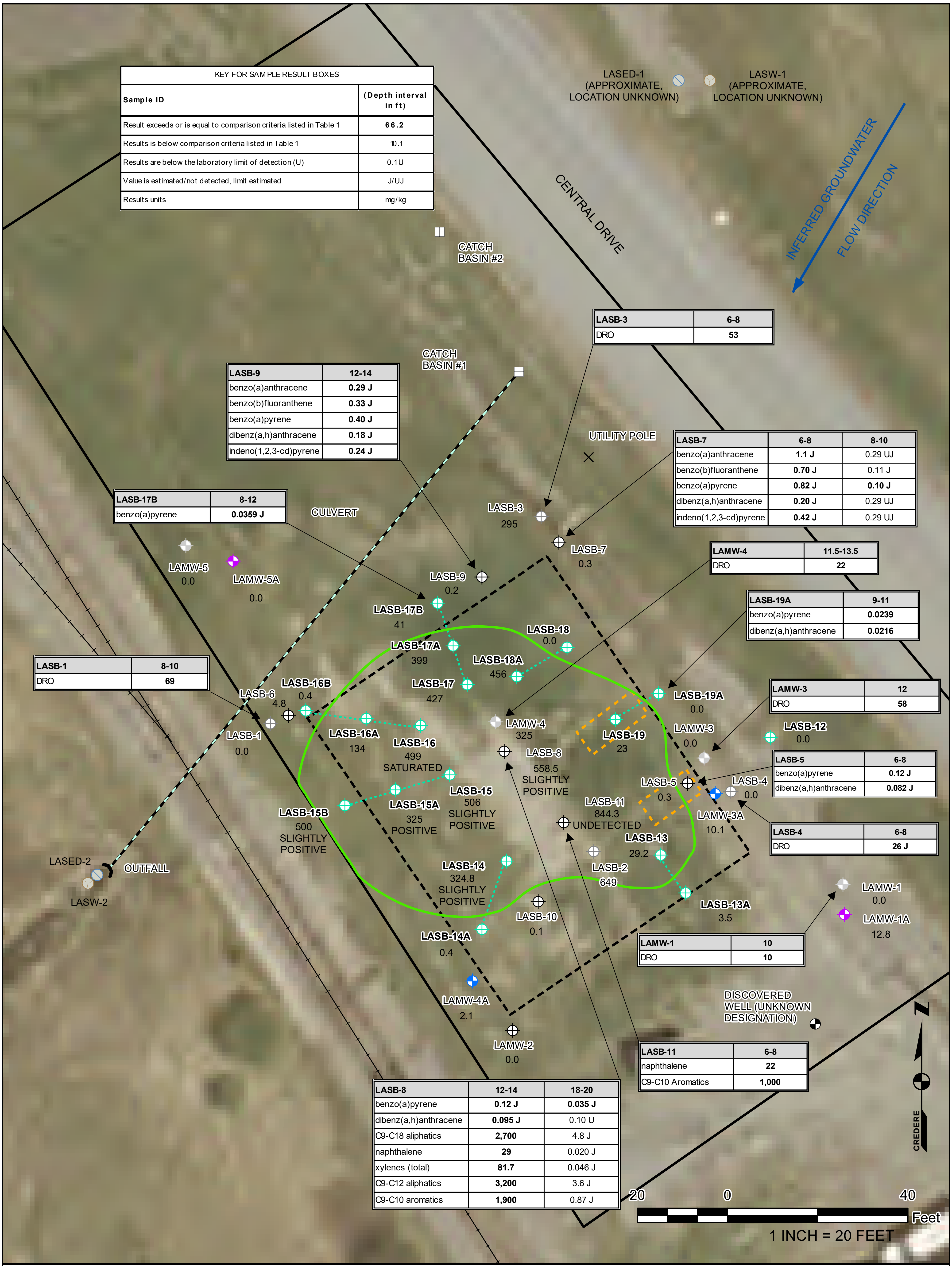

KEY FOR SAMPLE RESULT BOXES	
Sample ID	**(Depth interval in ft)**
Result exceeds or is equal to comparison criteria listed in Table 1	**66.2**
Results is below comparison criteria listed in Table 1	10.1
Results are below the laboratory limit of detection (U)	0.1U
Value is estimated/not detected, limit estimated	J/UJ
Results units	mg/kg

LASB-3	6-8
DRO	**53**

LASB-9	12-14
benzo(a)anthracene	**0.29 J**
benzo(b)fluoranthene	**0.33 J**
benzo(a)pyrene	**0.40 J**
dibenz(a,h)anthracene	**0.18 J**
indeno(1,2,3-cd)pyrene	**0.24 J**

LASB-7	6-8	8-10
benzo(a)anthracene	**1.1 J**	0.29 UJ
benzo(b)fluoranthene	**0.70 J**	0.11 J
benzo(a)pyrene	**0.82 J**	**0.10 J**
dibenz(a,h)anthracene	**0.20 J**	0.29 UJ
indeno(1,2,3-cd)pyrene	**0.42 J**	0.29 UJ

LASB-17B	8-12
benzo(a)pyrene	**0.0359 J**

LAMW-4	11.5-13.5
DRO	**22**

LASB-19A	9-11
benzo(a)pyrene	**0.0239**
dibenz(a,h)anthracene	**0.0216**

LASB-1	8-10
DRO	**69**

LAMW-3	12
DRO	**58**

LASB-5	6-8
benzo(a)pyrene	**0.12 J**
dibenz(a,h)anthracene	**0.082 J**

LASB-4	6-8
DRO	**26 J**

LAMW-1	10
DRO	**10**

LASB-11	6-8
naphthalene	**22**
C9-C10 Aromatics	**1,000**

LASB-8	12-14	18-20
benzo(a)pyrene	**0.12 J**	**0.035 J**
dibenz(a,h)anthracene	**0.095 J**	0.10 U
C9-C18 aliphatics	**2,700**	4.8 J
naphthalene	**29**	0.020 J
xylenes (total)	**81.7**	0.046 J
C9-C12 aliphatics	**3,200**	3.6 J
C9-C10 aromatics	**1,900**	0.87 J

NOTES
1. ALL RESULTS SHOWN EXCEED AT LEAST 1 COMPARISON CRITERION ON TABLE 1, HIGHER OF DUPLICATED PAIR RESULTS SHOWN WHERE APPLICABLE.
2. EXISTING CONDITIONS AND FEATURES SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON INFORMATION OBTAINED FROM BASE PLAN CONTAINED IN THE SEPTEMBER 2015 FINAL TRIP REPORT BY BATTELLE AND AECOM, THE OCTOBER 1997 SITE INVESTIGATION REPORT BY ROY F. WESTON, FIELD WORK PERFORMED ON NOV. 2, 2016, AND JULY 20, 2017.
3. PPMv - PARTS PER MILLION BY VOLUME
4. "POSITIVE"/"SLIGHTLY POSITIVE" INDICATES OIL IN SOIL SHAKE TEST RESULTS

DRAWN BY: **MAK/SCG** DATE: **1/15/2018**
CHECKED BY: **ASD** PROJECT: **15001301**

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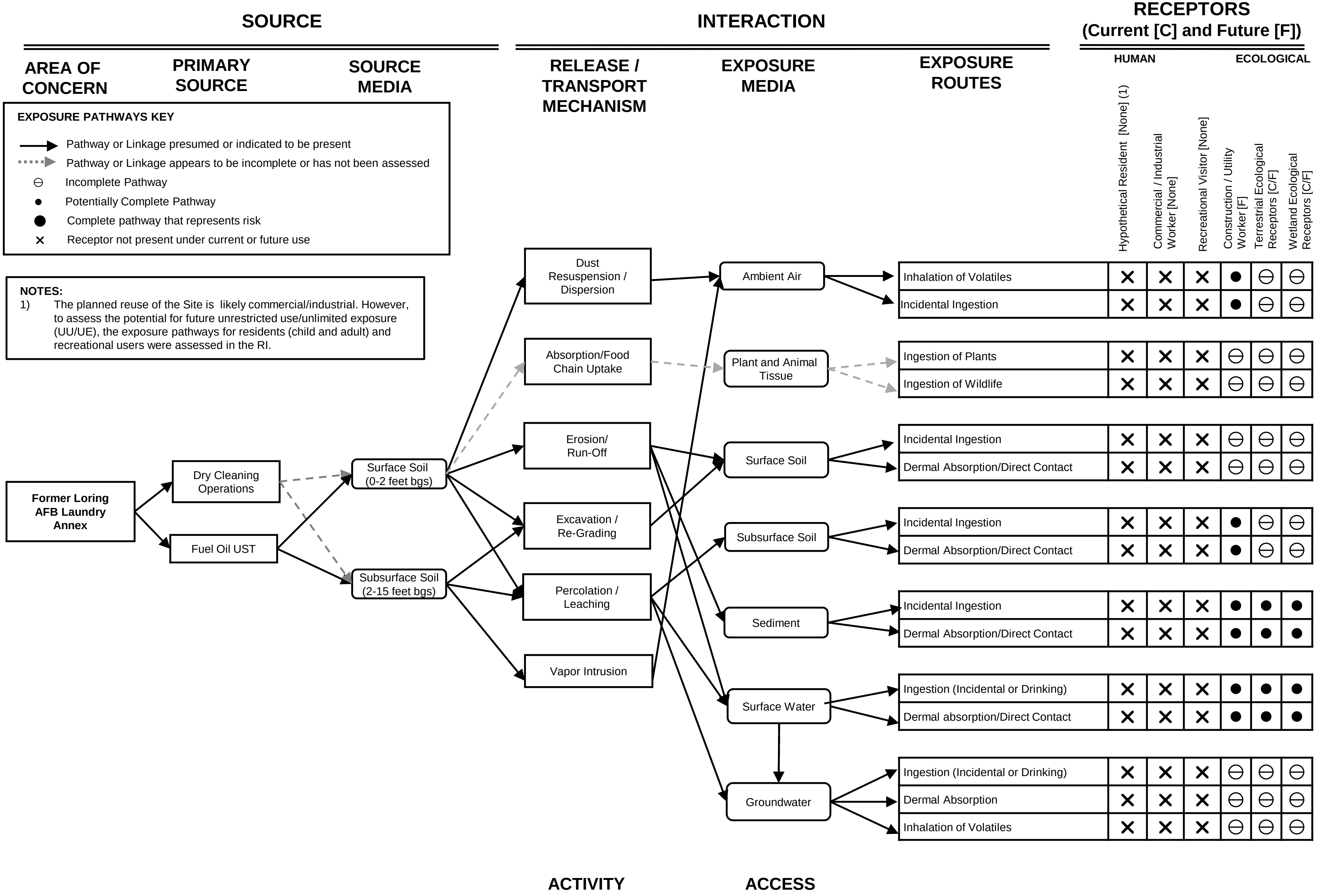
FIGURE 5
LAUNDRY ANNEX INFERRED EXTENT OF PETROLEUM SOIL CONTAMINATION

FORMER LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

⊕ SOIL BORING, CREDERE, JULY 2017
⊕ SOIL BORING, CREDERE, NOVEMBER 2016
⊕ BEDROCK WELL INSTALLED IN 2015
⊕ OVERBURDEN/BEDROCK INTERFACE WELL INSTALLED IN 2015
⊕ HISTORICAL SOIL BORING
◑ MONITORING WELL DISCOVERED IN 2015
⊕ ABANDONED MONITORING WELLS
▭ APPROX. EXTENT OF VOLATILE PETROLEUM CONTAMINATION
⊘ SEDIMENT SAMPLE LOCATION
- - - STEPOUT/IN PATHWAY
⊞ CATCH BASIN
OUTFALL
┼ RAILROAD
▭ SUSPECTED FORMER LOCATIONS OF 100-GALLON UST
▭ APPROX. LOCATIONS OF FORMER DRY CLEANING BUILDING FOUNDATION
— APPROX. SITE BOUNDARY
CULVERT
0.0 PID FIELD SCREENING RESULT (IN PPMv)
● SURFACE WATER SAMPLE LOCATION

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\FIGURE 5 - LA_VPH_EXTENT_RI.mxd

FIGURE 6
Conceptual Site Model Flow Chart for the Former Loring Air Force Base Laundry Annex, Presque Isle, ME



EXPOSURE PATHWAYS KEY

- → Pathway or Linkage presumed or indicated to be present
- ⇢ Pathway or Linkage appears to be incomplete or has not been assessed
- ⊖ Incomplete Pathway
- • Potentially Complete Pathway
- ● Complete pathway that represents risk
- ✕ Receptor not present under current or future use

NOTES:

1) The planned reuse of the Site is likely commercial/industrial. However, to assess the potential for future unrestricted use/unlimited exposure (UU/UE), the exposure pathways for residents (child and adult) and recreational users were assessed in the RI.

EXPOSURE MEDIA	EXPOSURE ROUTES	HUMAN				ECOLOGICAL	
		Hypothetical Resident [None] (1)	Commercial / Industrial Worker [None]	Recreational Visitor [None]	Construction / Utility Worker [F]	Terrestrial Ecological Receptors [C/F]	Wetland Ecological Receptors [C/F]
Ambient Air	Inhalation of Volatiles	✕	✕	✕	●	⊖	⊖
	Incidental Ingestion	✕	✕	✕	●	⊖	⊖
Plant and Animal Tissue	Ingestion of Plants	✕	✕	✕	⊖	⊖	⊖
	Ingestion of Wildlife	✕	✕	✕	⊖	⊖	⊖
Surface Soil	Incidental Ingestion	✕	✕	✕	⊖	⊖	⊖
	Dermal Absorption/Direct Contact	✕	✕	✕	⊖	⊖	⊖
Subsurface Soil	Incidental Ingestion	✕	✕	✕	●	⊖	⊖
	Dermal Absorption/Direct Contact	✕	✕	✕	●	⊖	⊖
Sediment	Incidental Ingestion	✕	✕	✕	●	●	●
	Dermal Absorption/Direct Contact	✕	✕	✕	●	●	●
Surface Water	Ingestion (Incidental or Drinking)	✕	✕	✕	●	●	●
	Dermal absorption/Direct Contact	✕	✕	✕	●	●	●
Groundwater	Ingestion (Incidental or Drinking)	✕	✕	✕	⊖	⊖	⊖
	Dermal Absorption	✕	✕	✕	⊖	⊖	⊖
	Inhalation of Volatiles	✕	✕	✕	⊖	⊖	⊖

TABLES

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LASB-1						LASB-2				LASB-3				LASB-4						LAMW-1			
							Sample ID:	LASB1-1				LASB1-2		LASB2-1		LASB2-2		LASB3-1		LASB3-2		LASB4-1				LASB4-2		LAMW1-1		LAMW1-2	
							Sample Depth:	8-10				18-20		13-15		15-17		6-8		16-17		6-8				10-12		4-6		10	
							Sample Date	9/27/1996				9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		DUPS-3		9/27/1996		9/27/1996		9/27/1996	
	Comparison Criteria[6]						**Field QC:**	FS		RE		FS		FS		FS		FS		FS		FS		FD		FS		FS		FS	
Parameter*	**EPA Residnetial RSL[1]**	**EPA Industrial RSL[1]**	**Commercial Maine DEP RAG[2]**	**Construction Worker Maine DEP RAG[2]**	**Maine DEP Commercial PG[3]**	**Maine DEP Construction PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																															
Acetone	6100	67000	100,000	98,000	NE	NE	NA	**0.068**		**0.052**		0.006	U	0.031	U	0.006	U	**0.079**		**0.015**		0.006	U	0.006	U	**0.034**		0.006	U	0.006	U
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Toluene	490	4700	810	820	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	0.006	U	0.006	U	0.006	U	**0.018**	**J**	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Ethylbenzene	5.8	25	380	470	NE	NE	NA	0.006	U	0.006	U	0.006	U	**0.13**		0.006	U	**0.018**		0.006	U	0.006	U	0.006	U	**0.002 J**		0.006	U	0.006	U
Total xylenes	58	250	260	260	NE	NE	NA	0.006	U	0.006	U	0.006	U	**0.63**		0.006	U	**0.12**		0.006	U	0.006	U	0.006	U	**0.01**		0.006	U	0.006	U
Diesel Range Organics (DRO) (mg/kg)																															
DRO	NE	NE	NE	NE	NE	NE	10	**69**		NS		5.5	U	**9.4**		5.5	U	**53**		**7**	**J**	5.9	U	**26**	**J**	**7.8**		**5.7**	**J**	**10**	**J**
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																															
PCBs	0.12	0.95	13	74	NE	NE	NA	ND		NS		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Pesticides																															
4,4-DDE	2	9.3	130	100	NE	NE	NA	0.0093	U	NS		0.0088	U	0.0098	U	0.0088	U	0.013	U	0.009	U	0.0095	U	0.0098	U	**0.0091**	**J**	0.0093	U	0.045	U
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	0.0093	U	NS		0.0088	U	**0.0098**		0.0088	U	0.013	U	0.009	U	0.0095	U	0.0098	U	**0.0091**	**J**	0.0093	U	0.045	U
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	0.0093	U	NS		0.0088	U	0.0098	U	0.0088	U	0.013	U	0.009	U	0.0095	U	0.0098	U	**0.0091**	**J**	0.0093	U	**0.0011 J**	**J**
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	0.0093	U	NS		0.0088	U	0.0098	U	0.0088	U	**0.013**	**J**	0.009	U	0.0095	U	0.0098	U	0.0091	U	0.0093	U	0.045	U
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																															
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
2-methylnaphthalene	24	300	4,100	960	730	120	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
chrysene	110	2100	29000	100000	350	4,300	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																															
benzene	1.2	5.1	75	240	86	30	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
toluene	490	4700	810	820	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
ethylbenzene	5.8	25	380	470	430	3,900	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
total xylenes	58	250	260	260	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LAMW-2				LAMW-3				LAMW-4				LAMW-5				LASB-5						LASB-6			
							Sample ID:	LAMW2-1		LAMW2-2		LAMW3-1		LAMW3-2		LAMW4-1		LAMW4-2		LAMW5-1		LAMW-5-2		LASB-5-1		LASB-5-1-D		LASB-5-2		LASB-6-1		LASB-6-2	
							Sample Depth:	6-8		10-12		4-6		12		11.5-13.5		21.5-23.5		8-11.7		18-20		6-8				9-11		12-14		14-16	
							Sample Date	9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/28/1996		11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016	
	Comparison Criteria[6]						Field QC:	FS		FS		FS		FS		FS		FS		FS		FS		FS		FD		FS		FS		FS	
Parameter*	**EPA Residnetial RSL[1]**	**EPA Industrial RSL[1]**	**Commercial Maine DEP RAG[2]**	**Construction Worker Maine DEP RAG[2]**	**Maine DEP Commercial PG[3]**	**Maine DEP Construction PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																																	
Acetone	6100	67000	100,000	98,000	NE	NE	NA	**0.072**		0.006	U	**0.31**		**0.018**		**15**		0.006	U	**2.7**		**0.054**		NS		NS		NS		NS		NS	
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	0.006	U	0.006	U	**0.055**		0.006	U	6.4	U	0.006	U	**0.58**		0.006	U	NS		NS		NS		NS		NS	
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	0.006	U	**0.004**	**J**	0.006	U	0.006	U	6.4	U	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	0.006	U	**0.002**	**J**	0.006	U	0.006	U	6.4	U	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Toluene	490	4700	810	820	NE	NE	NA	0.006	U	0.006	U	**0.002**	**J**	0.006	U	6.4	U	0.006	U	**0.008**	**J**	0.006	U	NS		NS		NS		NS		NS	
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.006	U	6.4	U	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Ethylbenzene	5.8	25	380	470	NE	NE	NA	0.006	U	0.006	U	**0.006**	**J**	0.006	U	**2.6**	**J**	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Total xylenes	58	250	260	260	NE	NE	NA	0.006	U	0.006	U	**0.073**		0.006	U	**31**		0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Diesel Range Organics (DRO) (mg/kg)																																	
DRO	NE	NE	NE	NE	NE	NE	10	**9.5**	**J**	**6.4**	**J**	6.5	U	**58**		**22**		5.5	U	**7**	**J**	**3.5**	J	NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																																	
PCBs	0.12	0.95	13	74	NE	NE	NA	ND		ND		ND		ND		ND		ND		ND		ND		NS		NS		NS		NS		NS	
Pesticides																																	
4,4-DDE	2	9.3	130	100	NE	NE	NA	0.0099	U	0.0089	U	0.01	U	**0.0018 J**	**J**	0.01	U	0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	0.0099	U	0.0089	U	0.01	U	0.0087	U	**0.0017 J**		0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	0.0099	U	**0.00074 J**		0.01	U	**0.012**		0.01	U	0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	0.0099	U	0.0089	U	0.01	U	0.0087	U	0.01	U	0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) **(Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)**																																	
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	UJ	0.12	UJ	0.11	UJ	0.13	UJ	0.11	UJ
2-methylnaphthalene	24	300	4,100	960	730	120	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.071**	J	**0.15**	J	0.11	U	0.13	U	0.11	U
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.092**	J	**0.17**	J	0.11	U	0.13	U	0.11	U
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.052**	J	**0.10**	J	0.11	U	0.13	U	0.11	U
chrysene	110	2100	29000	100000	350	4,300	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.10**	J	**0.16**	J	0.11	U	0.13	U	0.11	U
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.091**	J	**0.11**	J	0.11	U	0.13	U	0.11	U
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	**0.14**	J	0.11	U	0.13	U	0.11	U
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.081**	J	**0.12**	J	0.11	U	0.13	U	0.11	U
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.057	U	**0.098**	J	0.11	U	0.13	U	0.11	U
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	**0.082**	J	0.11	U	0.13	U	0.11	U
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.072**	J	**0.13**	J	0.11	U	0.13	U	0.11	U
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		6.7	U	**18**	J	6.6	U	**57**		**3.5**	J
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		11	U	12	U	11	U	13	U	11	U
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**7.4**	J	**14**	J	6.6	U	**7.9**	J	6.6	U
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NA		NA		NA		NA		NA	
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																																	
benzene	1.2	5.1	75	240	86	30	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
toluene	490	4700	810	820	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
ethylbenzene	5.8	25	380	470	430	3,900	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
total xylenes	58	250	260	260	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		2.0	U	2.0	U	1.6	U	2.7	U	1.7	U
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		2.7	U	2.6	U	2.2	U	**17**		2.3	U
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.33	U	0.33	U	0.27	U	**4.0**	J	0.29	U

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LASB-7				LASB-8				LASB-9		LASB-10		LASB-11		LASB-12				LASB-13A			
							Sample ID:	LASB-7-1		LASB-7-2		LASB-8-1		LASB-8-2		LASB-9-1		LASB-10-1		LASB-11-1		LASB-12-1		LASB-12-2		LASB-13A-1		LASB-13A-2	
							Sample Depth:	6-8		8-10		12-14		18-20		12-14		12-14		6-8		6-8		8.5-10.5		6-8		8-10	
							Sample Date	11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016		7/20/2017		7/20/2017		7/20/2017		7/20/2017	
	Comparison Criteria[6]						Field QC:	FS		FS		FS		FS		FS		FS		FS		FS		FS		FS		FS	
Parameter*	**EPA Residnetial RSL[1]**	**EPA Industrial RSL[1]**	**Commercial Maine DEP RAG[2]**	**Construction Worker Maine DEP RAG[2]**	**Maine DEP Commercial PG[3]**	**Maine DEP Construction PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																													
Acetone	6100	67000	100,000	98,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Toluene	490	4700	810	820	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Ethylbenzene	5.8	25	380	470	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Total xylenes	58	250	260	260	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Diesel Range Organics (DRO) (mg/kg)																													
DRO	NE	NE	NE	NE	NE	NE	10	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																													
PCBs	0.12	0.95	13	74	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Pesticides																													
4,4-DDE	2	9.3	130	100	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																													
naphthalene	3.8	17	250	130	3,700	10,000	NA	**0.20**	J	0.29	UJ	**15**	J	0.10	UJ	0.20	UJ	0.11	UJ	**7.2**	J	0.0019	U	0.0021	U	0.0022	U	0.0018	U
2-methylnaphthalene	24	300	4,100	960	730	120	NA	**0.3**	J	0.29	UJ	**1.8**		0.10	UJ	0.20	U	0.11	U	**0.6**		0.0019	U	0.0021	U	0.0022	U	0.0018	U
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	**1.0**	J	0.29	UJ	**0.4**		0.10	U	**0.31**	J	0.11	U	0.14	U	**0.00089**	**J**	0.0021	U	0.0022	U	0.0018	U
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	**0.3**	J	0.29	UJ	0.16	U	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	0.20	UJ	0.29	UJ	0.16	U	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	**0.072**	J	0.29	UJ	**0.14**	J	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	**0.16**	J	0.29	UJ	0.16	U	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	**1.6**	J	0.29	UJ	**0.4**		0.10	U	**0.5**		0.11	U	0.14	U	**0.0023**	**J**	**0.0012**	**J**	**0.0012**	**J**	**0.0011**	**J**
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	**1.9**	J	**0.20**	J	**0.5**		0.10	U	**0.6**		0.11	U	0.14	U	**0.0021**	**J**	**0.0011**	**J**	**0.0012**	**J**	**0.0012**	**J**
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	**1.1**	J	0.29	UJ	**0.12**	J	0.10	U	**0.29**	J	0.11	U	0.14	U	**0.0019**	**J**	0.0021	U	0.0022	U	**0.001**	**J**
chrysene	110	2100	29000	100000	350	4,300	NA	**1.4**	J	**0.15**	J	**0.21**	J	0.10	U	**0.5**		0.11	U	0.14	U	**0.0015**	**J**	0.0021	U	0.0022	UJ	**0.0009**	**J**
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	**0.7**	J	**0.11**	J	**0.12**	J	0.10	U	**0.33**	J	0.11	U	0.14	U	**0.0021**	**J**	0.0021	U	0.0022	U	**0.0012**	**J**
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	**0.7**	J	0.29	UJ	**0.14**	J	0.10	U	**0.4**		0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	UJ	0.0018	U
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	**0.8**	J	**0.10**	J	**0.12**	J	**0.035**	J	**0.4**	J	0.11	U	0.14	U	**0.0016**	**J**	0.0021	U	0.0022	U	**0.00087**	**J**
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	**0.4**	J	0.29	UJ	**0.079**	J	0.10	U	**0.24**	J	0.11	U	0.14	U	**0.001**	**J**	0.0021	U	0.0022	U	0.0018	U
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	**0.20**	J	0.29	UJ	**0.095**	J	0.10	U	**0.18**	J	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	UJ	0.0018	U
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	**0.5**	J	0.29	UJ	**0.11**	J	0.10	U	**0.33**	J	0.11	U	0.14	U	**0.0011**	**J**	0.0021	U	0.0022	U	0.0018	U
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	**7.9**	J	17	UJ	**2700**		**4.8**	J	12	U	6.4	U	**1000**		7.1	UJ	6.9	UJ	7.2	UJ	6.3	UJ
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	**12**	J	**40**	J	82	U	10	U	**36**	J	11	U	69	U	12	U	12	U	12	UJ	11	U
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	**120**	J	**110**	J	**120**		6.2	U	**130**		6.4	U	**39**		NA		NA		NA		NA	
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NA		NA		NA		NA		NA		NA		NA		7.1	U	6.9	U	7.2	U	6.3	U
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																													
benzene	1.2	5.1	75	240	86	30	NA	**0.034**	J	0.23	U	1.9	U	0.038	U	**0.03**	J	0.036	U	1.2	U	0.046	U	0.048	U	0.078	U	0.037	U
toluene	490	4700	810	820	10,000	10,000	NA	**0.1**		**0.063**	J	1.9	U	0.038	U	**0.049**	J	0.036	U	1.2	U	0.046	U	0.048	U	0.078	U	0.037	U
ethylbenzene	5.8	25	380	470	430	3,900	NA	**0.019**	J	0.23	U	**4.4**		0.038	U	0.13	U	0.036	U	1.2	U	0.046	U	0.048	U	0.078	U	0.037	U
total xylenes	58	250	260	260	10,000	10,000	NA	**0.146**	J	0.23	U	**81.7**		**0.046**	J	0.13	U	0.036	U	**22.5**		0.046	U	0.048	U	0.078	U	0.037	U
naphthalene	3.8	17	250	130	3,700	10,000	NA	**0.054**	J	0.23	U	**29**		**0.020**	J	**0.028**	J	0.036	U	**22**		0.046	U	0.048	U	0.078	U	0.037	U
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	2.1	U	11	U	**48**	J	1.8	UJ	6.4	U	1.8	U	**32**	J	**1.1**	**J**	2.3	U	**3.8**	**J**	1.8	U
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	2.8	U	15	U	**3200**		**3.6**	J	**4.0**	J	2.3	U	**2300**		2.9	U	3.1	U	5.0	U	2.4	U
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	0.35	U	1.8	U	**1900**		**0.87**	J	1.1	U	0.29	U	**1000**		**0.87**	**J**	0.38	U	**0.74**	**J**	0.30	U

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LASB-14A						LASB-15B		LASB-17B		LASB-18		LASB-19A	
							Sample ID:	LASB-14A-1				LASB-14A-2		LASB-15B-1		LASB-17B-1		LASB-18-1		LASB-19A-1	
							Sample Depth:	6-8				8-10		12-14		8-12		12-14		9-11	
							Sample Date	7/20/2017				7/20/2017		7/20/2017		7/20/2017		7/20/2017		7/20/2017	
	Comparison Criteria[6]						**Field QC:**	FS		FD (LASB-141-1)		FS		FS		FS		FS		FS	
Parameter*	**EPA Residnetial RSL[1]**	**EPA Industrial RSL[1]**	**Commercial Maine DEP RAG[2]**	**Construction Worker Maine DEP RAG[2]**	**Maine DEP Commercial PG[3]**	**Maine DEP Construction PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																					
Acetone	6100	67000	100,000	98,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Toluene	490	4700	810	820	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Ethylbenzene	5.8	25	380	470	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Total xylenes	58	250	260	260	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Diesel Range Organics (DRO) (mg/kg)																					
DRO	NE	NE	NE	NE	NE	NE	10	NS		NS		NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																					
PCBs	0.12	0.95	13	74	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Pesticides																					
4,4-DDE	2	9.3	130	100	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																					
naphthalene	3.8	17	250	130	3,700	10,000	NA	0.0021	U	0.0022	U	0.0022	U	**0.0084**		**0.0068**	**J**	0.0018	U	0.0019	U
2-methylnaphthalene	24	300	4,100	960	730	120	NA	0.0021	U	0.0022	U	0.0022	U	**0.0021**	**J**	**0.0020**	**J**	0.0018	U	0.0019	U
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	**0.00096**	**J**	0.0022	U	**0.0018**	**J**	**0.0111**		**0.0270**	**J**	**0.0014**	**J**	**0.009**	
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	0.0021	U	0.0022	U	0.0022	U	**0.0011**	**J**	**0.0118**	**J**	0.0018	U	0.0019	U
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	0.0021	U	0.0022	U	0.0022	U	**0.00092**	**J**	0.0031	UJ	0.0018	U	0.0019	U
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	0.0021	U	0.0022	U	0.0022	U	**0.0013**	**J**	**0.0036**	**J**	0.0018	U	0.0019	U
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	0.0021	U	0.0022	U	0.0022	U	**0.0026**	**J**	**0.0074**	**J**	0.0018	U	**0.0111**	
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	**0.0026**	**J**	**0.001**	**J**	**0.0023**	**J**	**0.0211**		**0.0730**	**J**	**0.002**	**J**	**0.0215**	
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	**0.0026**	**J**	**0.00087**	**J**	**0.0024**	**J**	**0.0211**		**0.0679**	**J**	**0.0021**	**J**	**0.0231**	
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	**0.0039**	**J**	0.0022	U	**0.0015**	**J**	**0.01**		**0.0424**	**J**	**0.0014**	**J**	**0.0266**	
chrysene	110	2100	29000	100000	350	4,300	NA	**0.0036**	**J**	0.0022	U	**0.0014**	**J**	**0.0082**		**0.0363**	**J**	**0.0012**	**J**	**0.0226**	
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	**0.004**	**J**	0.0022	U	**0.0017**	**J**	**0.0102**		**0.0470**	**J**	**0.0017**	**J**	**0.0228**	
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	**0.0031**	**J**	0.0022	U	0.0022	U	**0.0028**	**J**	**0.0170**	**J**	0.0018	U	**0.0209**	
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	**0.0034**	**J**	0.0022	U	**0.0013**	**J**	**0.007**		**0.0359**	**J**	**0.0013**	**J**	**0.0239**	
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	**0.0035**	**J**	0.0022	U	**0.001**	**J**	**0.0042**		**0.0217**	**J**	**0.0009**	**J**	**0.0252**	
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	**0.0026**	**J**	0.0022	U	0.0022	U	**0.0011**	**J**	**0.0065**	**J**	0.0018	U	**0.0216**	
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	**0.0032**	**J**	0.0022	U	**0.001**	**J**	**0.0044**		**0.0238**	**J**	**0.0011**	**J**	**0.022**	
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	7.7	UJ	6.9	UJ	7.1	UJ	**6.8**	**J**	8.5	UJ	**4.2**	**J**	6.4	UJ
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	13	U	12	U	12	U	11	U	14	U	11	U	11	UJ
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NA		NA		NA		NA		NA		NA		NA	
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	7.7	U	**19**	**J**	7.1	U	6.6	U	8.5	U	**28**		**8.2**	**J**
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																					
benzene	1.2	5.1	75	240	86	30	NA	0.081	U	0.047	U	0.052	U	0.053	U	0.091	U	0.046	U	0.039	U
toluene	490	4700	810	820	10,000	10,000	NA	0.081	U	0.047	U	0.052	U	0.053	U	0.091	U	0.046	U	0.039	U
ethylbenzene	5.8	25	380	470	430	3,900	NA	0.081	U	0.047	U	0.052	U	0.053	U	0.091	U	0.046	U	0.039	U
total xylenes	58	250	260	260	10,000	10,000	NA	0.081	U	0.047	U	0.052	U	0.053	U	**1.9**		0.046	U	0.039	U
naphthalene	3.8	17	250	130	3,700	10,000	NA	0.081	U	**0.020**	**J**	0.052	U	**0.14**	**J**	**0.078**	**J**	0.046	U	0.039	U
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	3.9	U	2.2	U	2.5	U	2.6	U	4.4	U	2.2	U	1.9	U
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	5.2	U	3.0	U	3.3	U	**37**		**18**		3.0	U	2.5	U
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	0.65	U	0.37	U	0.41	U	**20**		**18**		0.37	U	0.31	U

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

NOTES:

mg/kg - milligrams per kilogram

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - US EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2017 (THQ 0.1 or 1x10-6)

2 - Maine Department of Environmental Protection (DEP) Remedial Action Guidelines (RAGs), October 19, 2018, Table 3: Maine RAGs for the Soil Exposure Pathway, by Exposure Scenario (THQ=1 or 1x10-5)

3 - Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (PGs), May 23, 2014, Table 5: Soil Remediation Guidelines for Petroleum Target Compounds and Hydrocarbon Fractions (THQ=1 or 1x10-5)

4 - Former guideline provided for reference since current criteria are not available.

5 - PAH target compounds were analyzed by 8270D SIM for samples collected July 2017.

6 - Darker highlights are considered the primary comparison criteria.

ND - Results were below the laboratory reporting limits, reporting limits vary by compound

NE - Not established

NS - Not sampled

bgs - below ground surface

J - Results are considered estimated

UJ - Results are below the laboratory LOD, LOD is estimated

U - Not detected at the laboratory LOD or considered ND due to blank contamination, LOD indicated

FS - field sample

FD - field duplicate

RE - reanalyzed result

NA - Not applicable, current criteria available or criteria vary by compound with all results below the reporting limit.

Bold Exceeds laboratory LOD or is an estimated concentration (J) below the LOD

Exceeds/equals residential RSL or construction worker hydrocarbon fraction RAG

Exceeds/equals outdated or secondary comparison criteria

LOD exceeds comparison criteria

Table 2
Summary of Historical Groundwater Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

Sample Location:						LAMW-1				LAMW-3				LAMW-4				LAMW-5								LAMW-1A		LAMW-3A		LAMW-4A		LAMW-5A			
Sample ID:						LAW1-1		LAW1-2		LAW3-1		LAW3-2		LAW4-1		LAW4-2		LAW5-1				LAW5-2				LAMW-01A051515		LAMW-03A-051515		LAMW-04A-051515		LAMW-05A-051515			
Sample Date:						11/4/1996		5/31/1997		11/1/1996		5/31/1997		11/1/1996		5/31/1997		11/1/1996		DUP3-R1		5/31/1997		DUP3-R2		5/15/2015		5/15/2015		5/15/2015		5/15/2015		LAMW05A-D-051515	
Parameter*	Former MEGs[1]	Current Res RAG[2]	Current Ind RAG[2]	Tapwater RSL[3]	MCL[4]	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260 or 504.1 (µg/L)																																			
Vinyl chloride	NA	0.19	0.22	0.019	2	0.5	U	0.5	U	0.5	U	**0.8**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	NA	15	1400	1.5	700	0.5	U	0.5	U	**4**		**5**		**2**		**2**		**2**		0.5	U	0.5	U	0.5	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Total Xylenes	NA	190	2100	19	10,000	0.5	U	0.5	U	**12**		**8**		**21**		**11**		**16**		0.5	U	0.5	U	0.5	U	**0.074**	**J**	0.75	U	0.75	U	0.75	U	0.75	U
1,2,4-Trimethylbenzene	NA	56	1000	5.6	NE	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		**0.051**	**J**	0.25	U	0.25	U	0.25	U	0.25	U
2-Butanone	NA	5600	9000	560	NE	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	**4.0**		1.2	U	1.2	U	1.2	U	1.2	U
Benzene	NA	4.6	350	0.46	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.22**		0.25	U	0.25	U	0.25	U	0.25	U
Carbon disulfide	NA	810	3100	81	NE	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	**0.31**	**J**	0.25	U	0.25	U	0.25	U	0.25	U
Acetone	NA	14000	100000	1400	NE	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	**16**		1.2	U	**2.2**	**J**	**2.2**	**J**	**1.9**	**J**
Chloroform	NA	2.2	170	0.22	80	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.076**	**J**	**0.10**	**J**	**6.4**		**0.2**	**J**	**0.19**	**J**
Bromodichloromethane	NA	1.3	130	0.13	80	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.25	U	0.25	U	**0.61**		0.25	U	0.25	U
Toluene	NA	1100	24000	110	1,000	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**1.3**		**0.44**	**J**	**20**		**0.45**	**J**	**0.41**	**J**
Volatile Petroleum Hydrocarbons (VPH) by MassDEP VPH 04-1.1 (µg/L)																																			
Toluene	NA	1100	24000	110	1000	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		3.8	U	3.8	U	**10**		3.8	U	3.8	U
Extractable Petroleum Hydrocarbons (EPH) by MassDEP EPH 04-1.1 (µg/L)																																			
All fractions and target compounds	NA	NA	NA	NA	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		ND		ND		ND		ND		ND	
Total Petroleum Hydrocarbons (TPH) as Diesel Range Organics (DRO) and Gasoline Range Organics (GRO) (µg/L)																																			
DRO	50	NE	NE	NE	NE	50	U	**220**		**840**		**510**		**420**		**400**		50	U	50	U	50	U	50	U	NS		NS		NS		NS		NS	
GRO	50	NE	NE	NE	NE	50	U	50	U	**1400**		**990**		**500**		**340**		50	U	50	U	50	U	50	U	NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) (µg/L)																																			
PCBs	NA	0.079	NA	0.0047	0.5	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NS		NS		NS		NS		NS	
Pesticides ((µg/L)																																			
All Compounds	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NS		NS		NS		NS		NS	

NOTES:

µg/L - micrograms per liter

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - Former Maximum Exposure Guidelines (MEGs) included for reference for GRO and DRO comparison.

2 - Remedial Action Guidelines for Sites Contaminated with Hazardous Substances, October 19, 2018 (THQ = 1 x 10^{-5})

3 - US EPA Tapwater Regional Screening Levels, May 2020 (THQ = 1 x 10^{-6})

4 - US EPA Drinking Water Standards and Health Advirories Tables, July 11, 2017 (THQ = 1 x 10^{-6})

J - Results are considered estimated due to non-conformances in the data quality assurance/quality check (QA/QC)

U - results are below the laboratory reporting limit, reporting limit indicated.

ND - Results were below the laboratory reporting limits, reporting limits vary by compound or aroclor

NE - Not established

NA - Not applicable, current criteria available or criteria vary by compound with all results below the reporting limit.

Bold Exceeds laboratory reporting limit

Exceeds applicable comparison criteria

Exceeds former guidelines that is no longer applicable. Provided for historical refere

Table 3
Summary of Historical Sediment Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

				Sample Location:	**LASED-1**											
				Sample ID:	**LASED1-3**		**LASED1-4**		**LASED1-1202**		**LASED1-0403**		**LASED1-0903**		**LASED1-0504**	
				Sample Date:	**10/25/1999**		**5/16/2000**		**12/4/2002**		**4/20/2003**		**9/17/2003**		**5/10/2004**	
				Field QC:	**FS**		**FS**		**FS**		**FS**		**FS**		**FS**	
Parameter*	**EPA Residential RSL[1]**	**Maine DEP RAG[2]**	**Maine DEP PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds by EPA Method 8260B																
2-Butanone	27000	100,000	NE	NA	**69.5**		63.7	UJ	NS		NS		NS		NS	
Acetone	61000	100,000	NE	NA	**337**		155	UJ	NS		NS		NS		NS	
Methylene Chloride	35	110	NE	NA	**4**	**J**	12.7	UJ	NS		NS		NS		NS	
Styrene	600	70,000	NE	NA	17	U	**6.72**	**J**	NS		NS		NS		NS	
Total Petroleum Hydrocarbons (TPH) by Maine DEP Methods 4.2.17 for GRO and 4.1.25 for DRO																
TPH GRO	NE	NE	NE	NE	1.6	UJ	2.7	UJ	NS		NS		NS		NS	
TPH DRO	NE	NE	NE	10	**39**	**J**	**105**	**J**	**40**		**84**		**96**	**J**	**82**	

Table 3
Summary of Historical Sediment Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

LASED-2																							
LASED2-3				**LASED2-4**				**LASED2-1202**				**LASED2-0403**				**LASED2-0903**				**LASED2-0504**			
10/25/1999		**DUPS-17**		**5/16/2000**		**DUPS-18**		**12/4/2002**		**LASED2**		**4/20/2003**		**LASED2**		**9/17/2003**		**LASED2**		**5/10/2004**		**LASED2**	
FS		**FD**		**FS**		**FD**		**FS**		**FD**		**FS**		**FD**		**FS**		**FD**		**FS**		**FD**	
Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
30.3	U	44	U	11.2	UJ	11.9	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
36.6		**40.8**	**J**	**485**	**J**	**119 J**	**J**	NS		NS		NS		NS		NS		NS		NS		NS	
1.4	**J**	**0.92**	**J**	22.3	UJ	23.8	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
7.6	U	11	U	11.2	UJ	11.9	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
2.7	**J**	**0.9**	**J**	3.6	UJ	3.4	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
163	**J**	**76**	**J**	**220**	**J**	**146**	**J**	**71**		**84**		**72**		**70**		**83**		**84**		**82**		**54**	

Table 3
Summary of Historical Sediment Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

NOTES:

mg/kg - milligrams per kilogram

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - US EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2017 (THQ 0.1 or 1x10-6)

2 - Maine Department of Environmental Protection (DEP) Remedial Action Guidelines (RAGs), October 19, 2018, Sediment Recreator (THQ=1 or 1x10-5)

3 - Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (PGs), May 23, 2014,
Table 5: Soil Remediation Guidelines for Petroleum Target Compounds and Hydrocarbon Fractions (THQ=1 or 1x10-5)

4 - Former guideline provided for reference since current criteria are not available.

J - Results are considered estimated

UJ - Results are considered estimated due to laboratory non-conformance, results were below the laboraotry reporting limit.

U - Results are below the laboratory reporting limit , reporting limit indicated

NE - Not established

NS - Not sampled

DRO - Diesel range organics

GRO - Gasoline range organics

Bold Exceeds laboratory limit of detection

Exceeds applicable comparison criteria

Exceeds former guidelines that is no longer applicable. Provided for historical reference.

Table 4
Summary of Historical Surface Water Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

Location:						LASW-1														LASW-2																			
Sample ID:						LASW1-3		LASW1-4		LASW1-1202				LASW1-0403		LASW1-0903		LASW1-0504		LASW2-3		LASW2-4		LASW2-1202				LASW2-0403				LASW2-0903				LASW2-0504			
Sample Date:						10/25/1999		5/16/2000		12/4/2002		DUP		4/20/2003		9/17/2003		5/10/2004		10/25/1999		5/16/2000		12/4/2002		DUP		4/20/2003		DUP		9/17/2003		DUP		5/10/2004		DUP	
Parameter*	Former MEGs[1]	Current Res RAG[2]	Current Res RAG[2]	EPA Tapwater RSL[3]	MCL[4]	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds by EPA Method 8260B (µg/L)																																							
Acetone	NA	14000	100000	1400	NE	**20**	**J**	20	U	NS		NS		NS		NS		NS		**20**	**J**	20	U	NS		NS		NS		NS		NS		NS		NS		NS	
Total Petroleum Hydrocarbons (TPH) by Maine DEP Methods 4.2.17 for GRO and 4.1.25 for DRO (µg/L)																																							
TPH - GRO	50	NE	NE	NE	NE	50	U	40	UJ	NS		NS		NS		NS		NS		50	U	40	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
TPH - DRO	50	NE	NE	NE	NE	60	U	50	UJ	50	U	50	U	50	U	50	U	50	U	110	U	**150**	**J**	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U

NOTES:

µg/L - Micrograms per liter

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - Former Maximum Exposure Guidelines (MEGs) included for reference for GRO and DRO comparison.

2 - Remedial Action Guidelines for Sites Contaminated with Hazardous Substances, October 19, 2018 (THQ = 1 x 10^{-5})

3 - US EPA Tapwater Regional Screening Levels, May 2020 (THQ = 1 x 10^{-6})

4 - US EPA Drinking Water Standards and Health Advirories Tables, July 11, 2017 (THQ = 1 x 10^{-6})

J - Results are considered estimated

UJ - Results are considered estimated due to laboraotyr non-conformance, results were below the laboraotry reporting limit.

U - Results are below the laboratory reporting limit , reporting limit indicated

NE - Not established

NS - Not sampled

DRO - Diesel range organics

GRO - Gasoline range organics

Bold Exceeds laboratory reporting limit

Exceeds former guidelines that is no longer applicable. Provided for historical reference.

APPENDIX A

CURRENT CONDITIONS PHOTO LOG

Current Conditions Photo Log
Loring Air Force Base Laundry Annex
1050 Central Drive, Presque Isle, Maine

1. View of the Site facing southwest from Central Drive.

2. View across the Site facing northwest .

3. View across the Site facing southeast.

4. Adjoining property east of the Site where the former laundry building and laundry steam plant were located.

APPENDIX B

CUMULATIVE SOIL BORING LOGS

WESTON MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG

BORING NO. LAMW-1

PROJECT: MEFUDS – LAFB Laundry Annex
CLIENT: US Army Corps of Engineers, New England Division
BORING CONTRACTOR: Maine Test Borings RIG: B-51

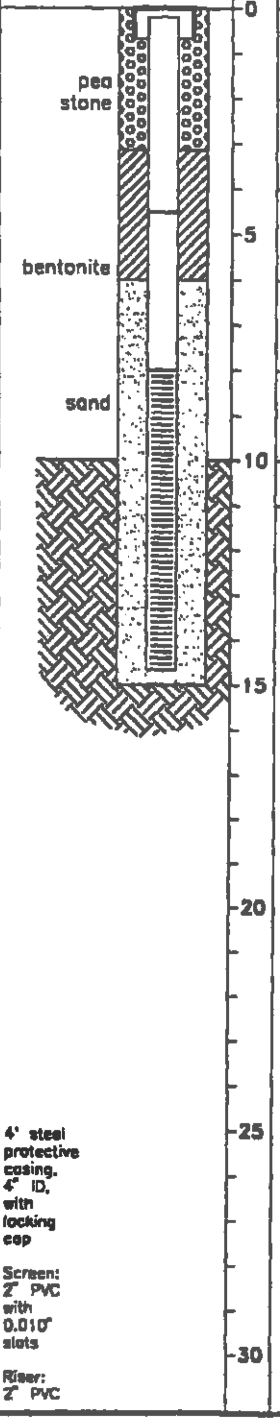
SHEET NO. 1 OF 1
JOB NO. 10971-010-001
ELEVATION (PVC) 492.21 ft
DATE STARTED 9/28/96
DATE FINISHED 9/28/96
DRILLER D. McKeen
INSPECTOR R. Eichhorn

GROUNDWATER

DATE	TIME	WATER ELEVATION	DATUM
9/30/96	15:15	approx. 14.7 ft	below top of PVC

	CAS.	SAMP.	CORE	TUBE
TYPE	HSA	SS		
DIA.	4 1/4"ID	1 7/8"ID		
WT.		150#		
FALL		30"		

WELL CONSTRUCTION



SAMPLE RECOVERY (in.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
14/24	14–16 19–17	FILL SANDY ELASTIC SILT: Lt brown SILT and f.–c. SAND, little f.–c. gravel. Loose, dry, nonplastic.	
12/24	13–30 4–21	4.0'	
14/24	4–7 9–8	TILL ELASTIC SILT: Lt. yellow–brown SILT and CLAY, trace f.–c. sand, trace gravel. Firm, dry, nonplastic.	OVM ≈ background Collected analytical sample LAMW1–1. (4'–6')
14/24	10–13 10–18	7.0' LEAN CLAY: Lt. brown CLAY, little silt, trace gravel. Firm, moist, nonplastic. 0.5' gravel layer at 8' BGS.	
12/24	14–22 25–35	10.0'	OVM ≈ background Collected analytical sample LAMW1–2. (10')
6/6	41–50/0"	Augered through bedrock to 15' BGS. 15.0'	
		END OF BORING	

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WESTON
MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG

BORING NO. LAMW-2

PROJECT: MEFUDS – LAFB Laundry Annex	SHEET NO. 1 OF 1
CLIENT: US Army Corps of Engineers, New England Division	JOB NO. 10971-010-001
BORING CONTRACTOR: Maine Test Borings RIG: B-61	ELEVATION (ground) ND

GROUNDWATER

DATE	TIME	WATER ELEVATION	DATUM

	CAS.	SAMP.	CORE	TUBE
TYPE	HSA	SS		
DIA.	4 1/4" ID	1 7/8" ID		
WT.		150#		
FALL		30"		

DATE STARTED 9/27/96
DATE FINISHED 9/27/96
DRILLER J. Rudnicki
INSPECTOR T. Warr

WELL CONSTRUCTION	DEPTH (FEET)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
NO WELL INSTALLED	0	11/24	3-4 5-4	TOPSOIL 0.3' FILL SILTY SAND W/ GRAVEL: Brown, f.-c. SAND, little silt, little f.-c. gravel. Loose, moist. 2.0'	
		21/24	7-4 4-3	POSSIBLE FILL ELASTIC SILT W/ GRAVEL: Brown SILT, little f.-c. gravel, little silt, trace f.-c. sand. Loose, wet, mod. plasticity. 4.0'	
	5	12/24	2-4 4-4	SANDY FAT CLAY: Green-gray CLAY, little f.-c. sand, little silt, trace f.-c. gravel, trace organics. Loose, wet, high plasticity.	
		5/24	3-4 4-4		OVM = background Collected analytical sample LAMW2-1 (6'-8')
		0/24	3-4 5-6	10.0'	
	10	15/24	22-21 11-16	TILL GRAVELLY SILT: Brown SILT, some f.-c. gravel, little f.-c. sand, trace clay. Stiff, moist, low plasticity. 12.9'	OVM = background Collected analytical sample LAMW2-2 (10'-12')
		0/11	15-50/3"	WEATHERED BEDROCK 15.0'	
	15			END OF BORING Auger refusal.	
	20				
	25				
	30				

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WESTON
MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG

BORING NO. LAMW-3

PROJECT: MEFUDS – LAFB Laundry Annex
CLIENT: US Army Corps of Engineers, New England Division
BORING CONTRACTOR: Maine Test Borings RIG: B-51

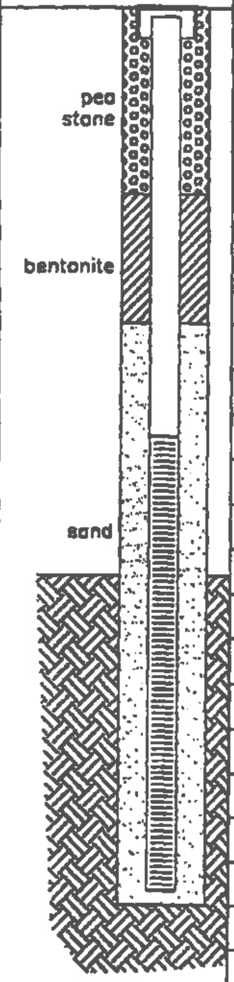
SHEET NO. 1 OF 1
JOB NO. 10971-010-001
ELEVATION (PVC) 492.04 ft
DATE STARTED 9/27/96
DATE FINISHED 9/27/96
DRILLER D. McKeen
INSPECTOR R. Eichhorn

GROUNDWATER

DATE	TIME	WATER ELEVATION	DATUM
10/1/96	07:00	11.27 ft	below top of PVC

	CAS.	SAMP.	CORE	TUBE
TYPE	HSA	SS		
DIA.	4 1/4"ID	1 7/8"ID		
WT.		150#		
FALL		30"		

WELL CONSTRUCTION



DEPTH (FEET)	SAMPLE RECOVERY (In.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
0			Augered through FILL/COBBLES to 4' BGS.	
			4.0'	
5	12/24	3-3 3-3	TILL FAT CLAY: Dk. brown CLAY, little silt, trace f. sand. Firm, moist, high plasticity.	OVM = background Collected analytical sample LAMW3-1. (4'-6')
	24/24	3-3 7-7		
	10/24	33-9 10-13	10.0'	
10	12/24	10-18 17-20	GRAVELLY ELASTIC SILT: Tan-gray SILT, little gravel, trace f.-c. sand, trace clay. Stiff, dry, nonplastic.	OVM = background Collected analytical sample LAMW3-2. (12')
	6/6	16-50/0"	12.6'	
15			Augered through weathered rock to 20' BGS.	
20			20.0'	
			END OF BORING	
25				
30				

4' steel protective casing, 4" ID, with locking cap

Screen: 2" PVC with 0.010" slots

Riser: 2" PVC

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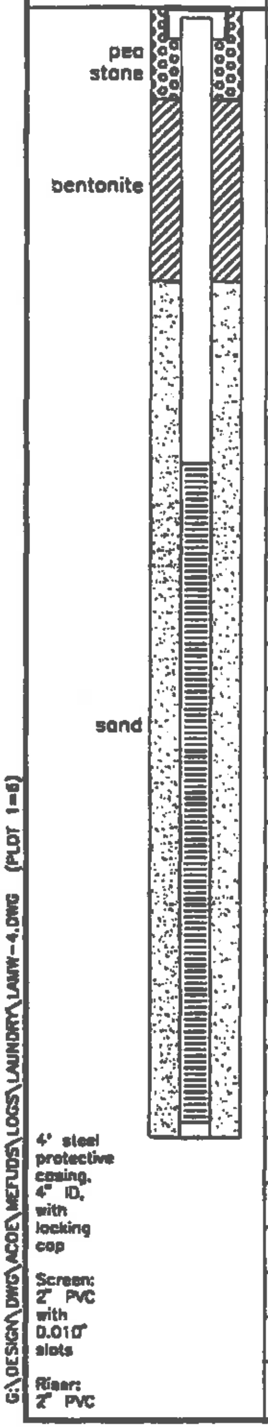
WESTON
MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG
BORING NO. LAMW-4

PROJECT: MEFUDS - LAFB Laundry Annex	SHEET NO. 1 OF 1
CLIENT: US Army Corps of Engineers, New England Division	JOB NO. 10971-010-001
BORING CONTRACTOR: Maine Test Borings RIG: B-61	ELEVATION (PVC) 492.41 ft

GROUNDWATER					CAS.	SAMP.	CORE	TUBE	
DATE	TIME	WATER ELEVATION	DATUM	TYPE	HSA	SS			DATE STARTED 9/27/96
									DATE FINISHED 9/27/96
10/1/96	07:00	12.95 ft	below top of PVC	DIA.	4 1/4"ID	1 7/8"ID			DRILLER J. Rudnicki
				WT.		150#			INSPECTOR T. Warr
				FALL		30"			

WELL CONSTRUCTION



DEPTH (FEET)	SAMPLE RECOVERY (In.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
0			CONCRETE 0.7'	
	11/24	7-7 8-7	FILL GRAVELLY ELASTIC SILT: Brown-gray SILT, little f.-c. gravel, trace f.-c. sand, trace-little clay. Loose, wet, low plasticity. Gravel and clay content decrease w/ depth. Wood present in samples.	
	16/24	3-3 4-5		OVM = background
5	13/24	3-3 3-3		
	5/24	1-4 5-6		
10	22/24	4-5 5-6	11.5'	
	19/24	7-8 7-7	TILL GRAVELLY ELASTIC SILT: Green-gray SILT, some f.-c. gravel, trace f.-c. sand, trace-little clay. Loose, wet, low plasticity. Clay and gravel content varies slightly.	OVM = background Collected analytical sample LAMW4-1 (11.5'-13.5')
	12/24	11-12 12-14		OVM range = 325-52 ppm (11.5'-17.5')
15	14/24	4-8 8-9		
	22/24	8-9 14-21		
20	24/24	5-11 11-17		
	19/24	18-27 33-31	23.5'	OVM = background Collected analytical sample LAMW4-2 (21.5'-23.5')
	7/11	26-56/5"	WEATHERED BEDROCK 25.0'	Collected geotechnical sample (22'-24')
25			END OF BORING Auger refusal.	
30				

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WESTON MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG

BORING NO. LAMW-5

PROJECT: MEFUDS – LAFB Laundry Annex
CLIENT: US Army Corps of Engineers, New England Division
BORING CONTRACTOR: Maine Test Borings
RIG: B-61

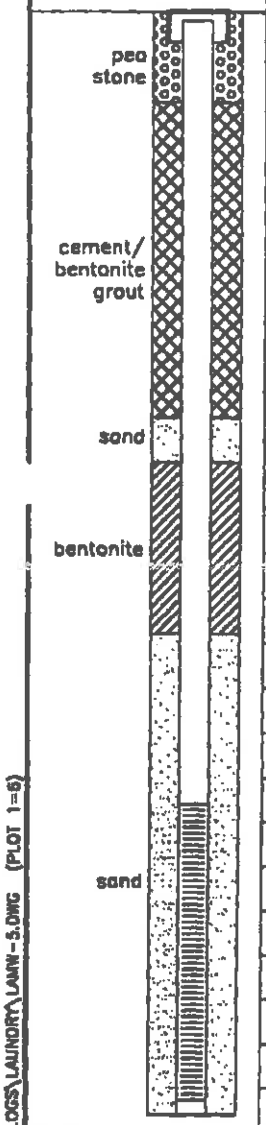
SHEET NO. 1 OF 1
JOB NO. 10971-010-001
ELEVATION (PVC) 490.75 ft
DATE STARTED 9/28/96
DATE FINISHED 9/28/96
DRILLER J. Rudnicki
INSPECTOR T. Worr

GROUNDWATER

DATE	TIME	WATER ELEVATION	DATUM
9/30/96	11:50	10.00 ft	below top of PVC

	CAS.	SAMP.	CORE	TUBE
TYPE	HSA	SS		
DIA.	4 1/4" ID	1 7/8" ID		
WT.		150#		
FALL		30"		

WELL CONSTRUCTION



4" steel protective casing, 4" ID, with locking cap

Screen: 2" PVC with 0.010" slots

Riser: 2" PVC

DEPTH (FEET)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS PER 6 INCHES
0	19/24	6-9
		6-3
	15/24	5-6
		5-4
5	6/24	3-4
		4-3
	0/24	3-4
		4-3
	17/24	5-5
		5-5
10	23/24	2-4
		4-6
	17/24	9-11
		11-30
15	18/24	9-13
		11-12
	19/24	4-12
		13-13
	23/24	15-26
		24-38
20	0/0	50/0"
25		
30		

C L A S S I F I C A T I O N

TOPSOIL 0.4'

FILL
SILTY GRAVEL W/ SAND: Brown f.-c. GRAVEL, some silt, little f.-c. sand. Loose, moist. 2.0'

SILT W/ GRAVEL: Brown SILT, some f.-c. gravel, little f.-c. sand. Loose, moist. 4.0'

POSSIBLE FILL
GRAVELLY ELASTIC SILT: Brown SILT, little f.-c. gravel, little clay, trace f.-c. sand. Loose, moist-wet, mod. plasticity. 8.0'

PEAT
ORGANIC SOIL: Black ORGANICS, trace clay, trace silt. Moist. 11.7'

TILL (?)
FAT CLAY W/ GRAVEL: Blue-gray CLAY, little silt, little f.-c. gravel, trace f.-c. sand. Loose, moist-wet, high plasticity. 16.0'

GRAVELLY ELASTIC SILT: Gray-brown SILT, little f.-c. gravel, trace f.-c. sand, trace clay. Loose, moist-wet, mod. plasticity. 20.0'

WEATHERED BEDROCK 24.6'

END OF BORING
Auger refusal.

R E M A R K S

OVM = background
Collected analytical sample LAMW5-1 (8'-11.7')

OVM = background
Collected analytical sample LAMW5-2 (18'-20')

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WESTON MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG

BORING NO. LASB-1

PROJECT: MEFUDS – LAFB Laundry Annex	SHEET NO. 1 OF 1
CLIENT: US Army Corps of Engineers, New England Division	JOB NO. 10971-010-001
BORING CONTRACTOR: Maine Test Borings RIG: B-51	ELEVATION (ground) 490.44 ft

GROUNDWATER

DATE	TIME	WATER ELEVATION	DATUM

	CAS.	SAMP.	CORE	TUBE
TYPE	HSA	SS		
DIA.	4 1/4" ID	1 7/8" ID		
WT.		150#		
FALL		30"		

DATE STARTED 9/27/96
DATE FINISHED 9/27/96
DRILLER D. McKeen
INSPECTOR R. Eichhorn

WELL CONSTRUCTION	DEPTH (FEET)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
NO WELL INSTALLED	0	14/24	4-10 8-9	FILL GRAVELLY SILT: Lt. Brown SILT and f.-c. GRAVEL, trace-little clay, trace-little gravel. Firm, dry-moist, nonplastic.	
		12/24	8-7 17-12		
	5	12/24	6-5 6-10		
		0/24	11-13 7-6	8.0'	
		12/24	17-14 15-12	TILL ELASTIC SILT: Dk. brown SILT, trace f.-c. gravel, trace clay. Firm, dry, slight plasticity.	OVM = background Collected analytical sample LASB1-1. (8'-10')
	10	14/24	4-6 7-8	12.0'	
		12/24	12-13 12-14	FAT CLAY: Olive CLAY, some gravel, trace f.-c. sand, trace clay. Stiff, wet, mod.-high plasticity. 14.0'	
	15	12/24	10-23 16-15	LEAN CLAY: Brown CLAY, little silt, trace f. sand, trace gravel. Stiff, dry, mod. plasticity. 16.0'	
		12/24	16-16 18-20	GRAVELLY LEAN CLAY W/ SILT: Lt. Brown CLAY, some silt, little f.-c. gravel, trace sand. Stiff, dry, mod. plasticity.	
		19/24	8-9 16-20	20.0'	OVM = background Collected analytical sample LASB1-2. (18'-20')
	20			END OF BORING	
	25				
	30				

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TEST BORING LOG

BORING NO. LASB-2

PROJECT: MEFUDS – LAFB Laundry Annex	SHEET NO. 1 OF 1
LIENT: US Army Corps of Engineers, New England Division	JOB NO. 10971-010-001
BORING CONTRACTOR: Maine Test Borings RIG: B-61	ELEVATION (ground) 492.86 ft

GROUNDWATER					CAS.	SAMP.	CORE	TUBE	
									DATE STARTED 9/27/96
DATE	TIME	WATER ELEVATION	DATUM	TYPE	HSA	SS			DATE FINISHED 9/27/96
				DIA.	4 1/4" ID	1 7/8" ID			DRILLER J. Rudnicki
				WT.		150#			INSPECTOR T. Warr
				FALL		30"			

WELL CONSTRUCTION	DEPTH (FEET)	SAMPLE RECOVERY (In.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
NO WELL INSTALLED	0			CONCRETE 0.5'	
		12/24	8-3	FILL SILT W/ GRAVEL: Brown SILT, little f.–c. gravel, trace f.–c. sand. Loose, moist. 3.0'	
			3-4		
		19/24	3-3	ORGANIC SOIL W/ GRAVEL: Blackish-gray ORGANICS and SILT, little f.–c. gravel, trace f.–c. sand, trace clay. Loose, moist, low plasticity. 5.0'	
	5		3-3		
		13/24	3-3	SILT W/ GRAVEL: Tan SILT, little f.–c. gravel, trace f.–c. sand, trace organics, trace clay. Loose, moist, low plasticity. 7.0'	
			3-4		
		20/24	3-3	ELASTIC SILT W/ GRAVEL: Gray-brown SILT, some clay, little f.–c. gravel, trace f.–c. sand, trace organics. Loose, wet, mod. plasticity. 11.0'	
			3-3		
	10	12/24	1-2		
			5-2		OVM = background Rootlets present.
		23/24	3-5	TILL FAT CLAY W/ GRAVEL: Greenish-gray CLAY and SILT, little gravel, trace f.–c. sand. Loose, wet, high plasticity. 14.0'	OVM=347ppm (11'-13')
			7-9		
		23/24	20-16		OVM=649ppm Collected analytical sample LASB2-1 (13'-15')
	15		12-13	GRAVELLY SILT: Gray-brown SILT and f.–c. GRAVEL, little f.–c. sand. Stiff, wet-saturated. 16.8'	
		23/24	5-8		OVM = background Collected analytical sample LASB2-2 (15'-17')
			16-63	WEATHERED BEDROCK 17.0'	
				END OF BORING Auger refusal.	
	20				
	25				
	30				

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WESTON

MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG

BORING NO. LASB-3

PROJECT: MEFUDS – LAFB Laundry Annex	SHEET NO. 1 OF 1
CLIENT: US Army Corps of Engineers, New England Division	JOB NO. 10971-010-001
BORING CONTRACTOR: Maine Test Borings RIG: B-51	ELEVATION (ground) 491.11 ft

GROUNDWATER

DATE	TIME	WATER ELEVATION	DATUM

	CAS.	SAMP.	CORE	TUBE
TYPE	HSA	SS		
DIA.	4 1/4"ID	1 7/8"ID		
WT.		150#		
FALL		30"		

DATE STARTED	9/27/96
DATE FINISHED	9/27/96
DRILLER	D. McKeen
INSPECTOR	R. Eichhorn

WELL CONSTRUCTION	DEPTH (FEET)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
NO WELL INSTALLED	0	14/24	4-7	FILL SILT, trace-little gravel, trace-little f.-c. sand.	
			12-15		
		6/24	10-9		
			7-4	4.0'	
	5	15/24	3-2	LACUSTRINE LEAN CLAY: Brown CLAY, little silt, trace f.-c. sand and gravel. Firm, moist, mod. plasticity.	
			2-2	6.0'	
		15/24	3-5	SILT: Brown SILT, trace-little clay, trace f.-c. sand, trace-some organics (roots, peat). Black staining. Firm, wet, mod. plasticity.	OVM = 295 ppm Collected analytical sample LASB3-1. (6'-8')
			3-5		
		16/24	3-2		
			4-6	10.0'	
	10	22/24	1-4	TILL FAT CLAY AND GRAVELLY FAT CLAY: Gray-brown CLAY, trace-little gravel. Firm-stiff, saturated, mod.-high plasticity.	
			5-8		
		22/24	13-20		
			12-16		
	15	22/24	5-10		
			10-11		OVM = background Collected analytical sample LASB3-2. (16'-17')
		12/24	12-14	17.5'	
			18-22	WEATHERED BEDROCK C. GRAVEL composed of gray Dolomite.	
		8/8	7-50/0.2"	18.7'	
				END OF BORING Auger and sampler refusal on bedrock.	
	20				
	25				
	30				

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WESTON
MANAGERS DESIGNERS/CONSULTANTS

TEST BORING LOG
BORING NO. LASB-4

PROJECT: MEFUDS – LAFB Laundry Annex	SHEET NO. 1 OF 1
LIENT: US Army Corps of Engineers, New England Division	JOB NO. 10971-010-001
BORING CONTRACTOR: Maine Test Borings RIG: B-51	ELEVATION (ground) 492.43 ft

GROUNDWATER					CAS.	SAMP.	CORE	TUBE	
DATE	TIME	WATER ELEVATION	DATUM	TYPE	HSA	SS			DATE STARTED 9/27/96
				DIA.	4 1/4"ID	1 7/8"ID			DATE FINISHED 9/27/96
				WT.		150#			DRILLER D. McKeen
				FALL		30"			INSPECTOR R. Eichhorn

WELL CONSTRUCTION	DEPTH (FEET)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
NO WELL INSTALLED	0	12/24	5-6 9-9	FILL TOPSOIL, f.-c. GRAVEL. 1.0'	
		0/24	6-6 9-7	TILL ELASTIC SILT: Tan SILT, trace-some f.-c. sand, trace clay. Loose, dry-moist, nonplastic.	
	5	10/24	3-3 3-3	6.0'	
		10/24	5-6 4-7	FAT CLAY: Olive CLAY, trace silt, trace f. sand. Firm, wet, mod. plasticity. Becomes saturated at 8' BGS.	OVM = background Collected analytical sample LASB4-1. (6'-8')
		18/24	8-21 10-24	10.0'	
	10	10/10	21-17/0.4" 50/0"	LEAN CLAY W/ GRAVEL: Olive CLAY, little gravel, trace f. sand, trace silt. Firm, saturated, mod. plasticity. 12.0'	OVM = background Collected analytical sample LASB4-2. (10'-12')
				BEDROCK GRAY DOLOMITE 12.2'	
				END OF BORING Auger and sampler refusal on bedrock.	
	15				
	20				
	25				
	30				

G:\DESIGN\DWG ...\MEFUDS\LOGS\LAUNDRY\LASB-4.DWG (PLOT 1=8)

Project Number:
Client: Laundry Annex MEFUDS
Site Location:

AECOM

250 Apollo Drive
Chelmsford, Massachusetts
(978) 905-2100

Well LAMW-1A

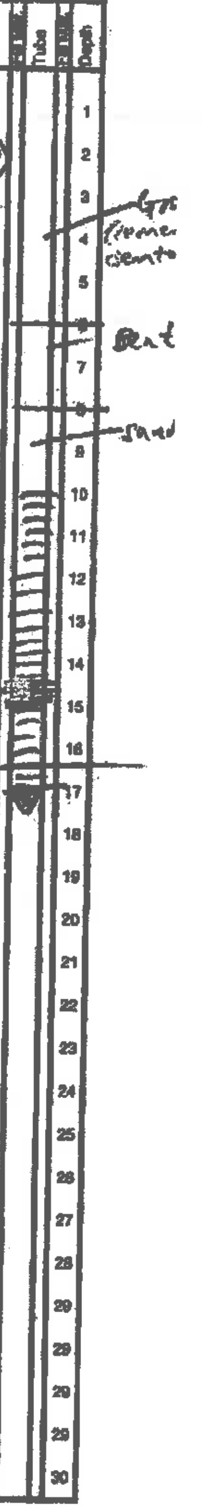
Boring Number:
Sheet: 1 of 1
Surface Elevation (ft-msl):
Equipment: Sonic
Inside Diameter:

Well Data

Boring Depth: 17'
Screen Depth: 10'
Screen length: 7'
Water Level NA

Project Manager: C. DeClus
Field Tech: E. Amir
Date Started: 05/12/15
Drilling Contractor: Mikek
Driller: Glaze
Date Completed: 05/12/15

Depth	Sample Depth	Blow Counts (24")				Rec (')	Sorting	Moisture	PID (ppm)	Field Identification	Description
		0-6	6-12	12-18	18-24						
1									(2.8)	Fill - @0" a layer of asphalt	
②								2.5Y/5/4		Brown M SAND, some	
3							@2.5'			C-VC sand, little clay, trace c gravel (SP)	(Subang).
④									(2.8)	Brown clay, some M-C sand, to tan, trace c gravel,	
5								2.5Y/4/4		decreasing sand,	
6										dec. gravel. (CL)	
7										5-10' - 5' recovery	
8										Brown gravelly clay, F-C subang-subrounded gravel,	
9										little M-C sand, trace silt, (fat clay) (CH)	
10										@9' - becomes silt w/some constituents (ML)	
11										10-11' - increasing clay, inc. F gravel	(subr-suba)
12										~12' - top of Bedrock	
13										Limestone (grey)	
14										weathered heavily between 13-15'	(H2O in hole - ~4 feet)
15											
16										15-17' grey Limestone - more competent	
17											
18										BOB @ 17'	
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											



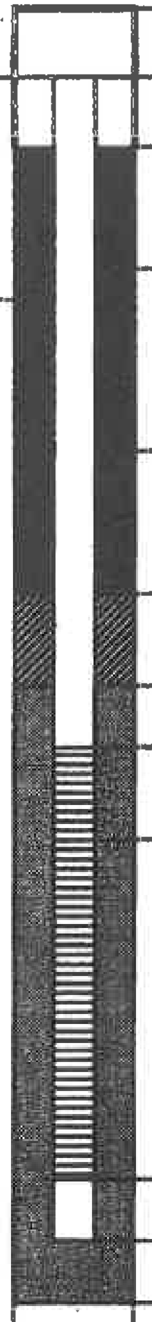
USCS classifications in parentheses

AECOM

Client: ME FUDS
Project Number: 60307883
Site Location: Presque Isle, ME
Well Location: — Former Laundry Annex **Coords:** — ①
Method: Sonic

Well ID: LAMW-1A
Date Installed: 5/12/15
Inspector: Erika Amir
Contractor: Glacier

MONITORING WELL CONSTRUCTION DETAIL (flush mounted well)



— % Cement

— % Bentonite

— % Native Materials

	Depth from G.S. (feet)	Elevation(feet) Datum —
Top of Steel Guard Pipe	—	—
Top of Riser Pipe	—	—
Ground Surface (G.S.)	0.0	—
Bottom of Steel Guard Pipe	—	—
Top of Bentonite	6	—
Top of Sand	8	—
Top of Screen	10	—
▽ Stabilized Water Level	—	—
Bottom of Screen	17	—
Bottom of Tail Pipe:	17	—
Bottom of Borehole	17	—

Riser Pipe:
Length 10'
Inside Diameter (ID) 2"
Type of Material 2" PVC schedule 40

Bentonite Seal Thickness 2' (chips)

Screen:
Length 7'
Inside Diameter (ID) 2"
Slot Size 0.010"
Type of Material PVC

Type/Size of Sand #00
Sand Pack Thickness 9'

Borehole Diameter: 4"

Approved:

Signature

Date 05/12/15

Describe Measuring Point:
notch cut in PVC

① Coordinates 1099916.1912 East / 1104800.0403 North

Project Number:
Client: MEFUDS

Site Location: Laundry Annex

AECOM
250 Apollo Drive
Chelmsford, Massachusetts
(978) 905-2100

Well LAMW-3A

Boring Number:
Sheet: 1 of 1
Surface Elevation (ft-msl):
Equipment: Sonic
Inside Diameter:

Well Data
Boring Depth: 32'
Screen Depth: 27'
Screen length: 5'
Water Level: NA

Project Manager: C. DiGiacomo | Field Tech: E. Amr | Date Started: 05/11/15
Drilling Contractor: Cascade | Driller: Moore | Date Completed: 05/27/15

Depth	Sample Depth	NA-Sonic 0-6 / 6-12 / 12-18 / 18-24	Rec (')	[illegible]	[illegible]	PID (ppm)	Field Identification	Description
0					PID	0.0	1' - Brown Topsoil - DK Brown F-M SAND some F gravel (subang-subrounded), trace C gravel, To .5 feet - soil (Fill) mixed w/ scrap fractured bedrock (SP)	
2				2-4'	3.5			
4				4-6'	1.8			
6			moist	6-8'	1.4		Brown Clay, little M-C sand, little F-C gravel + cobble. Likely fill. Soft @ 6' onward. 7' - Brick pieces. (CL)	
8			moist	8-10	3.4			
10			moist lower	10-12	10.1		6", 1' Grey stiff CLAY, little M Sand (in pockets), some rounded, smooth F-C gravel trace - little cobbles. (CL) (Till) [native]	
11	→ Stiff - top of BR?							
12				12-13	9.9		(11") mottled green - brown 1½' clay, little F-C sand, some F-C gravel, subang-subround. Till (CL)	
13	— Bedrock in shoe →						2" Grey stiff silty clay, some C-VC cobbles (up to 6") + little F-C gravel (subang-subround). Till (CL)	
16							Weathered gray, F-grained bedrock - limestone (tiny meso calcite veins). Drill to 15' - in rock. Slough is wet - perched H_2O; BR is dry.	
18	15-20 - 3' rec.							
20							possible fractures @ 19'4" - 19'8" (iron mineralization) angular breaks.	
21	20-24 - 4' rec.							
22	24-27 - 3' rec.						SAA - limestone	
24	27-31' - 4' rec.						When tooling pulled @ 31'; H_2O comes into hole, rises to 15.4' bgs	
32							BOB @ 32'	

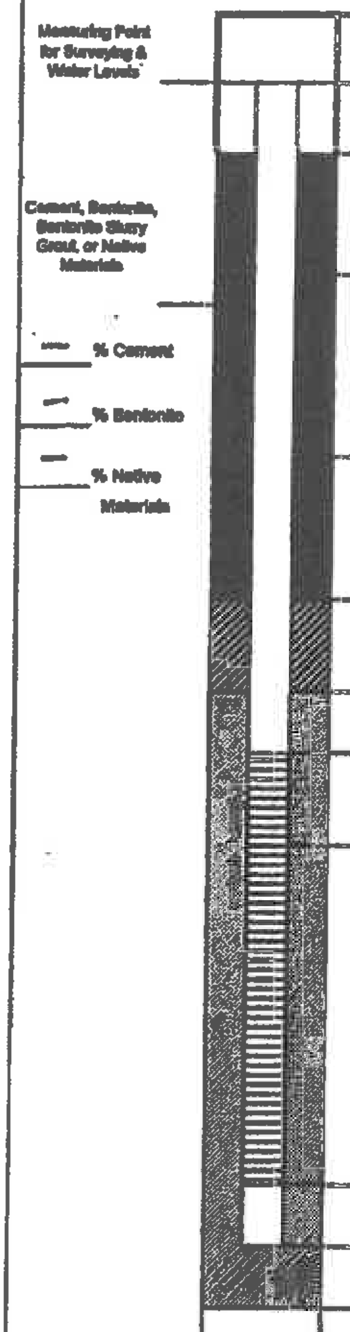
* USCS classifications in parentheses

AECOM

Client: ME FUDS
Project Number: 60307883
Site Location: Presque Isle, ME
Well Location: Former Laundry Area **Coords:** — ①
Method: Sonic

Well ID: LAMW-3A
Date Installed: 5/11/15 - 5/12/15
Inspector: Erika Amir
Contractor: Glacier

MONITORING WELL CONSTRUCTION DETAIL (flush Mounted well)



— % Cement
— % Bentonite
— % Native Materials

	Depth from G.S. (feet)	Elevation(feet) Datum ____
Top of Steel Guard Pipe	—	—
Top of Riser Pipe	—	—
Ground Surface (G.S.)	0.0	—
Bottom of Steel Guard Pipe	—	—
Top of Bentonite	23	—
Top of Sand	25	—
Top of Screen	27	—
▽ Stabilized Water Level	—	—
Bottom of Screen	32	—
Bottom of Tail Pipe:	32	—
Bottom of Borehole	32	—

Riser Pipe:
Length 27'
Inside Diameter (ID) 2"
Type of Material 2" PVC schedule 40

Bentonite Seal Thickness 2' (chips)

Screen:
Length 5'
Inside Diameter (ID) 2"
Slot Size 0.010"
Type of Material PVC

Type/Size of Sand #00
Sand Pack Thickness 9'

Borehole Diameter: 4"

Approved:
Signature
Date 05/12/15

Describe Measuring Point:
notch cut in PVC

① Coordinates 1099887.5809 East | 1104828.1138 North

Project Number:
Client: METBUDS

Site Location: Laundry Annex

AECOM

250 Apollo Drive
Chelmsford, Massachusetts
(978) 905-2100

Well LAMW-4A

Boring Number:
Sheet: 1 of 1
Surface Elevation (ft-msl):
Equipment: Sonic
Inside Diameter:

Well Data

Boring Depth: 50'
Screen Depth: [illegible]
Screen length: 10
Water Level NA

Project Manager: C. DeJesus
Field Tech: G. Amir
Date Started: 05/11/15
Drilling Contractor: G Bauer
Driller: Mark
Date Completed: 05/12/15

Depth	Sample Depth	Blow Counts (24") 0-6	6-12	12-18	18-24	Rec (')	Sorting	Moisture	PID (ppm)	Field Identification	Description	Fill Mat.	Tube	Fill Mat.	Depth
1										1' topsoil					1
2										2 - Tan Sandy CLAY, (lean clay),					2
3										(10-0) M-C sand, little C sub ang gravel + small cobbles, little silt (CL)					3
4								2.5Y/5/4		4' - SAA, dec. M-C sand (to little - trace)					4
5															5
6								6-8	2.1						6
7											This material is reworked ~~native~~ material - same color + components but lacking C-F cobbles, takes on H2O, less cohesive, less stiff				7
8								8-10	2.0	SAA					8
9															9
10										SAA					10
11															11
12										Brown Clayey Silt — trace M-C sand,	(7111) (ML)				12
13										little F-C subrounded gravel, little-some F-C cobbles	subangular to angular				13
14										Limestone BR, grey	Bedrock in hole @ 13'6"				14
15										to dk grey. Soft.			▼		15
16										15'-20' - Same BR,					16
17										driller reports large fracture @					17
18										~19'. Staining observed throughout					18
19										the core. Few calcite veins up to 1/4".					19
20										20-30' - good recovery					20
21										One L 4" piece @ about 14', soft Fe mottling/staining					21
22										@ ~19'.					22
23										30-40' - 9' recovery					23
24										Fe staining (possib. fractures @ 34', 35-35.5', 37'1".					24
25															25
26										Large pieces (up to 4") from 38-40'.					26
27										40-50' - 4.5' recovery					27
28										Fe. Staining @ 45'10".					28
29										5" piece @ bottom -					29
30										Then ~ 6" of grey sticky clay rock flour!					29
31										50' BOB.					29
32															29
33															30

5/26/15

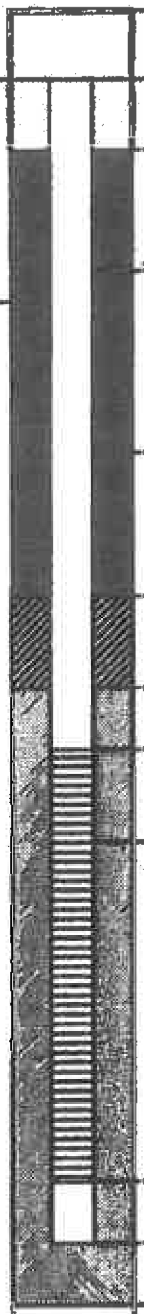
* USCS classifications in parentheses

AECOM

Client: ME FUDS
Project Number: 60307883
Site Location: Presque Isle, ME
Well Location: — Former Laundry Area **Coords:** — ①
Method: Sonic

Well ID: LAMW-4A
Date Installed: 5/11/15 – 5/12/15
Inspector: Erika Amir
Contractor: Glacier

MONITORING WELL CONSTRUCTION DETAIL (flush mounted well)



Measuring Point for Surveying & Water Levels

Cement, Bentonite, Bentonite Slurry Grout, or Native Materials

— % Cement

— % Bentonite

— % Native Materials

		Depth from G.S. (feet)	Elevation(feet) Datum ______
Top of Steel Guard Pipe		—	—
Top of Riser Pipe		—	—
Ground Surface (G.S.)		0.0	—
Riser Pipe:			
Length	40'		
Inside Diameter (ID)	2"		
Type of Material	2" PVC schedule 40		
Bottom of Steel Guard Pipe		—	—
Top of Bentonite		36	—
Bentonite Seal Thickness	2' (chips)		
Top of Sand		38	—
Top of Screen		40	—
▽ Stabilized Water Level			—
Screen:			
Length	10'		
Inside Diameter (ID)	2"		
Slot Size	0.010"		
Type of Material	PVC		
Type/Size of Sand	#00		
Sand Pack Thickness	9'		
Bottom of Screen		50	—
Bottom of Tail Pipe:		50	—
Bottom of Borehole		50	—

Borehole Diameter: 4"

Approved:

Signature

Date 05/12/15

Describe Measuring Point:
notch cut in PVC

① Coordinates 1099835.0534 East / 1104784.9554 North

Project Number: MEFUDS
Client: Laundry Annex
Site Location:

AECOM

250 Apollo Drive
Chelmsford, Massachusetts
(978) 905-2100

Well LAMW-5A

Boring Number:
Sheet: 1 of 1
Surface Elevation (ft-msl):
Equipment: Sonic
Inside Diameter:

Well Data

Boring Depth: 24'
Screen Depth: 17'
Screen length: 7'
Water Level: NA

Project Manager: C. De Leon
Field Tech: E. Amir
Date Started: 05/12/15
Drilling Contractor: Glacier
Driller: Mark
Date Completed: 05/12/15

Depth	Sample Depth	Blow Counts (24")				Rec (")	Sorting	Moisture	PID (ppm)	Field Identification	Description	Depth
		0-6	6-12	12-18	18-24							
1									0.0	Grass/Topsoil 0-4' - Brown silty little clay, little M-C Sand, little F angular gravel, trace C-VC angular gravel.	(Likely fill). (ML)	1
2												2
3												3
4									0.0			4
5												5
6										Dk brown/black clayey silt high organic content incl. wood chips + sticks trace M-C sand. (ML)	5.5'	6
7									0.0			7
8										2-3" layer tan/sienna colored wood chips.	8.5' grey-green layer @ 7'3"	8
9												9
10									0.0	6' chunk of wood.	9'	10
11										9.5-10' - abundant rootlets		11
12												12
13										6" grey M SAND w/ SILT — some C sand, trace F, wet.	10.5' (SM)	13
14									0.0			14
15										Tan Silt (some clay), some C-F gravel (subround-subang), little C-F cobbles (subang-ang), 2" grey gravelly layer @ 12' (ML)		15
16									0.0			16
17												17
18												18
19										Brown silt w/ clay, little visible organics (wood chips). (ML) 20' - large cobble (angular)	16'	19
20									0.0		Entire area is likely reworked in the past.	20
21												21
22												22
23										Top of Bedrock. Grey limestone	21'	23
24												24
25										SAA		25
26										BOB @ 24'.		26
27										After penetrating BR, water rose in the well to ~1'.	7 ft screen	27
28												28
29												29
30												29
31												28
32												29
33												30

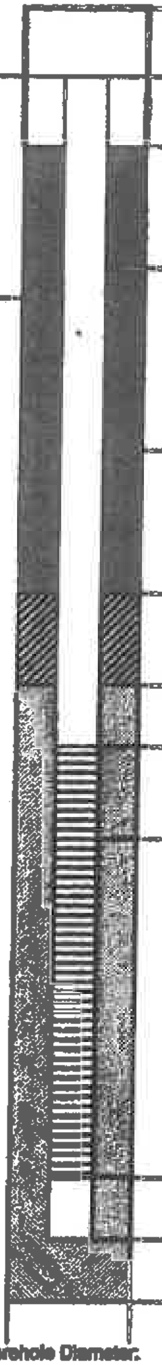
* USCS classifications in parentheses

AECOM

Client: ME FUDS
Project Number: 60307883
Site Location: Presque Isle, ME
Well Location: Former Laundry Annex **Coords:** — ①
Method: Sonic

Well ID: LAMW-5A
Date Installed: 5/12/15
Inspector: Erika Amir
Contractor: Glacier

MONITORING WELL CONSTRUCTION DETAIL (flush mounted well)



Measuring Point for Surveying & Water Levels

Cement, Bentonite, Bentonite Slurry Grout, or Native Materials

— % Cement
7 % Bentonite
— % Native Materials

	Depth from G.S. (feet)	Elevation(feet) Datum
Top of Steel Guard Pipe	—	—
Top of Riser Pipe	—	—
Ground Surface (G.S.)	0.0	—

Riser Pipe:
Length 17'
Inside Diameter (ID) 2"
Type of Material 2" PVC schedule 40

	Depth from G.S. (feet)	Elevation(feet)
Bottom of Steel Guard Pipe	—	—
Top of Bentonite	13	—
Bentonite Seal Thickness 2' (chips)		
Top of Sand	15	—
Top of Screen	17	—
Stabilized Water Level		—

Screen:
Length 7'
Inside Diameter (ID) 2"
Slot Size 0.010"
Type of Material PVC

Type/Size of Sand #00
Sand Pack Thickness 9'

	Depth from G.S. (feet)	Elevation(feet)
Bottom of Screen	24	—
Bottom of Tail Pipe:	24	—
Bottom of Borehole	24	—

Borehole Diameter: 4"

Approved:
Signature
Date 05/12/15

Describe Measuring Point:
Notch cut in PVC

① Coordinates 1099779.1439 East / 1104878.0646 North

Credere Associates, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

Soil Boring Log

LASB-5
PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 11/2/16
LOGGED BY M. Willis
DEPTH TO WATER* 8 feet bgs
DIAMETER 1.5 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore
TOC ELEVATION
GROUND ELEVATION NA
NOTES Sampled for EPH and VPH.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.0			0-12" Dry dark brown LOAM, some angular fine to coarse Gravel	No well installed
						12-36" Dry brown/gray SILT, little subangular fine to coarse Gravel, band of stone (ML)	
	48/28		0.37			0-12" Dry dark brown SILT, some angular fine to coarse Gravel, little coarse Sand (ML)	
5							
						12-28" Moist gray/brown SILT and CLAY, little fine to coarse Sand, trace fine angular Gravel (ML-CL)	
				LASB-5-1 (6-8)			
	36/36		0.1			0-36" Wet light brown/gray SILT and CLAY, some subrounded and subangular fine to coarse Gravel (ML-CL)	
10			0.05	LASB-5-2 (9-11)			
						Refusal @ 11 feet bgs	
15							
20							

Credere Associates, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

Soil Boring Log

LASB-6
PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 11/2/16

LOGGED BY M. Willis

DEPTH TO WATER* 8 feet bgs

DIAMETER 1.5 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH and VPH.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/27	NA	0.05		▥	0-27" Dry light brown/red SILT, some angular fine to coarse Gravel, little coarse Sand (ML)	No well installed
	48/24		0.05		▥	0-24" Dry light brown/red SILT, some angular fine to coarse Gravel, little coarse Sand (ML)	
5					▥		
	48/30		0.7		▥	0-15" Dry light brown/red SILT, some angular fine to coarse Gravel, little coarse Sand (ML)	
10			0.4		▨	15-30" Moist blue/gray with bands of yellow/brown SILT and CLAY, little medium to coarse Sand, band of stone and wood debris (ML-CL)	
	48/36		4.8		▥	0-12" Wet gray SILT, little medium to coarse Sand (ML)	
				LASB-6-1 (12-14)	▨	12-30" Moist gray/brown SILT and CLAY, little medium to coarse Sand, trace fine rounded Gravel (ML-CL)	
			0.4		▨		
15				LASB-6-2 (14-16)	●	30-36" Crushed gray STONE [weathered bedrock]	
						Refusal @ 16 feet bgs	
20							

CREDERE ENV 2015 - GINT STD US LAB.GDT - 2/12/18 14:03 - P:\15001301 USACE LORING FUDS RI-RA\WORK\TASK 7 (7.1_7.2[A]) - FIELD\BORING LOGS\LAUNDRY ANNEX SOIL BORINGS.GPJ

Credere Associates, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

Soil Boring Log

LASB-7
PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 11/2/16

LOGGED BY M. Willis

DEPTH TO WATER* 13.8 feet bgs

DIAMETER 1.5 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH and VPH.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.3			0-26" Dry dark brown LOAM, some subrounded fine Gravel, band of black ash-like material	No well installed
			0.2				
						26-36" Dry brown with black staining SILT, some angular coarse Sand, little fine Gravel (ML)	
	48/12		0.1			0-12" Dry brown with black staining SILT, some angular coarse Sand, little fine Gravel (ML)	
5							
				LASB-7-1 (6-8)			
	48/36		0.1			0-16" Moist dark brown/black SILT and CLAY, pieces of wood throughout (ML-CL)	
				LASB-7-2 (8-10)			
10						16-36" Wet gray SILT and CLAY, some subangular fine to coarse Gravel, trace medium Sand (ML-CL)	
	48/36		0.0			0-36" Moist light olive brown SILT and CLAY, some subrounded and subangular fine to coarse Gravel (ML-CL)	
15							
	36/36		0.0			0-36" Wet gray SILT, some subangular fine to coarse Gravel, trace medium to coarse Sand (ML)	
						Refusal @ 19 feet bgs	
20							

CREDERE ENV 2015 - GINT STD US LAB.GDT - 2/12/18 14:03 - P:\15001301 USACE LORING FUDS RI-RA\WORK\TASK 7 (7.1_7.2[A]) - FIELD\BORING LOGS\LAUNDRY ANNEX SOIL BORINGS.GPJ

Credere Associates, LLC
776 Main Street
Westbrook, Maine 04092
Phone: 207-828-1272
Fax: 207-887-1051

Soil Boring Log

LASB-8
PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 11/2/16

LOGGED BY M. Willis

DEPTH TO WATER* 13.9 feet bgs

DIAMETER 1.5 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH and VPH. Oleophilic dye test slightly positive at 12 to 14 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.1		▥	0-36" Dry light brown SILT, some subangular fine to coarse Gravel, little coarse Sand (ML)	No well installed
	48/1		0.0		▨	0-1" Dry brown SILT and CLAY, little coarse Sand (ML-CL)	
5					▨		
	48/8		157.7		▨	0-8" Wet dark brown/black SILT and CLAY, little medium Sand (ML-CL)	
10					▨		
	48/42		558.5 slightly positive	LASB-8-1 (12-14)	▨	0-20" Moist black SILT and CLAY, trace coarse Sand, dye test undetected (white) (ML-CL)	
			124.2		▥	20-42" Wet gray/brown SILT, some rounded to subrounded fine to coarse Gravel, little coarse Sand (ML)	
15					▥		
	48/48		510.6		▥	0-24" Wet gray/brown SILT, some rounded to subrounded fine to coarse Gravel, little coarse Sand (ML)	
			52.2	LASB-8-2 (18-20)	▨	24-48" Moist light olive gray SILT and CLAY, some subrounded fine to coarse Gravel, trace fine Sand, relatively dense (ML-CL)	
20						Refusal @ 20 feet bgs	

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Soil Boring Log

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CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 11/2/16 **LOGGED BY** M. Willis
DEPTH TO WATER* 13.5 feet bgs **DIAMETER** 1.5 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore
TOC ELEVATION
GROUND ELEVATION NA
NOTES Sampled for EPH and VPH.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/48	NA	0.2			0-12" Dry brown SILT, some subrounded fine to coarse Gravel, trace fine to medium Sand (ML) 12-18" Dry black COAL in silt matrix [FILL] 18-48" Dry brown/light red SILT, some fine to coarse subangular Gravel, trace coarse Sand (ML)	No well installed
	48/14		0.0			0-14" Dry brown/light red SILT, some fine to coarse subangular Gravel, trace coarse Sand, with bands of crushed stone (ML)	
5							
	48/34		0.1			0-28" Moist dark brown SILT, trace fine to coarse Sand, trace fine subrounded Gravel, trace wood debris (ML)	
10					▨	28-34" Moist olive gray SILT and CLAY, some medium to coarse Sand, trace fine subangular Gravel, relatively dense (ML-CL)	
	48/48		0.0	LASB-9-1 (12-14)		0-18" Saturated dark brown SILT, some medium Sand, Wood debris (ML) 18-48" Wet olive gray SILT, some fine to coarse Sand, little subrounded fine to coarse Gravel (ML)	
15	24/12		0.0			0-12" Moist gray SILT, some subrounded fine to coarse Gravel, little fine to medium Sand (ML)	
						Refusal at 18 feet bgs	
20							

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CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 11/2/16
LOGGED BY M. Willis
DEPTH TO WATER* Not encountered
DIAMETER 1.5 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore
TOC ELEVATION
GROUND ELEVATION NA
NOTES Sampled for EPH and VPH.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.1			0-18" Dry brown SILT, some coarse Sand, little rounded to subrounded fine to coarse Gravel (ML)	No well installed
						18-36" Dry light brown/red SILT, little subangular fine Gravel (ML)	
	48/40		0.1			0-30" Dry light brown/red SILT, little subrounded to subangular fine to coarse Gravel (ML)	
5							
						30-40" Moist olive/gray SILT and CLAY, some angular fine to coarse Gravel, trace medium Sand (ML-CL)	
	48/40		0.1			0-40" Moist light brown/gray SILT and CLAY, some angular fine to coarse Gravel, trace medium Sand (ML-CL)	
10							
	24/24		0.1	LASB-10-1 (12-14)		0-24" Moist light brown/gray SILT and CLAY, some angular fine to coarse Gravel, trace medium Sand (ML-CL)	
						Refusal @ 14 feet bgs	
15							
20							

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Soil Boring Log

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 11/2/16

LOGGED BY M. Willis

DEPTH TO WATER* Not encountered

DIAMETER 1.5 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U Truck Rig w/ 2" macrocore

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH and VPH. Oleophilic dye test undetected at 6 to 8 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/10	NA	0.3		▥	0-10" Dry brown SILT, some coarse Sand, little fine to coarse Gravel (ML) 4-10" Dry light brown/red SILT, little fine Gravel (ML)	No well installed
	48/48		25.2		▥	0-48" Dry light brown/red SILT, little fine to coarse Gravel, dye test slightly positive (light pink) (ML)	
5							
			844.3 undetected	LASB-11-1 (6-8)			
	36/36		316.3		▨	0-36" Moist light olive gray SILT and CLAY, some fine to coarse Gravel, trace fine Sand (ML-CL)	
10			347.4				
						Refusal @ 11 feet bgs	
15							
20							

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CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 7/20/17 **LOGGED BY** M. Willis
DEPTH TO WATER* Not encountered **DIAMETER** 2 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U
TOC ELEVATION
GROUND ELEVATION NA
NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/39	NA	0.0			0-39" Brown-gray SILT, some coarse Sand, some fine Gravel, with a layer of crushed stone at 36", dry (ML)	No well installed
	48/36		0.0			0-36" Light brown SILT and CLAY, some coarse Sand, little fine to coarse Gravel, moist (CL-ML; TILL)	
5							
				LASB-12-1 (6-8')			
	30/30		0.0			0-24" Light brown-gray SILT and CLAY, some coarse Sand, some fine to coarse Gravel, moist (CL-ML; TILL)	
				LASB-12-2 (8.5-10.5)			
10						0-6" Gray crushed STONE, dry (GW)	
						Refusal @ 10.5 feet bgs	
15							
20							

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CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 7/20/17 **LOGGED BY** M. Willis
DEPTH TO WATER* Not encountered **DIAMETER** 2 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U
TOC ELEVATION
GROUND ELEVATION NA
NOTES No sample collected due to evidence of contamination >10 ppm with PID.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.0			0-36" Brown-gray SILT, some coarse Sand, some fine Gravel, with a layer of crushed stone at 36", dry (ML)	No well installed
	48/24		29.2		▨	0-24" Light brown SILT and CLAY, some coarse Sand, little fine to coarse Gravel, moist (CL-ML; TILL)	
5					▨		
	36/36				▨	0-36" Light brown-gray SILT and CLAY, some coarse Sand, some fine to coarse Gravel, moist (CL-ML; TILL)	
			26		▨		
10			0.0		▨		
						Refusal @ 11 feet bgs	
15							
20							

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PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 7/20/17 **LOGGED BY** M. Willis
DEPTH TO WATER* Not encountered **DIAMETER** 2 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U
TOC ELEVATION
GROUND ELEVATION NA
NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	3.5		▨	0-36" Light brown SILT and CLAY, some fine to coarse Gravel, moist (CL-ML; TILL)	No well installed
	48/40		0.0		▨	0-40" Light brown SILT and CLAY, some coarse Sand, some fine to coarse Gravel, moist (CL-ML; TILL)	
5					▨		
				LASB-13A-1 (6-8)	▨		
	24/24		0.0		▨	0-24" Light brown SILT and CLAY, some medium to coarse Sand, little fine Gravel, moist (CL-ML; TILL)	
				LASB-13A-2 (8-10)	▨		
10						Refusal @ 10 feet bgs	
15							
20							

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* Not encountered **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No sample collected due to evidence of contamination >10 ppm with PID. Oleophilic dye test slightly positive at 8 to 10 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/30	NA	0.0		⁘	0-30" Brown SAND and SILT, some fine and coarse Gravel, dry SM; LOAM, TILL)	No well installed
	48/40		0.0		▨	0-40" Brown SILT and CLAY, some fine to medium Sand, trace fine and coarse Gravel, moist (CL-ML; TILL)	
5					▨		
	30/30		324.8 Slightly positive		▨	0-30" Gray SILT and CLAY, some fine Gravel, some coarse Sand, moist (CL-ML; TILL)	
10						Refusal @ 10.5 feet bgs	
15							
20							

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PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17

LOGGED BY M. Willis

DEPTH TO WATER* Not encountered

DIAMETER 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/40	NA	0.0			0-40" Brown SAND and SILT, some fine to coarse Gravel, dry [LOAM, FILL; SM]	No well installed
	48/48		0.4			0-48" Brown SILT and CLAY, some fine to medium Sand, trace fine to coarse Gravel, moist (CL-ML; TILL)	
5							
				LASB-14A-1 (6-8)			
	48/24		0.4	LASB-14A-2 (8-10)		0-24" Gray SILT and CLAY, some fine Gravel and some coarse Sand, moist (CL-ML; TILL)	
10							
						Refusal @ 12 feet bgs	
15							
20							

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17

LOGGED BY M. Willis

DEPTH TO WATER* 4 feet bgs

DIAMETER 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No samples collected due to evidence of contamination >10 ppm with PID. Oleophilic dye test slightly positive at 12 to 15 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/26	NA	0.0			0-26" Dark brown coarse SAND and SILT, some fine and coarse Gravel, sall layers of Crushed Rock, dry (SM: LOAM, FILL)	No well installed
	48/12		0.0			0-12" Dark brown SILT, little fine to coarse Sand, some fine to coarse Gravel, wet (ML; TILL)	
5							
	48/8		6.0			0-8" Gray SILT and CLAY, some coarse Sand, some fine to coarse Gravel, wet (CL-ML; TILL)	
10							
	36/36		506			0-36" Gray SILT and CLAY, some fine and coarse Sand, little coarse Gravel, wet (CL-ML; TILL)	
			Slightly positive				
15						Refusal @ 15' bgs	
20							

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* 4 feet bgs **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No samples collected due to evidence of contamination >10 ppm with PID. Oleophilic dye test positive at 10 to 12 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/34	NA	0.0			0-34" Dark brown SILT and coarse SAND, some fine to coarse Gravel, small layers of crushed Rock, dry (SM; LOAM, FILL)	No well installed
	48/24		0.0			0-24" Dark brown SILT, little fine to coarse Sand, some fine to coarse Gravel, wet (ML; TILL)	
5							
	48/30		325			0-30" Gray SILT and CLAY, some coarse Sand, some fine to coarse Gravel, some red staining, wet (CL-ML; TILL)	
10							
			Positive				
	72/48		165			0-48" Light brown CLAY, some fine and coarse Gravel, wet (CL; TILL) (Overdrove to 18 feet, full recovery may not be representative of 16 to 18 feet)	
15							
						Refusal @ 18 feet bgs	
20							

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* 8 feet bgs **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM. Oleophilic dye test slightly positive at 12 to 15 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/24	NA	0.0			0-24" Brown SAND and SILT, some crushed Stone, dry [LOAM, FILL; SM]	No well installed
5	48/24		0.0			0-24" Brown SILT and CLAY, some medium to coarse Sand, little fine to coarse Gravel, relatively dense compared to above, moist (CL-ML; TILL)	
10	48/30		325			0-30" Brown SILT and CLAY, some medium to coarse Sand, little fine to coarse Gravel, wet (CL-ML; TILL)	
15	48/32		500 Slightly positive	LASB-15B-1 (12-14)		0-32" Gray-brown CLAY, some coarse Sand, some fine to coarse Gravel, wet (CL; TILL)	
20						Refusal @ 16 feet bgs (Could not step out further due to railroad tracks)	

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Soil Boring Log

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* 8 feet bgs **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No samples collected due to evidence of contamination >10 ppm with PID. Oleophilic dye test saturated at 13 to 14 feet bgs.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/24	NA	0.4			0-24" Brown SILT and SAND, some fine and coarse Gravel, dry (SM; LOAM, FILL)	No well installed
5	48/30		0.0			0-30" Gray-brown SILT and CLAY, little fine to coarse Sand, trace fine Gravel, moist (CL-ML; TILL)	
10	48/42		150			0-42" Dark gray CLAY, some fine and coarse Gravel, wet (CL; TILL)	
15	48/38		Saturated 499			0-38" Gray-brown CLAY, some medium to coarse Sand, some fine Gravel, moist (CL; TILL)	
20						Refusal @ 16 feet bgs	

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Soil Boring Log

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CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 7/20/17 **LOGGED BY** M. Willis
DEPTH TO WATER* Not encountered **DIAMETER** 2 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U
TOC ELEVATION
GROUND ELEVATION NA
NOTES No samples collected due to evidence of contamination >10 ppm with PID.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.0		▩	0-36" Brown SILT and coarse SAND, some fine to coarse Gravel, dry (SM; LOAM, FILL)	No well installed
	48/30		26.5		▨	0-30" Brown to gray SILT and CLAY, some fine and coarse Gravel, little coarse Sand, moist (CL-ML; TILL)	
5					▨		
	48/28				▨	0-28" Dark brown-gray SILT and CLAY, some fine Gravel, some medium to coarse Sand, moist (CL-ML; TILL)	
10			105		▨		
	48/40				▨	0-40" Black to gray SILT and CLAY, some fine to coarse Gravel, some coarse Sand, moist (CL-ML; TILL)	
			134		▨		
15					▨		
						Refusal @ 16 feet bgs	
20							

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PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* 12 feet bgs **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/28	NA	0.0		⁙	0-28" Brown SAND and SILT with crushed Stone, some fine to medium coarse Gravel, dry [LOAM, FILL; SM]	No well installed
	48/20		0.0		▨	0-20" Brown SILT and CLAY, some fine to coarse Gravel, trace medium Sand, layer of crushed Stone at 6 ft bgs, relatively dense compared to above, dry (CL-ML; TILL)	
5					▨		
	48/2		0.0		▨	0-2" Brown SILT and CLAY, some medium to coarse Sand, trace fine Gravel, relatively loose compared to above, dry (CL-ML; TILL)	
10					▨		
	48/40		0.4	LASB-16B-1 (12-14)	▨	0-40" Gray SILT and CLAY, some fine to coarse Gravel, little medium to coarse Sand, relatively dense compared to above, wet (CL-ML; TILL)	
15					▨		
	42/42		0.0	LASB-16B-2 (18-19.5)	▨	0-42" Gray SILT and CLAY, some fine to coarse Gravel/Cobbles, trace coarse Sand, wet (CL-ML; TILL)	
						Refusal @ 19.5 feet bgs	
20							

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17

LOGGED BY M. Willis

DEPTH TO WATER* Not encountered

DIAMETER 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No samples collected due to evidence of contamination >10 ppm with PID.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/40	NA	0.0			0-40" Brown SILT and SAND, some fine and coarse Gravel, some orange staining, dry (SM; LOAM, FILL)	No well installed
5	48/36		113			0-36" Light brown to dark gray SILT and CLAY, some fine to coarse Gravel, little coarse Sand, moist (CL-ML; TILL)	
	48/24		441			0-24" Dark gray SILT and CLAY, some medium and coarse Sand, little fine Gravel, moist (CL-ML; TILL)	
10	36/36		427			0-36" Dark gray to gray SILT and CLAY, little fine Gravel, little coarse Sand, trace coarse gravel, and some orange staining throughout, moist (CL-ML; TILL)	
15						Refusal @ 15 feet bgs	
20							

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Westbrook, Maine 04092
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Fax: 207-887-1051

Soil Boring Log

LASB-17A

PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17

LOGGED BY M. Willis

DEPTH TO WATER* Not encountered

DIAMETER 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

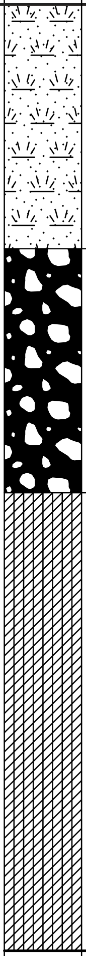
ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No samples collected due to evidence of contamination >10 ppm with PID.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/30	NA	8.8			0-30" Brown SILT and coarse SAND, little fine and coarse gravel, dry (SM; LOAM, FILL)	No well installed
	48/16		4.0			0-16" Crushed STONE, some Silt, some Clay (less than 2-inch layer; GW)	
5							
	48/30		399			0-30" Dark gray SILT and CLAY, little medium and coarse Sand, trace fine Gravel, moist (CL-ML; TILL)	
10							
	42/42		9.8			0-42" Dark gray SILT and CLAY, some coarse Sand, some fine to coarse Gravel, orange staining throughout, moist (CL-ML; TILL)	
15							
						Refusal @ 15.5 feet bgs	
20							

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Soil Boring Log

LASB-17B

PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* Not encountered **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/38	NA	0.1		░	0-38" Light brown fine to coarse SAND and SILT, some fine to coarse Gravel, dry [LOAM, FILL; SM]	No well installed
5	48/12		33.1		▨	0-12" Brown SILT and CLAY, some fine to coarse Gravel, some coarse Sand, relatively dense compared to above, moist (CL-ML; TILL)	
10	48/14		41	LASB-17B-1 (10-12)	▥	0-14" Light brown to black to gray SILT, some fine to coarse Gravel, little coarse Sand, relatively loose compared to above, moist (ML; TILL)	
	48/24		5.0		▨	0-24" Light brown-gray SILT and CLAY, some fine to coarse Gravel, little medium to coarse Sand, small layers of crushed Stone, moist (CL-ML; TILL)	
15						Refusal @ 16 feet bgs (Could not step out further north due to drain culvert.)	
20							

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Soil Boring Log

LASB-18

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CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17 **LOGGED BY** M. Willis

DEPTH TO WATER* 12 feet bgs **DIAMETER** 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

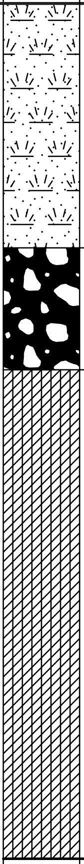
ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/36	NA	0.0			0-36" Brown medium to coarse SAND and SILT, some fine to coarse Gravel/Cobbles, dry [LOAM, FILL; SM]	No well installed
	48/24		0.0			0-12" STONE, dry (GW)	
5							
						0-12" Dark gray SILT and CLAY, little fine to coarse Gravel, little coarse Sand, relatively dense compared to above, moist (CL-ML; TILL)	
	48/28		0.0			0-28" Dark gray SILT and CLAY, some fine to coarse Gravel, some orange staining, moist (CL-ML; TILL)	
10							
	24/24		0.0	LASB-18-1 (12-14)		0-24" Gray SILT and CLAY, some fine to coarse Gravel, wet/saturated (CL-ML; TILL)	
						Refusal @ 14 feet bgs	
15							
20							

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Soil Boring Log

LASB-18A

PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base

PROJECT NAME Laundry Annex

PROJECT # 15001301

PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine

DATE STARTED 7/20/17

LOGGED BY M. Willis

DEPTH TO WATER* 12 feet bgs

DIAMETER 2 inches

CONTRACTOR County Environmental Engineering/Craig Brescia

WELL MATERIALS NA

DRILLING METHOD Direct Push w/ 2" macrocore

ANNULUS MATERIALS NA

DRILLING EQUIPMENT Geoprobe 540U

TOC ELEVATION

GROUND ELEVATION NA

NOTES No samples collected due to evidence of contamination >10 ppm with PID.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/30		0.0			0-30" Brown SILT and SAND, some fine and coarse Gravel, dry (SM; LOAM, FILL)	
		NA					No well installed
	48/32					0-32" Brown-gray SILT and CLAY, some fine to coarse Gravel, some coarse Sand, some black staining, moist (CL-ML; TILL)	
5			456				
			150				
	48/36		430			0-12" Brown-gray SILT and CLAY, some fine to coarse Gravel, some coarse Sand, moist (CL-ML; TILL)	
10							
	24/24		450			0-24" Brown-gray SILT and CLAY, some fine to coarse Gravel, some coarse Sand, wet (CL-ML; TILL)	
						Refusal @ 14 feet bgs	
15							
20							

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Soil Boring Log

LASB-19

PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 7/20/17
LOGGED BY M. Willis
DEPTH TO WATER* Not encountered
DIAMETER 2 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U
TOC ELEVATION
GROUND ELEVATION NA
NOTES No samples collected due to evidence of contamination >10 ppm with PID.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/18	NA	0.5			0-18" Brown SILT and coarse SAND, some fine and coarse Gravel, dry (SM; LOAM, FILL)	No well installed
	48/2		0.0			0-2" Brown SILT and coarse SAND, some fine and coarse Gravel, dry (SM; LOAM, FILL)	
5							
	24/12		23			0-12" Gray SILT and CLAY, some fine and coarse Gravel, little coarse Sand, moist (CL-ML; TILL)	
10						Refusal @ 10 feet bgs	
15							
20							

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Soil Boring Log

LASB-19A

PAGE 1 OF 1

CLIENT USACE FUDS - Former Loring Air Force Base
PROJECT NAME Laundry Annex
PROJECT # 15001301
PROJECT LOCATION 1050 Central Drive, Presque Isle, Maine
DATE STARTED 7/20/17
LOGGED BY M. Willis
DEPTH TO WATER* Not encountered
DIAMETER 2 inches
CONTRACTOR County Environmental Engineering/Craig Brescia
WELL MATERIALS NA
DRILLING METHOD Direct Push w/ 2" macrocore
ANNULUS MATERIALS NA
DRILLING EQUIPMENT Geoprobe 540U
TOC ELEVATION
GROUND ELEVATION NA
NOTES Sampled for EPH carbon fractions, VPH, and PAHs with SIM.

Depth (ft)	Penetration/ Recovery (in)	Blow Counts	Field Screening (ppm)	Lab Analytical Sample	Graphic Log	LITHOLOGY	WELL DIAGRAM
0	48/40	NA	0.3		▨	0-40" Light brown SILT and CLAY, some fine to coase Gravel, little medium to coarse Sand, small layers of crushed stone, dry (CL-ML; TILL)	No well installed
	48/32		0.0		▨	0-32" Brown SILT and CLAY, some fine to coarse Gravel, little coarse Sand, relatively dense compared to above, moist (CL-ML; TILL)	
5					▨		
	36/36		0.0		▨	0-36" Light gray SILT and CLAY, some fine to coarse Gravel, trace coarse Sand, moist (CL-ML; TILL)	
10				LASB-19A-1 (9-11)	▨		
						Refusal @ 11 feet bgs	
15							
20							

APPENDIX C

HUMAN HEALTH AND SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

US Army Corps
of Engineers®

HUMAN HEALTH AND
SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

Former Loring Air Force Base
Laundry Annex
Presque Isle, Maine

FUDS PROPERTY SITE NO. D01ME0132 02

MAY 2021

Prepared by:

US Army Corps of Engineers, New England District
696 Virginia Road
Concord, Massachusetts 01742

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FIGURES

TABLES

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ACRONYM LIST

ADD	Average daily dose
ASTM	American Society of Testing and Materials
AFB	Air Force Base
bgs	below ground surface
CSF	Cancer slope factors
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituents of potential concern
COPC	Constituents of potential concern
EPC	Exposure point concentration
EPA	United States Environmental Protection Agency
EPH	Extractable petroleum hydrocarbon
HHRA	Human Health Risk Assessment
IUR	Inhalation unit risk
IRIS	Integrated Risk Information System
Kg	kilogram
L	Liter
Maine DEP	Maine Department of Environmental Protection
Maine RAGs	Maine Remedial Action Guidelines
µg	microgram
mg	milligram
PAH	polynuclear aromatic hydrocarbon
RAGS	EPA Risk Assessment Guidance for Superfund
RfC	Reference concentration
RfD	Reference dose
SLERA	Screening Level Ecological Risk Assessment
TPH	Total petroleum hydrocarbons
UCL	95th percentile upper confidence limit of the mean
URZ	Urban residentially-zoned
USACE	United States Army Corps of Engineers
UST	Underground storage tank
VPH	Volatile petroleum hydrocarbon

1.0 INTRODUCTION

This report presents a Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (SLERA) for the former Loring Air Force Base (AFB) Laundry Annex in Presque Isle, Maine (the Site). The HHRA evaluates the potential risk of adverse health effects to human health at the Site in accordance with risk assessment guidance applicable to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program.

This HHRA was developed using EPA guidance and meets the intents of CERCLA. Published guidance from the Maine Department of Environmental Protection (MEDEP) was also considered. The HHRA was based on site-specific information and the following guidance and methods:

- *Department of the Army, Standard Scopes of Work for Environmental Risk Assessments* (EP 200-1-15)
- *Risk Assessment Handbook Volume I: Human Health Evaluation* U.S. Army Corps of Engineers (USACE,1999)
- *EPA Risk Assessment Guidance for Superfund (RAGS), Volume I;*
    1. *Human Health Evaluation Manual, Part A* (EPA, 1989a).
    2. *Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* (EPA, 2004).
    3. *Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment* (EPA, 2009).
- *EPA Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"* (EPA, 1991);
- *EPA Exposure Factors Handbook* (EPA, 1997a);
- *EPA Supplemental Guidance for Developing Soil Screening Levels* (EPA, 2002a);
- *EPA Regional Screening Level Table* (EPA, 2020);
- *Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances* (Maine DEP, 2018).

The SLERA evaluates the potential risk to ecological receptors at the Site in accordance with ecological risk assessment guidance applicable to the CERCLA program, as embodied in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA 1997) and USACE (2016) *Standard Scopes of Work for Environmental Risk Assessments* (EP 200-1-15).

2.0 SITE BACKGROUND

The Former Loring AFB Laundry Annex is located along Central Drive in Presque Isle. The Laundry Annex historically provided laundry and dry cleaning services for Air Force personnel and their dependents at Loring Air Force Base and other nearby military installations. The Laundry Annex consisted of three separate structures: a dry cleaning building, a laundry building, and a laundry steam plant. The former dry cleaning building and immediate surrounding vicinity is the subject of this report. The former dry cleaning building was located on the west side of Central Drive (0.24 acre lot) and was owned by the U.S. government from 1941 until 1974, when it was sold to the City of Presque Isle in November 1974. There are currently no structures on the Site.

The former laundry building and steam plant (1.06 acre lot) were located on the east side of Central Drive, hydrologically upgradient of the former dry cleaning building, and are not assessed in this HHRA because the buildings were beneficially reused by the Maine State Department of Educational and Cultural Services (the current owner) after transfer of ownership (in May 1974) and are not eligible for inclusion under the FUDS program.

The Site is a 0.24-acre portion of a larger 0.46-acre parcel and is currently vacant land (**Figure 1**). The Site is in an area zoned "LI" (light industrial) which, by ordinance, prohibits residential use (City of Presque, 2019) (**Figure 2** – *Presque Isle Comprehensive Plan Urban Zoning Map*). Land contiguous to the northwest, west, and southwest of the Site is zoned "I" (industrial zone), land contiguous and immediately south of the Site is zoned "LI", and land across the street northeast, east, and southeast of the Site is zoned as "I-C" (Industrial-Commercial) (City of Presque Isle, 2019; https://www.axisgis.com/presque_isleME/). The former Site building was demolished in the early 1980s and the associated foundation slab was removed in 1998. The topography of the Site is relatively flat and grassy. An unnamed tributary to Presque Isle Stream drains through an underground culvert just north of the Site and flows south/southwest through wetland areas to join Presque Isle Stream.

One intact 100-gallon underground storage tank (UST) was identified and removed in 1994. Sampling and analyses of the UST contents in June 1994 detected concentrations of 2-butanone (75 µg/L), xylenes (12 µg/L), and Aroclors 1232 (1.3 µg/L) and 1260 (1.4 µg/L) (Manson, 1994). Soil removed to access the UST was stockpiled and analyzed, and contained low concentrations of xylenes and 2-butanone. No confirmation soil samples were collected after the UST removal and no soil is believed to have been disposed.

3.0 SITE ENVIRONMENTAL CONDITIONS

A comprehensive description of the Site environmental conditions including site investigations and current conditions is included in the 2020 Remedial Investigation (RI) Report (Credere, 2020). Information presented in the following subsections is a synopsis of site information to provide the context of this risk assessment.

3.1 History of Releases and Investigations

A soil gas/microwell investigation was conducted in 1996 to provide preliminary information on Site conditions, and included the collection of 22 soil gas samples analyzed for the following volatile organic compounds (VOCs): vinyl chloride, cis- and trans-1,2-dichloroethene, trichloroethene, tetrachloroethene, benzene, ethylbenzene, toluene, and xylenes. No VOCs were detected in the soil gas samples. Although no VOCs were detected in the soil gas samples, it should be noted that, for seven of nine analytes, the analytical reporting limits were higher than target screening level concentrations to identify contaminants of potential concern in soil gas for the evaluation of indoor air risks. However, the Municipal Zoning Ordinance (CoPI, 2019) prohibits any construction on the Site, thereby eliminating the need for additional soil gas sampling. Ten groundwater grab samples were also collected from seven locations; no constituents were detected, although one location showed the presence of a petroleum sheen. Based on these results, no further soil gas investigations have taken place, but groundwater sampling and analyses continued.

Two potential source areas were further investigated by soil boring advancement and monitoring well installation: the area of the former 100-gallon UST and an alleged solvent release from former building exits and through the foundation. Sediment and surface water samples were also collected approximately annually between 1999 and 2004 from the unnamed stream that crosses under the Site through an underground culvert.

No further investigations or response actions were performed until additional sampling was conducted in 2015. Four groundwater samples were collected from four replacement wells in May 2015. Eleven soil boring samples were collected from 10 locations and analyzed for VOCs and polynuclear aromatic hydrocarbons (PAHs) in 2016. In 2017, an additional eleven soil boring samples were collected from 10 locations and analyzed for VOCs and PAHs. The 2017 borings and soil sampling were part of a step out soil sampling program to delineate the extent of residual petroleum.

Additional soil, groundwater, sediment and surface water data were collected from the Laundry Annex that identified petroleum contamination [as either total petroleum hydrocarbons (TPH) or volatile/extractable petroleum hydrocarbon fractions (VPH/EPH)] to investigate a potential historical petroleum release surrounding the 1994 100-gallon UST. Petroleum fractions are not addressed under CERCLA, so those petroleum hydrocarbon fraction results are not evaluated in the HHRA. The 2016 and 2017 petroleum hydrocarbon fraction data collected will be used to evaluate petroleum under the Maine DEP RAGs (MEDEP, 2018) and Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (MEDEP, 2014) in a Petroleum Assessment Report.

3.2 Summary of Current Site Conditions

A complete discussion of the nature and extent of contamination at the Site is included in the RI report (Credere, 2020), which should be consulted for additional information.

3.2.1 Soil

Soil sample analytical results (**Table 1 -** *Summary of Soil Analytical Data*) show soil samples collected in 2016 and 2017 and used in the HHRA; only constituents with at least one detection are presented. The full data set may be found in the Additional Investigation Trip Reports dated April 2017 (Credere, 2017) and March 2018 (Credere, 2018). Sample locations are presented in **Figure 1 -** *Site Plan.*

Soil samples applied to the HHRA were those collected in 2016 and 2017 from depths of 6 to 16 feet feet below ground surface (bgs) and analyzed for volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs). Surface soil is not included in the HHRA. As described in **Section 2.2.1** of the RI, the surface of the Site consists of topsoil at the surface underlain by fill extending to depths ranging from 1 to 4 feet bgs in the eastern and northern portions of the Site and to 8 or more feet bgs in the western portion of the Site along the railroad tracks. Further discussion of the extent of soil contamination is discussed in **Section 3.4.1** of the RI.

VOCs and PAHs were detected in soil. No PCBs were detected in soil. Some pesticides were detected in soil in earlier sampling events, but since there was no known storage or release of pesticides associated with the Laundry Annex, any pesticides detected are likely present because they were applied appropriately for their intended use. In addition, petroleum fractions were detected in soil, but are not addressed under the CERCLA program. The petroleum fraction soil data will be used to evaluate petroleum under the Maine DEP RAGs (MEDEP, 2018) and Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (MEDEP, 2014) in a Petroleum Assessment Report.

3.2.2 Groundwater

Groundwater analytical results (**Table 2 -** *Summary of Groundwater Analytical Data*) are from 2015. The 2015 data are used in the HHRA, since older groundwater data collected in 1996-1997 are not likely to represent current groundwater conditions.

Groundwater samples collected in 2015 contained detected VOC concentrations (some reported at estimated values below the laboratory reporting limit) below EPA Regional Screening Levels (RSLs) for tap water. The detected VOCs included acetone, benzene, bromodichloromethane, 2-butanone, carbon disulfide, chloroform, ethylbenzene, toluene, 1,2,4-trimethylbenzene, and xylenes. No PAHs were detected in groundwater. Further discussion of the groundwater concentrations may be found in **Section 3.4.2** of the RI.

3.2.3 Sediment

Sediment sample analytical results are shown in **Table 3** - *Summary of Sediment Analytical Data.* Sediment samples were collected from locations upstream of the stream culvert (six samples) and downstream of the stream culvert (six samples) in the unnamed stream that crosses under the Site through a culvert. Samples were collected approximately yearly between 1999 and 2004; no more recent sediment data are available, therefore these older data were used in the HHRA.

Low concentrations of the VOCs acetone and 2-butanone, both of which are common laboratory contaminants, were detected in upstream and/or downstream sediment samples, but are not anticipated to be related to Site releases. Styrene was also detected once in an upstream sample, but not in downstream samples, and is also anticipated to be unrelated to Site releases. Individual PAHs were not analyzed in sediments. Further discussion of sediment results may be found in **Section 3.4.3** of the RI.

3.2.4 Surface Water

Surface water analytical results are shown in **Table 4** - *Summary of Surface Water Analytical Data*. Surface water samples were collected from upstream and downstream locations (six samples each) in the unnamed stream. Samples were collected over the same time period as sediment samples (1999 to 2004) and analyzed for the same suite of constituents. No more recent surface water data are available, therefore these data were used in the HHRA.

Acetone was detected in both upstream and downstream surface water samples in 1999, but was also detected in the trip blank, so is judged to be a sampling artifact. Individual PAHs were not analyzed in surface water. Further discussion of surface water results may be found in **Section 3.4.3** of the RI.

3.3 Comparison of Constituent Concentrations with Human Health Screening Criteria

3.3.1 Soil

Soil analytical results with at least one detection were compared with EPA Regional Screening Levels (RSLs) for residential soil (May 2020, lower of 1E-6 cancer risk or 0.1 hazard quotient) to select constituents of potential concern (COPCs), that is, constituents requiring further assessment in the HHRA. EPA Soil Screening Levels values addressing leaching-to-groundwater were not applied because groundwater data were available for the Site.

Constituents in soil above EPA's residential soil RSLs are shown below (Exhibit 1) as well as in **Table 1** (along with the MEDEP (October 2018) urban development background concentrations). Of the four COPCs, only the naphthalene, with a maximum detected concentration of 29 mg/kg, exceeds the MEDEP urban soil background level of 0.22 mg/kg. There is no MEDEP urban soil background level reported for xylenes.

EXHIBIT 1
CONSTITUENTS DETECTED AT CONCENTRATIONS ABOVE SCREENING LEVELS

COPC	Locations with Exceedance (Depth)	Maximum Detected Concentration mg/kg	Soil Screening Level (USEPA Residential Soil RSLs, May 2020) mg/kg
Xylenes (total)	LASB-8-1 (12-14′)	82	58
Naphthalene	LASB-8-1 (12-14′), LASB-11-1 (6-8′)	29	2.0
Benzo(a)pyrene	LASB-5-1/Dup (6-8′), LASB-7-1 (6-8′), LASB-8-1 (12-14′), LASB-9-1 (12-14′)	0.82 J	0.11

EXHIBIT 1
CONSTITUENTS DETECTED AT CONCENTRATIONS ABOVE SCREENING LEVELS

COPC	Locations with Exceedance (Depth)	Maximum Detected Concentration mg/kg	Soil Screening Level (USEPA Residential Soil RSLs, May 2020) mg/kg
Dibenzo(a,h)anthracene	LASB-7-1 (6-8′), LASB-9-1 (12-14′)	0.20 J	0.11

COPC	Constituent of potential concern
mg/kg	Milligrams per kilogram
J	Estimated concentration

There were two PAHs detected in soil without published RSLs, benzo(g,h,i)-perylene and phenanthrene.

- Benzo(g,h,i)-perylene is classified in EPA's IRIS on-line database as a carcinogen, however, a toxicity value is not published for it. Although the maximum detected concentration (0.50 mg/kg) is greater than the RSL for benzo(a)pyrene, another carcinogenic PAH (0.11 mg/kg), the mean (0.079 mg/kg) is less than the benzo(a)pyrene RSL. In addition, the maximum detected value is less than the MEDEP urban soil background concentration of 0.79 mg/kg. Thus, benzo(g,h,i)-perylene is not selected as a COPC for the HHRA.
- Phenanthrene is not classified in EPA's IRIS as either a carcinogen or a non-carcinogenic PAH, due to lack of relevant published toxicity data for this compound, thus there are no established toxicity values to determine a screening level or to calculate risk. However, the maximum detected concentration (1.0 mg/kg) is less than the MEDEP urban background soil concentration of 1.6 mg/kg, thus phenanthrene is not selected as a COPC for the HHRA.

3.3.2 Groundwater

Detected groundwater constituent concentrations were compared with EPA RSLs for tap water (EPA, 2020) to select groundwater COPCs, even though the groundwater at this Site is not used for drinking water.

Several VOCs were detected in groundwater including: acetone, benzene, bromodichloromethane, 2-butanone, carbon disulfide, chloroform, toluene, 1,2,4-trimethyl-benzene, and xylenes. Of these, only two were detected at concentrations above the EPA tap water RSLs: bromodichloromethane (maximum detect of 0.61 µg/L vs. tapwater RSL of 0.13 µg/L) and chloroform (maximum detect of 6.4 µg/L vs. tapwater RSL of 0.22 µg/L). These two VOCs were also detected in the equipment blank for the samples (among other analytes), were not detected in historic groundwater samples, and are not likely to be DoD-related; therefore, these are sampling/laboratory artifacts. Neither PAHs nor PCE/degradation products were detected in groundwater. Thus, there are no COPCs for groundwater in the HHRA.

3.3.3 Sediment

There are no applicable EPA screening criteria for sediment. Thus, human health risk-based EPA residential soil RSLs were used as a conservative screening level for detected constituents in sediment. This is a conservative approach since contact with sediment would be much less than might occur in a residential setting. All detected constituent concentrations in sediment samples were below the EPA residential soil RSLs. Additionally, VOC concentrations were higher in the upstream samples, and TPH (analyzed as GRO/DRO) concentrations were generally consistent between upstream and downstream locations indicating the source is upstream or the concentrations reflect the local background conditions. Therefore, there are no COPCs for sediment in the HHRA.

3.3.4 Surface Water

Only acetone was detected in surface water, but this result was qualified because acetone was also detected in the trip blank. There are no applicable EPA surface water screening criteria for acetone. However, acetone is typically considered a laboratory contaminant, and the detected concentration of acetone is less than the EPA RSL for tap water. This is a conservative COPC screening approach since there would be no or limited ingestion of the surface water. Since no other constituents were detected in surface water, there are no COPCs for surface water in the HHRA.

4.0 HUMAN HEALTH RISK ASSESSMENT

4.1 Hazard Identification

COPCs are quantitatively assessed in this section.

4.1.1 Data Evaluation

Soil, groundwater, surface water, and sediment data were evaluated for use in this HHRA. Data were evaluated as follows:

- Any constituent with at least a single detected result was compared to RSLs and included as a COPC if the maximum result was greater than the RSL, as described in the previous section and below
- Non-detected results were included in the EPC calculation as one-half the detection limit
- Duplicate results were averaged
- Any non-detected duplicate result was averaged at one-half the detection limit.

Of the data evaluated, only subsurface soil had four constituents detected above residential soil RSLs.

4.1.2 Constituents of Concern

As shown in Table 1, the following COPCs were detected above EPA residential soil RSLs in subsurface soil:

- Xylenes (total)
- Naphthalene
- Benzo(a)pyrene
- Dibenzo(a,h)anthracene

There were no COPCs in any other site media. Since there were two sets of naphthalene results for each sample (one reported in the VOC/VPH analysis and one in the EPH/PAH analysis), the higher result (naphthalene/VPH) was conservatively used to calculate the exposure point concentration (EPC).

4.2 Toxicity Assessment

EPA (2003) recommends the following hierarchy in selecting toxicity values to apply in CERCLA risk assessments:

- Tier 1 - EPA's Integrated Risk Information System (IRIS);
- Tier 2 – EPA's Provisional Peer-Reviewed Toxicity Values (PPRTVs); and
- Tier 3 – Additional EPA and non-EPA sources of toxicity values. Toxicity values from the California EPA, the Agency for Toxicity Substances and Disease Registry (ATSDR), and the EPA's Health Effects Assessment Summary Tables (HEAST) are specifically identified

for Tier 3; however, the guidance also states that "[a]dditional sources of toxicity values, which are not specifically referenced in this recommended hierarchy, can be considered."

Human health toxicity values applied to this HHRA were obtained from IRIS (Tier 1).

Toxicity values used to assess carcinogenic health risks are oral cancer slope factors (CSF) for oral and dermal exposures and inhalation unit risk (IUR) values for inhalation exposures. Toxicity values used to assess non-carcinogenic health hazards are oral reference doses (RfD) for ingestion and dermal exposures and reference concentrations (RfC) for inhalation exposures. Sub-chronic toxicity values were unavailable for the COPCs, thus chronic toxicity values were applied.

Brief toxicity profiles for the four COPCs are presented in **Appendix A**. Toxicity values applied to the HHRA are summarized and referenced in the risk calculation spreadsheets.

4.3 Exposure Assessment

This section identifies and discusses:

- Human receptor groups potentially exposed to COPCs
- Pathways and routes by which these receptor groups may be exposed
- Exposure point concentration (EPC) calculations

4.3.1 Identification of Human Receptor Groups and Exposure Pathways

Based on current and reasonably foreseeable future Site uses, the following human receptor groups were quantitatively assessed in the HHRA:

Utility Workers. The potential for utility worker exposure exists under current and future land uses; there are no current prohibitions on such activities. Adult utility workers that could be exposed to subsurface soils through incidental ingestion, dermal contact, and inhalation exposure pathways are quantitatively assessed. For a conservative risk estimate and since contamination was detected from 6 to 16 feet, those subsurface analytical results were used to evaluate the exposure pathways.

The following receptor groups were considered, but are not quantitatively assessed for the reasons provided:

Trespassers. Known sources of contamination at the Site are subsurface release points (i.e., the UST) and investigations revealed no evidence of a possible source of surficial contamination (no observations of contamination, no detections of contaminants that may have been released at the surface such as solvents from a dry cleaner vent). In addition, as described in **Section 2.2.1** of the RI, the surface of the Site consists of topsoil underlain by fill extending to depths ranging from 1 to 4 feet bgs in the eastern and northern portions of the Site and to 8 or more feet bgs in the western portion of the Site along the railroad tracks. The surface water and sediment results show that no constituents exceed conservative screening values and they were similar to background levels; thus no COPCs were selected. Therefore, trespassers are not assessed in the HHRA.

Residents. The Site is not currently under residential use and is zoned for light industrial use only. While the Site is near, but does not border, some urban residentially-zoned (URZ) land to the east, there are currently no residences in the immediate vicinity. Due to its location (near railroad tracks), size, and zoning restrictions, the Site will not likely be developed. Its only other foreseeable future use is as a parking lot. Therefore, residential use of the Site is not a reasonably anticipated future use and is not assessed in the HHRA.

Commercial/Industrial and Construction Workers. The Site is not currently commercially or industrially used, but was historically used for bulk military laundering facilities. Since the Site is located in a Light Industrial Zone, commercial or industrial use is not currently prohibited. However, based on its location, size, and zoning restrictions, construction of a building for such use is not considered a reasonably foreseeable future use. Based on these circumstances, potential commercial/industrial and construction workers are not assessed in the HHRA.

Recreational Receptors. The Site is not used recreationally. Similar to the explanation for the trespasser receptor, there are no compete exposure pathways. Therefore, recreational receptors were not assessed.

Landscape Workers. Similar to the trespasser receptor, there are no compete exposure pathways for surface soil. Therefore, landscape workers were not assessed.

Receptors exposed to Indoor Air exposure via Vapor Intrusion. Since the Site is currently undeveloped, and foreseeable future use is to remain undeveloped or for use as a parking lot, vapor intrusion is not a current or likely future exposure pathway. Therefore, vapor intrusion is not quantitatively assessed in this HHRA.

4.3.2 Exposure Scenarios

The potential human receptor group, utility workers, was assessed for exposure to COPCs through the following pathways:

EXHIBIT 2

EXPOSURE PATHWAYS FOR UTLITY WORKERS

Exposure Pathway	**Utility Workers**
Soil ingestion	✓
Soil dermal contact	✓
Outdoor inhalation of entrained soil particles	✓
Outdoor inhalation of volatile soil COPCs	✓

✓ Assessed exposure pathway.

The HHRA assumes that utility workers will contact subsurface soil during intrusive activities.

4.4.3 Exposure Point Concentrations

This section describes the derivation of exposure point concentrations (EPCs) for COPCs in soil and air.

4.4.3.1 Soil Exposure Point Concentrations

Soil EPCs were based on soil samples collected in 2015 and 2017 (**Table 1)**.

The soil EPC for each COPC was the 95th percentile upper confidence limit of the mean (95% UCL) concentration, calculated by EPA's ProUCL v.5.1, the output for which is presented in **Appendix B**.

4.4.3.2 Air Exposure Point Concentrations

EPCs for particulates in outdoor air were derived using an EPA-recommended approach. Air EPCs for the entrained soil particle pathway were estimated using a particle emission factor (PEF) of 1.36×10^9 m^3/kg (MEDEP, 2018). These values are shown in the risk calculation tables in **Appendix C**.

Outdoor air EPCs for the volatile COPCs (xylene and naphthalene) were derived from soil EPCs using ASTM screening-level models (ASTM, 2015). The ASTM models estimate a volatilization factor relating soil COPC concentrations to outdoor air COPC concentrations, based on physical and chemical properties of the COPCs and assumptions about soil and ambient characteristics. Values applied to the models and calculations of the VOC air concentrations are presented in **Appendix D**.

4.4.4 Quantitation of Exposure

COPC exposure was quantified by combining exposure factors with EPCs to derive an average daily dose (ADD), or intake. Exposure factors used to quantify the magnitude, frequency, and duration of exposure for each receptor group are summarized in **Appendix C**.

Equations used to quantify the ADD for the Utility Worker exposure pathways are presented in **Appendix C**.

4.4 Quantitation of Human Health Risk

Potential cancer risks and non-carcinogenic health hazards were quantified by combining estimated COPC intakes with the appropriate toxicity values.

The risk assessment procedure for carcinogenic COPCs derives an excess lifetime cancer risk, which is the incremental risk (above the background risk level) of incurring cancer as a result of exposure to COPCs. Cancer risks for each COPC in each exposure pathway are summed to derive a cumulative excess lifetime cancer risk. Estimated incremental cancer risks potentially due to Site exposures are compared with the maximum acceptable cancer risk identified for the CERCLA program, which is a risk of 1 in 10,000, denoted as 1×10^{-4}. The acceptable incremental cumulative cancer risk range under the CERCLA program is 1×10^{-4} to 1×10^{-6} [National Contingency Plan (NCP), 40 CFR 300.430]. An estimated cumulative cancer risk equal to or lower than a 1×10^{-4} incremental cancer risk is, in the CERCLA definition, an acceptable incremental cancer risk.

The risk assessment procedure for non-carcinogenic COPCs derives a Hazard Quotient (HQ), which is the ratio of an estimated exposure or intake to toxicity factor (e.g., the RfD or RfC), at or below which no health hazards are expected. The average daily dose (intake) is divided by toxicity factor (RfD or RfC). For each receptor group, HQs for each COPC within and between exposure pathways are summed to derive a total Hazard Index (HI), which is compared with the maximum acceptable HI of one (1) adopted for the CERCLA program. A total HI equal to or below one (1) meets the maximum acceptable HI benchmark and is not likely to represent an unacceptable non-cancer health hazard.

If an HI of greater than one is calculated, there may be concern for potential noncancer effects. However, an HI is not a statistical probability and the level of concern does not increase linearly as unity is exceeded because RfDs and RfCs (upon which the HI is based) do not have equal accuracy or precision and are not based on the same severity of toxic effects. If an HI does exceed a value of 1, it can be segregated by target organ system or critical effect (EPA 1989) to get a better indication of the potential for non-cancer effects.

4.4.1 Risk Assessment Results - Utility Workers

Risk assessment calculations for utility workers are presented in **Appendix C** and summarized below:

EXHIBIT 3
RISK ASSESSMENT SUMMARY
UTILITY WORKERS

Exposure Pathway	Non-Carcinogenic Hazard Index	Excess Lifetime Cancer Risk
Soil ingestion	0.001	3 x 10^{-9}
Soil dermal contact	0.003	1 x 10^{-9}
Inhalation of entrained soil particles	0.00002	3 x 10^{-16}
Outdoor inhalation of volatilized soil COPCs	0.2	-- [1]
Total (all pathways)	**0.2**	**4 x 10^{-9}**
CERCLA Maximum Acceptable Value	1	1 x 10^{-4}

[1]. No carcinogens in this pathway.

Under current and potential future Site uses, the total HI and the excess lifetime cancer risk are below CERCLA maximum acceptable HI and cancer risk values, respectively, indicating the Site is unlikely to pose unacceptable health hazards or cancer risks to utility workers. Because the HI value was below 1, it was not segregated by target organ system.

4.5 Uncertainty Assessment

The HHRA used site-specific data, and was conducted in accordance with EPA and USACE risk assessment guidance. This section discusses the potential impact of uncertainties on the quantitative HHRA.

4.5.1 Uncertainties Associated with Site Data

A total of 22 soil samples including 2 duplicates collected in 2016 and 2017 were applied to the HHRA. Only the 2016 and 2017 data were included since VOCs generally degrade or evaporate in the environment. The data used in HHRA may overestimate future risk.

If a constituent was not detected at any location on the Site, it was assumed not to be present on Site and was not included as a COPC; this assumption may underestimate risk. In some cases, constituents were not detected at a reporting limit above the screening level. It is assumed that the lack of detection of these constituents indicates that they do not exist at the Site, and thus they are not evaluated in the risk assessments. This assumption was supported on a case by case basis by evaluating the expected presence of the individual compound relative to the CSM and the presence of other associated compounds (e.g., families of chlorinated VOCs, or pyrogenic or petrogenic PAHs). This assumption could result in the underestimate of site risks.

There are no current surface soil data for the site. However, Site soil boring logs and soil observations in November 2016 (Credere, 2017b) and July 2017 (Credere, 2018), showed overburden consists of topsoil at the surface underlain by fill extending to depths ranging from 1 to 4 feet bgs in the eastern and northern portions of the Site and to 8 or more feet bgs in the western portion of the Site along the railroad tracks. DoD use of the Site ended in 1974, so the presence of any contamination related to DoD activities in surface soil is unlikely since VOCs are the DoD-related contaminants of concern and VOCs are likely to volatilize from the surface soil after long time periods. In addition, evidence of contaminant migration is not evident in samples collected from the subsurface soil, groundwater, surface water, or sediment. Therefore, the lack of current surface soil data adds some uncertainty to the HHRA and may result in an underestimation of Site risks, but the potential current concentrations of VOCs in surface soil are anticipated to be below screening levels or not present. The soil data are judged to contribute a moderate to high degree of uncertainty to the HHRA and may underestimate or overestimate potential health risks. However, the magnitude of the uncertainty cannot be quantified.

Since only four groundwater, and six surface water and sediment samples were collected, the sample results may not fully represent the concentrations of contaminants in these media across the Site. However, the Site itself is small, so this uncertainty is not likely significant.

No probable DoD-related constituents were detected above screening levels in groundwater, sediment, and surface water, therefore these media were not quantitatively evaluated in the HHRA. Additionally, groundwater is within shallow bedrock (below 15 feet bgs) and is not used for drinking water purposes; therefore, exposure to groundwater is limited. However, analytical reporting limits for certain PAHs in groundwater were above screening levels. This suggests that PAHs reported as not detected could have been present in groundwater at concentrations above screening levels. Omission of these PAHs from the HHRA may have underestimated potential health risks, although most PAHs have a low water solubility and dissolved PAHs are seldom present in groundwater at high concentrations.

4.5.2 Uncertainties Associated with the Toxicity Assessment

Toxicity values were obtained from the EPA IRIS database (Tier I), and are based on the available toxicity literature. The uncertainty associated with toxicity values is associated with the robustness of the toxicity literature used to develop them. However, toxicity values generally have applied safety factors that result in conservative estimates of health risks. The magnitude of the uncertainty varies with each toxicity value, so the overall magnitude of uncertainty associated with toxicity values is variable. Uncertainty factors applied to non-carcinogenic RfDs and RfCs are shown in the Appendix C toxicity value table.

4.5.3 Uncertainties Associated with Exposure Point Concentrations

Consistent with guidance, soil EPCs were the 95% UCL of the mean concentration of each COPC. The 95% UCL of the mean provides a conservative estimate of the average (or mean) concentration.

The ability to quantify concentrations below the Limit of Quantitation (LOQ) or Reporting Limit brings some uncertainty to determining EPCs, because the “true” concentrations could be higher or lower than the “J” value between the LOQ and Method Detection Limit (the statistically derived lowest limit of detection).

Outdoor air EPCs for the soil particle inhalation pathway were based on use of a MEDEP default value for PEF (MEDEP 2018). This PEF may or may not be a good estimate of exposure through this pathway, depending on site conditions that might occur during utility work.

Collectively, EPCs contribute a moderate degree of uncertainty to the risk assessment and may either underestimate or overestimate potential health risks, depending on the applied data and site-specific conditions.

4.5.4 Uncertainties in Exposure Scenarios and Exposure Factors

One human receptor group was assessed for exposure to COPCs: utility workers. The uncertainty associated with the scope of receptors assessed is low since the size of the site and zoning preclude both residential and commercial building construction.

Exposure factors used to quantify exposures were generally obtained from EPA guidance. The uncertainty associated with exposure factors for adults is low, based on the extent of research underlying the EPA guidance values. Maine DEP exposure factors for site-specific exposure factors such as exposure frequency (RAGS D table 4) were also used. Exposure factors are not likely to overestimate potential health risks, although the overall magnitude of the uncertainty cannot be quantified, since uncertainty varies with each applied exposure parameter.

4.5.5 Uncertainties Associated with the Risk Assessment Approach

By combining conservative reasonable maximum exposure estimates and IRIS toxicity values, the results of the HHRA may be conservative and may not represent typical, or average, exposures at the site. Health risks, particularly to an average exposed individual, are likely to be overestimated. The risk assessment approach is consistent with both EPA and USACE guidance.

5.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

5.1 Introduction

According to the EPA's *Ecological Risk Assessment Guidance: Process for Designing and Conducting Ecological Risk Assessments* (1997), an ecological risk assessment (ERA) refers to a qualitative and/or quantitative appraisal of the actual or potential impacts of contaminants from a hazardous waste site on plants and animals other than humans and domesticated species. A risk does not exist unless: (1) the stressor has the ability to cause one or more adverse effects, and (2) it co-occurs with or contacts an ecological component long enough and at a sufficient intensity to elicit the identified adverse effects.

The eight steps in an ERA identified in the guidance are the following:

Step 1: Screening Level – Problem Formulation and Ecological Effects Evaluation
Step 2: Screening Level – Preliminary Exposure Estimates and Risk Calculations
Step 3: Problem Formulation
Step 4: Study Design and Data Quality Objective Process
Step 5: Verification of Field Sampling Design
Step 6: Site Investigation and Data Analysis
Step 7: Risk Characterization
Step 8: Risk Management

The Screening Level Ecological Risk Assessment (SLERA) presented herein addresses the first two components of this scheme.

5.2 Screening Level Problem Formulation

Components of the screening level problem formulation, as described in EPA (1997) are as follows:

- Description of the environmental setting and the contaminants known or suspected to exist at the site;
- Contaminant fate and transport mechanisms that might exist at the site;
- Mechanisms of ecotoxicity associated with contaminants and likely categories of receptors that could be affected;
- Identification of complete exposure pathways might exist at the site; and,
- Selection of endpoints to screen for ecological risk.

5.2.1 Environmental Setting of Site

The Site is located along the west side of Central Drive, is approximately 0.25 acres in area, and is currently vacant land. **Figure 2** illustrates the Site after removal of former structures.

Environmental features on the Site were identified through "Beginning with Habitat" maps from the Maine DEP website. The maps are depicted in **Figure 3** - *Water Resources and Riparian Habitat*, **Figure 4** – *Wetlands Characterization*, **Figure 5** – *High Value Plant and Animal Habitat*, **Figure 6** – *Undeveloped Habitat Blocks and Crossings*, and **Figure** 7 – *Habitat Co-Occurrence Map*.

As shown on **Figure 3**, an unnamed tributary to Presque Isle Stream drains through a culvert just north of the Site and flows south/southwest through wetland areas to join Presque Isle Stream. Presque Isle Stream then flows east/northeasterly and discharges into the Aroostook River approximately 1.7 miles east/northeast of the Site. A riparian habitat surrounding the unnamed tributary is identified in **Figure 3**; however, it is unlikely this is applicable to the Site because the stream is culverted beneath the ground surface. The nearest inland lake is Hanson Brook Lake, located 0.8 miles west/northwest of the Site at its closest point.

As shown on **Figure 4**, wetland areas downstream of the culverted unnamed tributary are classified as forested, forested/shrub-scrub, or shrub-scrub wetlands. The nearest downstream wetland area to the Site is described as having an "undocumented" function or "use for cultural/educational purposes", whereas further downstream wetlands function as finfish/ shellfish or plant/animal habitat.

As shown on **Figure 5**, an approximately 735-acre habitat for the state-threatened upland sandpiper is located approximately 900 feet northwest of the Site at its closest point, and extends away from the Site to the north, west and south. This habitat does not occur on the Site itself. Also shown on **Figure 5** are several protected inland waterfowl/wading bird areas in the vicinity of the Site, the closest being approximately 3,200 feet to the southeast.

There are no undeveloped habitat blocks and connectors within a one-mile radius of the Site, as shown on **Figure 6**.

On **Figure 7**, a resource co-occurrence score of 0 to 2 is assigned for the Site due to the limited presence of environmental features on the Site, such as those discussed above. Scores can range from 0 to 18, depending on the presence and quality of features present.

5.2.2 Presence of Constituents of Concern

The presence of constituents of concern (COCs) in various Site media is discussed in previous HHRA sections. All detected COCs are assessed for potential ecological impacts.

5.2.3 Fate and Transport Characteristics

VOCs and PAHs were detected during sampling of soil, sediment, and surface water. As previously discussed, petroleum hydrocarbons and pesticides are not evaluated in this risk assessment.

VOCs detected in soils were benzene, ethylbenzene, toluene, and xylenes, and styrene. These VOCs were infrequently detected. VOCs have a somewhat low binding to organic matter that enhances migration and volatility/degradability and limits persistence. VOCs may volatilize from soil, surface water, and sediment to ambient air and could contact ecological receptors.

PAHs were also detected; they have a strong tendency to bind to organic material, a low or non-existent volatility, and a lower rate of biological or chemical degradation than VOCs. As such, PAHs have a limited tendency to migrate from locations where first released (except as incidental to media migration) and tend to be persistent in the environment.

5.2.4 Mechanisms of COPC Ecotoxicity

The detected VOCs have a fairly low aquatic and terrestrial toxicity (TOXNET on-line database; IDEM 2000). Limited information on the mechanisms and toxicity of acetone or 2-butanone to ecological receptors was identified.

PAHs have wide-ranging effects on ecological receptors. Effects on benthic invertebrates include inhibited reproduction, delayed emergence, sediment avoidance, and mortality. Fish exposed to PAHs have exhibited fin erosion, liver abnormalities, cataracts, and immune system impairments leading to increased susceptibility to disease. In aquatic systems, PAHs tend towards increased toxicity with increased molecular weight. Some PAHs are cancer-causing, producing tumors in epithelial tissues, and may also cause adverse effects on reproduction and development (EPA Region 5 Ecological Toxicity Information, undated). A key factor in PAH toxicity is the formation of reactive metabolites; and the mechanism of PAH-induced carcinogenesis is believed to be through the binding of PAH metabolites to deoxyribonucleic acid (DNA) (ATSDR 2009).

5.2.5 Likely Categories of Potentially Affected Receptors

At the Laundry Annex, potentially exposed ecological receptors could include terrestrial mammal, bird, and insect species that would normally be present in this area of Maine. Potentially exposed aquatic organisms include fish (to the extent that flow is continuous in the stream) and aquatic invertebrates and other insects.

5.2.6 Potentially Complete Exposure Pathways

At the Laundry Annex, potentially complete ecological exposure pathways exist only for exposure to surface water and sediment in the unnamed stream traversing the Site. Ecological exposure to COPCs in soil is unlikely, since soil contamination was identified only in subsurface soil at depths of 6 feet or deeper, but exposures could occur if soil is disturbed. According to EPA (2015b), the average biologically relevant soil sampling depth is between 20 cm and 30 cm (7.9 to 11.8 inches), depending on soil type, for the purposes of conducting a terrestrial risk assessment. This indicates that all soil samples were collected at soil depths that are not biologically relevant under current Site conditions. Similarly, direct exposure of ecological receptors to groundwater is unlikely since groundwater is located at depths greater than 8 feet and there are no reported springs in the annex area.

5.3 Comparison of Site Detections with Ecological Screening Benchmarks

A comparison of detected contaminants with ecological screening benchmarks is presented in this section to identify environmental COPCs.

5.3.1 Soil

Although soil samples were collected at soil depths that are not biologically relevant under current Site conditions, soil data are compared to ecological soil screening benchmarks in order to provide context for the SLERA. **Table 5** - *Summary of Soil Analytical Data and Comparison with Ecological Screening Benchmarks* presents the VOC and PAH soil results which are compared to the following ecological screening benchmarks:

- EPA Ecological Soil Screening Levels (EcoSSLs) (various dates); and
- EPA Region 4 Ecological Soil Screening Values (EPA 2018).

The following soil samples contained constituent concentrations exceeding ecological soil screening benchmarks:

EXHIBIT 4
SOIL SAMPLES EXCEEDING ECOLOGICAL SOIL SCREENING VALUES

Constituent	**Sample Exceeding Ecological Soil Screening Benchmark (depth)**	**Maximum Detected Concentration mg/kg**	**Ecological Soil Screening Benchmark [1] mg/kg**
Ethylbenzene	LASB-8-1 (12-14')	4.4	0.27
Xylenes	LASB-7-1 (6-8'); LASB-8-1 (12-14'); LASB-11-1 (6-8')	81.7	0.10
Chrysene	LASB-7-1 (6-8')	1.4	Total HMW PAHs, 1.1
Fluoranthene	LASB-7-1 (6-8')	1.6	Total HMW PAHs, 1.1
Pyrene	LASB-7-1 (6-8')	1.9	Total HMW PAHs, 1.1

mg/kg	Milligrams per kilogram
HMW	High molecular weight
[1]	EPA Region IV ecological soil screening value

All constituents identified as exceeding their ecological soil screening benchmarks were obtained from depths of 6 feet bgs or deeper,

5.3.2 Sediment

Table 3 presents sediment analytical data; constituents detected in sediment were acetone, 2-butanone, and styrene. The following ecological sediment screening values were reviewed to compare with detections:

- EPA Region III BTAG Freshwater Sediment Screening Benchmarks (EPA 2006), or
- EPA Region 4 Freshwater Sediment Screening Levels for Narcotic Mode of Toxicity, ecological screening values (ESVs) (EPA 2018)

Acetone was detected in both upstream and downstream sediments in 1999 and 2000; no analysis of acetone was conducted in subsequent sampling events. It is usually assumed that acetone is present as a sampling or analysis artifact; the downstream detection in 2000 was reportedly associated with the presence of acetone in the method blank, although the original lab reports were unavailable for review. There is no EPA Region III sediment screening value for acetone; it was detected at a higher concentration than the EPA Region 4 ESV (0.065 mg/kg) in one of two upstream samples at 0.337 mg/kg, and in one of two downstream samples at 0.485 mg/kg.

2-Butanone was detected in the upstream sediment sample in 1999 only and not detected in any downstream sample. There is no EPA Region III sediment screening value for 2-butanone; however, all detects were lower than the EPA Region 4 ESV (7.6 mg/kg).

Styrene was detected in the upstream sediment sample in 2000 only and not detected in any downstream sample. The detected concentration (0.00672 mg/kg) was below both the EPA Region III sediment screening value for styrene (0.56 mg/kg) and the Region 4 ESV (0.126 mg/kg).

5.3.3 Surface Water

Table 4 presents surface water analytical data; one constituent, acetone, was detected in surface water. Only EPA Region 4 Surface Water Screening Values (EPA 2018) were available for acetone as an ecological surface water benchmark.

Acetone was detected in upstream and downstream surface water samples in 1999 at equal concentrations, but was not detected in the 2000 sampling. It is usually assumed that acetone is present as a sampling or analysis artifact; also acetone was found to be present in the laboratory method blank, although the laboratory report was unavailable for review. The detected concentration did not exceed the ecological surface water benchmark.

5.3.4 Groundwater

There is no direct exposure of ecological receptors to in situ groundwater, so this medium was not screened for ecological concerns.

5.4 Interpretation of Screening Results

For soil:

- Ethylbenzene, xylenes, chrysene, fluoranthene and pyrene were detected at concentrations exceed their ecological soil screening benchmarks in soil samples at depths greater than 6 feet.
- This soil depth is below the EPA-identified biologically relevant depth. Therefore, exposure of ecological receptors to soil is currently incomplete, although ecological receptor exposure to subsurface soil could potentially occur in the future during utility work if impacted subsurface soil is relocated to the surface.

Based on these findings, there is no evidence of the potential for ecological risks due to contact with the deep soil at the Laundry Annex Site.

For sediment:

- Acetone was detected in both upstream and downstream sediments in 1999 and 2000, suggesting either an upstream source or presence of acetone as a sampling artifact. There is no sediment screening criteria for acetone.
- 2-Butanone and styrene were only detected in sediment samples upstream of the Site.

Based on these findings, no evidence of the potential for ecological risks exists with respect to sediment at the Laundry Annex Site.

<u>For surface water</u>:

- Acetone was detected in upstream and downstream surface water samples in 1999 at equal concentrations, but is a common laboratory contaminant and was also present in the laboratory method blank. In 2000, acetone was not detected in surface water.
- Acetone detections did not exceed its ecological sediment benchmark concentration.

Based on these findings, no evidence of the potential for an ecological risk exists with respect to surface water.

5.5 Preliminary Exposure Estimates and Risk Calculations

The only media that ecological receptors are potentially exposed to under current Site uses are sediment and surface water, and all detected constituent concentrations are either below screening values or point to an alternate source, such as laboratory contamination. Therefore, no additional exposure estimates or risk calculations are needed.

Exposure of ecological receptors to soil and groundwater is currently incomplete. Although ecological receptor exposure to subsurface soil could potentially occur in the future during utility work, if impacted subsurface soil is relocated to the surface, quantitative risk calculations were not performed.

5.6 SLERA Summary

The SLERA concludes that the Site does not pose an unacceptable risk to ecological receptors and thus, a full baseline ecological assessment is not required.

6.0 SUMMARY AND CONCLUSIONS

An HHRA and SLERA were conducted for the Loring AFB Laundry Annex Site in Presque Isle, Maine, using site-specific data and USACE and EPA risk assessment guidance.

The HHRA assessed potential health risks posed to one receptor group: utility workers. The utility worker receptor group was assessed for exposure to COPCs through soil ingestion, soil dermal contact, outdoor inhalation of entrained soil particles, and outdoor inhalation of volatile COPCs from soil. The COPCs for the HHRA were xylenes, naphthalene, benzo(a)pyrene, and dibenzo(a,h)anthracene.

Quantitative results of the HHRA are summarized below:

EXHIBIT 5
HUMAN HEALTH RISK ASSESSMENT SUMMARY

Receptor Group	**Non-carcinogenic Hazard Index**	**Excess Lifetime Cancer Risk**
Current/Future Site Uses		
Utility Workers	0.2	**4×10^{-9}**

The calculated HI for utility workers, is below the maximum acceptable HI of 1 and calculated cancer risks are below the maximum acceptable CERCLA cancer risk of 1×10^{-4}. Construction workers for a potential future parking lot would have a lower risk than the estimated risk for the utility worker exposure scenario. Therefore, the Site does not pose an unacceptable risk to human health for utility workers or for workers constructing a potential future parking lot.

Future residential and commercial/industrial use of the Site was not assessed because of the parcel’s transfer deed restrictions and municipal zoning ordinance, the foreseeable future use is undeveloped or possibly a parking lot, which would further reduce the soil exposure potential for future Site users. The current use is “green space”, parking, and snow storage for the adjacent building.

The SLERA concluded that the Site does not pose an unacceptable risk to ecological receptors and that a full baseline ecological assessment is not required.

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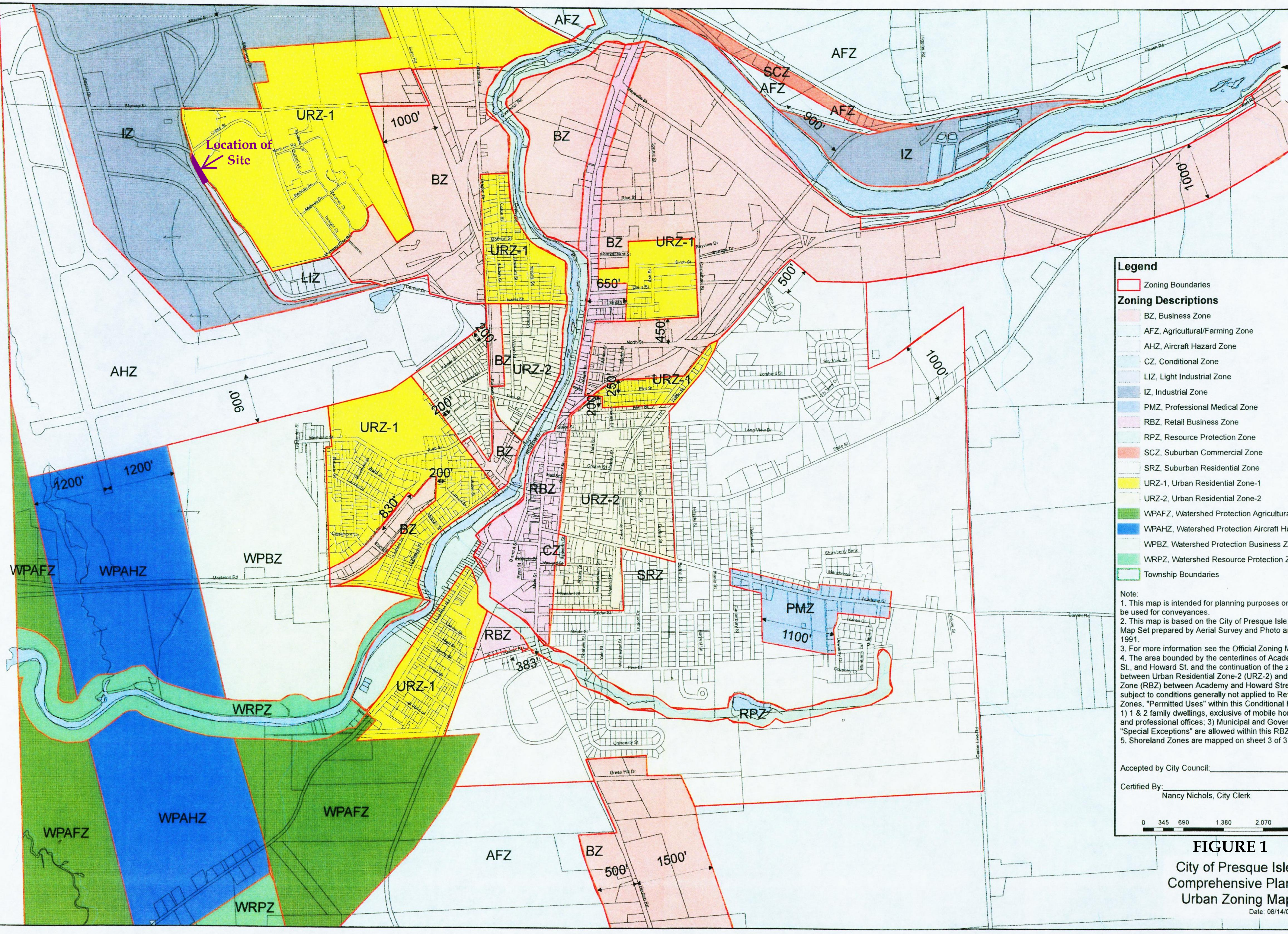
FIGURES



Note:
1. This map is intended for planning purposes or
be used for conveyances.
2. This map is based on the City of Presque Isle
Map Set prepared by Aerial Survey and Photo a
1991.
3. For more information see the Official Zoning M
4. The area bounded by the centerlines of Acade
St., and Howard St. and the continuation of the z
between Urban Residential Zone-2 (URZ-2) and
Zone (RBZ) between Academy and Howard Stre
subject to conditions generally not applied to Re
Zones. "Permitted Uses" within this Conditional
1) 1 & 2 family dwellings, exclusive of mobile ho
and professional offices; 3) Municipal and Gover
"Special Exceptions" are allowed within this RBZ
5. Shoreland Zones are mapped on sheet 3 of 3

Accepted by City Council:__________

Certified By:__________
Nancy Nichols, City Clerk

FIGURE 1

City of Presque Isle
Comprehensive Plan
Urban Zoning Map
Date: 08/14/0

NOTES

1. EXISTING CONDITION FEATURES SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON INFORMATION OBTAINED FROM BASE PLAN CONTAINED IN THE SEPTEMBER 2015 FINAL TRIP REPORT BY BATTELLE AND AECOM, THE OCTOBER 1997 SITE INVESTIGATION REPORT BY ROY F. WESTON, FIELD WORK PERFORMED ON NOV. 2, 2016, AND JULY 20, 2017.

2. DECIMAL DEGREE COORDINATES WERE EXTRACTED FROM THE GIS POINT COORDINATE SYSTEM.

DRAWN BY: **MAK/SCG** DATE: **10/11/2017**
CHECKED BY: **ASD** PROJECT: **15001301**

Credere Associates, LLC
776 MAIN STREET
WESTBROOK, MAINE
Tel. 207.828.1272
Fax 207.887.1051
WWW.CREDERELLC.COM

FIGURE 2
SITE PLAN

LORING AFB
LAUNDRY ANNEX
1050 CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

SOIL BORING, CREDERE, JULY 2017
SOIL BORING, CREDERE, NOVEMBER 2016
BEDROCK WELL INSTALLED IN 2015
OVERBURDEN/BEDROCK INTERFACE WELL INSTALLED IN 2015
HISTORICAL SOIL BORING
MONITORING WELL DISCOVERED IN 2015
ABANDONED MONITORING WELLS

STEPOUT/IN PATHWAY
CATCH BASIN
OUTFALL
RAILROAD
POSSIBLE FORMER LOCATIONS OF 100-GALLON UST
FORMER DRY CLEANING BUILDING FOUNDATION
APPROXIMATE SITE BOUNDARY
CULVERT

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\FIGURE 3 - LAUNDRY ANNEX JULY UPDATE.mxd

Beginning with HABITAT

An Approach to Conserving Maine's Natural Space for Plants, Animals, and People

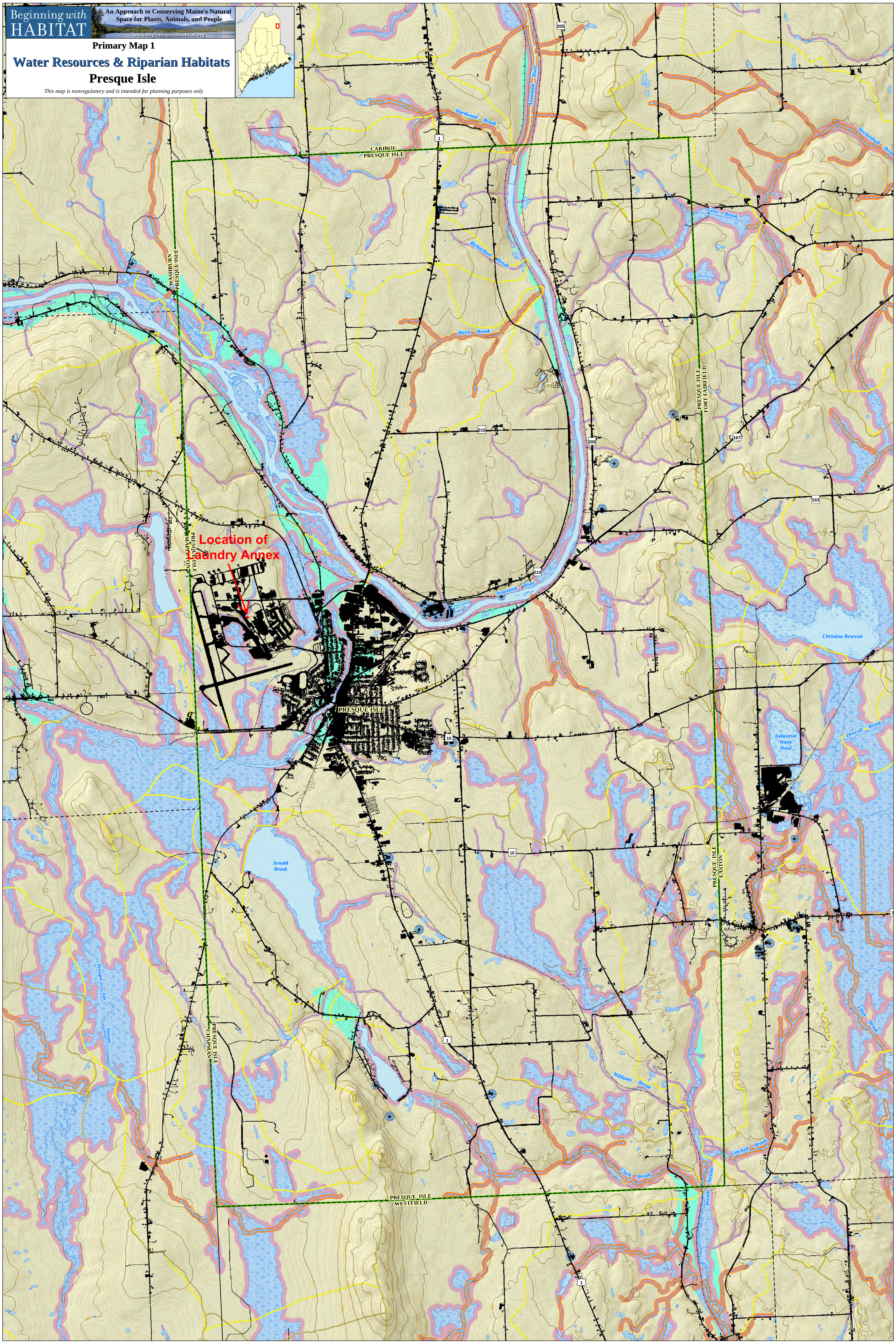
www.beginningwithhabitat.org

Primary Map 1

Water Resources & Riparian Habitats

Presque Isle

This map is nonregulatory and is intended for planning purposes only

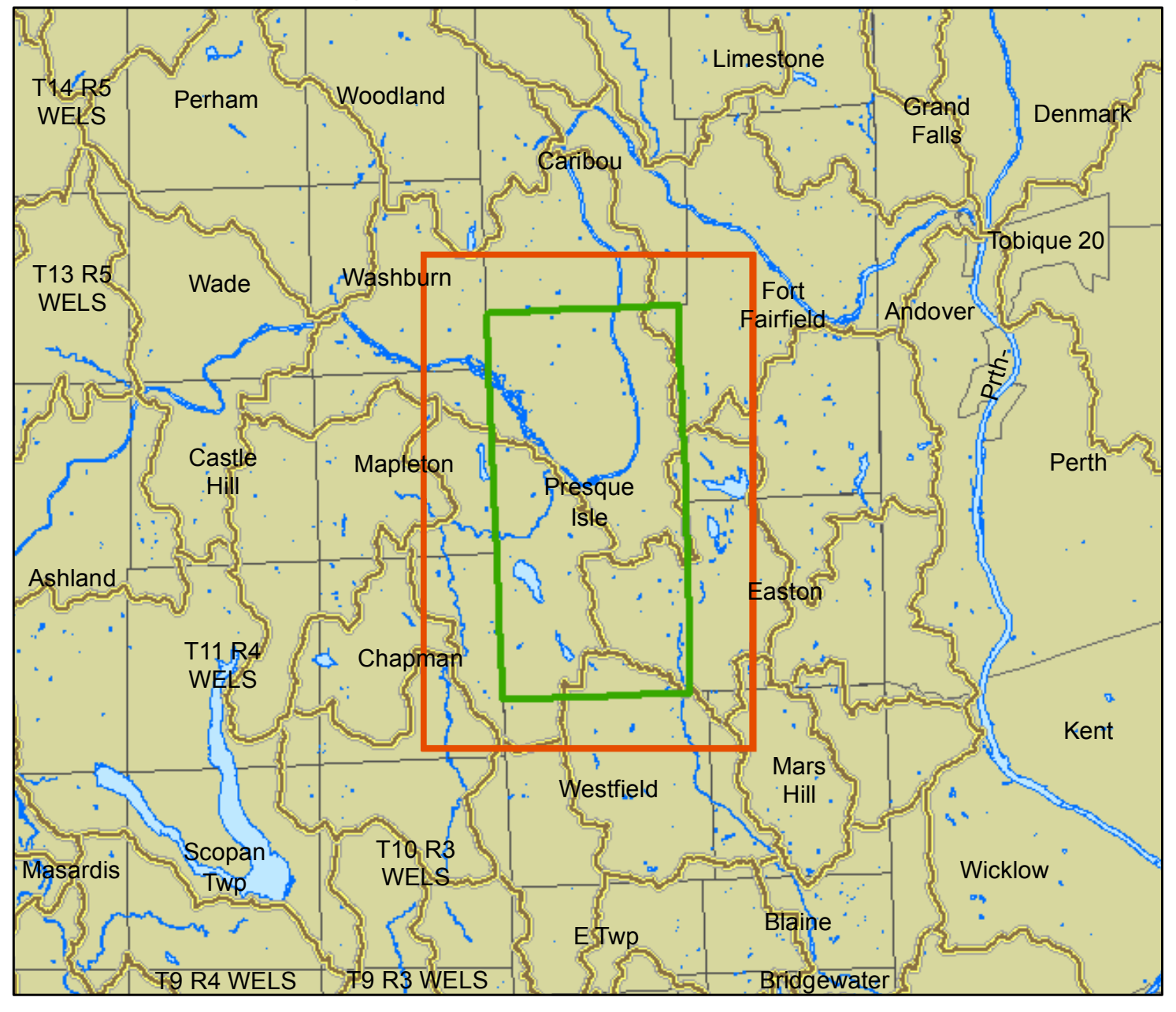


LEGEND

This map depicts riparian areas associated with major surface water features and important public water resources. This map does not depict all streams or wetlands known to occur on the landscape and should not be used as a substitute for on the ground surveys. This map should be used as a planning reference only and is intended to illustrate the natural hydrologic connections between surface water features. Protecting riparian habitats protects water quality, maintains habitat connections, and safegards important economic resources including recreational and commercial fisheries.

🟩	**Selected Town or Area**
⬚	**Organized Township Boundary**
⬚	**Unorganized Township**
▨	**Developed**- Impervious surfaces including buildings and roads
▭	**Subwatersheds** - Drainage divides are grouped together to form subwatersheds. See inset below for more information.
▭	**Drainage divides** - These are the smallest hydrologic units mapped in Maine. They contain watershed boundaries for most ponds and rivers in Maine.
▨	**NWI Wetlands** - National Wetlands Inventory (NWI) uses aerial photographs to approximate wetland locations. NWI data is not a comprehensive mapping of wetland resources and typically under represents the presence of wetlands on the landscape. The presence of wetlands needs to be determined in the field prior to conducting activities that could result in wetland disturbance.
■	**Riparian Habitat** - depicted using common regulatory zones including a 250-foot-wide strip around Great Ponds (ponds ≥10 acres), rivers, coastline, and wetlands ≥10 acres and a 75-foot-wide strip around streams. Riparian areas depicted on this map may already be affected by existing land uses.
■	**Shellfish Growing Areas** - The Maine Department of Marine Resources maps growing areas for economically important shellfish resources. This map depicts softshell and hard clam resources in order to illustrate the relation of these resources to streams and shoreline areas vital to their conservation.
🟧	**Brook Trout Habitat** - Streams and ponds, buffered to 100 feet, where wild Brook Trout populations have been documented, or managed to enhance local fisheries.
✦	**Public Water Supply Wells**
●	**Source protection area** - Buffers that represent source water protection areas for wells and surface water intakes that serve the public water supply. Their size is proportional to population served and/or by the type of water supply system. These buffers range from 300 to 2,500 feet in radius.
■	**Aquifers** - flow of at least 10 gallons per minute

Regional View of Watersheds

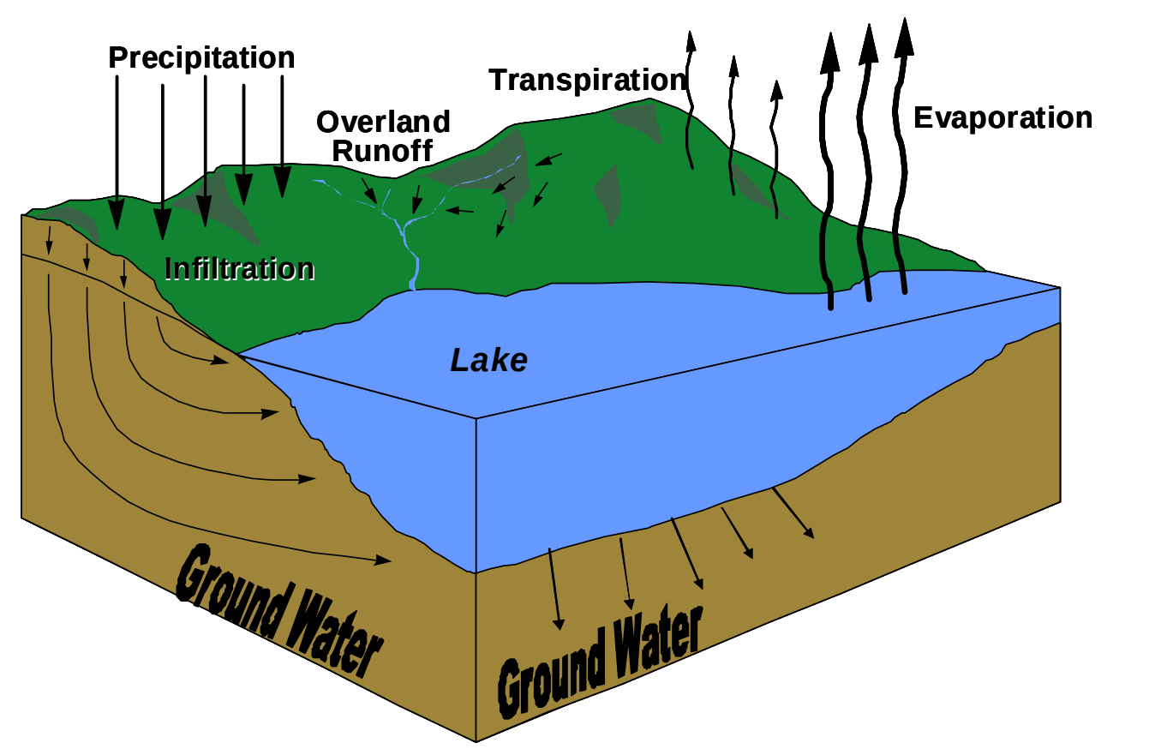


A watershed includes all of the land that drains to a common waterbody. The areas within the watershed are linked ecologically by the water, sediment, nutrients, and pollutants that flow through them. For the purpose of mapping "hydrological units," watersheds are often grouped into larger drainages or divided into smaller ones. Drainage divides (shown on main map as yellow line), are the smallest hydrological units and generally drain into small ponds, wetlands, or streams. These units are grouped into subwatersheds (HU12) and are represented on the main map and the above inset map by the yellow-brown-yellow outlines.

🟥	**Main Map Extent**
🟩	**Selected Town or Area**
▭	**Subwatersheds**

1 inch = 6 miles

Relationship of Ground Water and Surface Water



Precipitation is the source of all water. Surface water and ground water are related. Drinking water can come from either source. Ground contaminants can affect both. The relationship between ground water and surface water is part of the ***hydrologic cycle.*** ***Precipitation*** that falls from the atmosphere as rain or snow reaches the land surface and recharges rivers, lakes, wetlands, and other surface bodies of water directly through ***overland runoff***. Surface water also seeps into the ground through ***infiltration*** and eventually reaches the ground water; or through ***evaporation***, returns to the atmosphere. Water evaporates from leaves and stems of plants through ***transpiration***.

Shoreland Zoning

Maine's Mandatory Shoreland Zoning Act is intended to protect water quality, conserve wildlife habitat, and preserve the natural beauty of Maine's shoreline areas. Successful implementation requires local awareness of and appreciation for surface water resources and effective enforcement of setback and buffer requirements.

At a minimum, Maine's shoreland zones include all land within:

- 250 feet of the high-water line of any pond over 10 acres, any river that drains at least 25 square miles, and all tidal waters and saltwater marshes;
- 250 feet of a freshwater wetland over 10 acres (except "forested" wetlands); and
- 75 feet of a stream that is either an outlet stream of a great pond, or located below the confluence of two perennial streams as depicted on a USGS topographic map.

Shoreland zoning encourages towns to provide greater protection to their local water resources by applying shoreland zone protections to additional resource types such as smaller streams and wetlands, and rare terrestrial features. For specific guidance regarding Maine's Mandatory Shoreland Zoning Act contact the Dept. of Environmental Protection Shoreland Zoning Unit: 207-287-3901 (Augusta), 207-822-6300 (Portland), 207-941-4116 (Bangor). www.maine.gov/dep/blwq/docstand/szpage.htm

Data Sources

DATA SOURCE INFORMATION

TOWNSHIP BOUNDARIES
Maine Office of GIS (2013); *metwp24*
ROADS
Maine Office of GIS, Maine Department of Transportation (2013); *medotpub*
HYDROLOGY
USGS National Hydrography Dataset (NHD) Maine (2012)
DEVELOPED
Maine Office of GIS, Maine Department of Environmental Protection, Maine Deprtment of Inland Fisheries and Wildlife (2011); *impervious_change_2007*
NATIONAL WETLANDS INVENTORY
U.S. Fish & Wildlife Service (2013); *NWI*
SHELLFISH
Maine Department of Marine Resources; *softshell_clams, hard_clams*
RIPARIAN BUFFERS
Maine Office of GIS, Maine Natural Areas Program (2011)
WELLS, WELL BUFFERS
Maine Office of GIS, Maine Department of Human Services-Drinking Water Program (2004); *wells, wellsbuf*
AQUIFERS
Maine Office of GIS, Maine Geological Survey (2006); *aquifer_polygons*
DRAINAGE DIVIDES
Maine Office of GIS (1994); *medrdvd*
BROOK TROUT HABITAT
Maine Department of Inland Fisheries & Wildlife (2011)

DATA SOURCE CONTACT INFORMATION

Maine Office of GIS: http://www.maine.gov/megis/
Maine Natural Areas Program: http://www.maine.gov/dacf/mnap/index.html
Maine Department of Marine Resources: http://www.maine.gov/dmr/
Maine Department of Transportation: http://www.maine.gov/mdot/
Maine Geological Survey: http://www.maine.gov/doc/nrimc/mgs/mgs.htm
Maine Department of Inland Fisheries & Wildlife: http://www.maine.gov/ifw/wildlife/index.html

DIGITAL DATA REQUEST

To request digital data for a town or organization, please visit our website.
http://www.beginningwithhabitat.org/the_maps/gis_data_request.html

Feet 5,000 2,500 0 0.5 1 Miles
Meters 1,000 500 0 0.5 1 Kilometers

Scale: 1:24,000
Projection: UTM 19N
Datum: NAD 1983

Supported in part by Maine Outdoor Heritage Fund lottery ticket sales

Map Prepared by Maine Department of Inland Fisheries & Wildlife
October 2016

Supported in part by Loon Conservation Plate funds

FIGURE 3

Beginning with HABITAT

An Approach to Conserving Maine's Natural Space for Plants, Animals, and People

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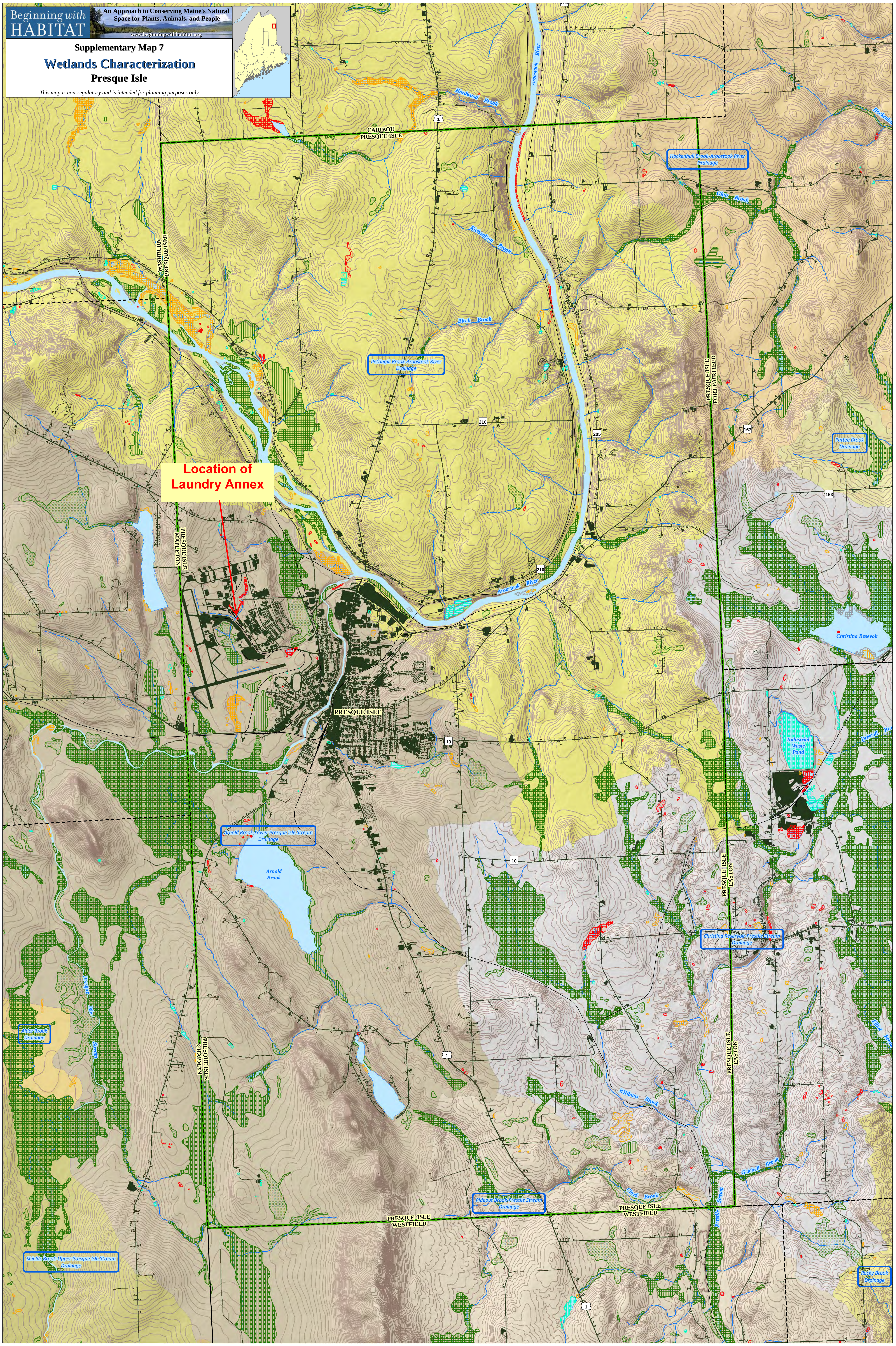
Supplementary Map 7

Wetlands Characterization

Presque Isle

This map is non-regulatory and is intended for planning purposes only



LEGEND

This map depicts all wetlands shown on National Wetland Inventory (NWI) maps, but categorized them based on a subset of wetland functions. This map and its depiction of wetland features neither substitute for nor eliminate the need to perform on-the-ground wetland delineation and functional assessment. In no way shall use of this map diminish or alter the regulatory protection that all wetlands are accorded under applicable State and Federal laws. For more information about wetlands characterization, contact Elizabeth Hertz at the Maine Department of Conservation (207-287-8061, elizabeth.hertz@maine.gov).

The Wetlands Characterization model is a planning tool intended to help identify likely wetland functions associated with significant wetland resources and adjacent uplands. Using GIS analysis, this map provides basic information regarding what ecological services various wetlands are likely to provide. These ecological services, each of which has associated economic benefits, include: floodflow control, sediment retention, finfish habitat, and/or shellfish habitat. There are other important wetland functions and values not depicted in this map. Refer to www.maine.gov/dep/water/wetlands/ipwetfv2.html for additional information regarding wetland functions and values. Forested wetlands and small wetlands such as vernal pools are known to be underrepresented in the National Wetlands Inventory (NWI) data used to create this map. The model developed to estimate the functions provided by each wetland could not capture every wetland function or value. Therefore, it is important to use local knowledge and other data sources when evaluating wetlands, and each wetland should be considered relative to the whole landscape/watershed when assessing wetland resources at a local level.

Organized Township Boundary

Unorganized Township

Selected Town or Area of Interest

Developed: Impervious surfaces including buildings and roads

Subwatersheds- The shaded, background polygons are subwatersheds (areas that drain to a particular lake, wetland, pond, river, stream, or the ocean). The subwatersheds are shaded to show topographic relief. This "hillshading" assumes the sun is shining from the northwest, so ridgetops and northwest-facing slopes appear light, whereas valleys and southeast-facing slopes appear dark. Because many areas of Maine are relatively flat, the topographic relief shown here has been exaggerated to make the details easier to see.

Wetland Functions: Fill Pattern

Some wetlands may have more than one funtion (fill pattern)

RUNOFF / FLOODFLOW ALTERATION

Wetlands provide natural stormwater control capabilities. As natural basins in the landscape, wetlands are able to receive, detain, and slowly release stormwater runoff. Wetland shelves along stream banks naturally regulate flood waters by providing an area for swollen stream flows to expand and slow, thereby protecting downstream properties. This map assigns Runoff/Floodflow Alteration Functions to wetlands that are (a) contained in a known flood zone, (b) associated with a surfacewater course or waterbody, and (c) with slope < 3%.

AND/OR

EROSION CONTROL / SEDIMENT RETENTION

Wetlands act as natural sponges that can hold water, allowing suspended particles such as sediment to settle out. The dense vegetation in most wetlands helps to stabilize soil and slow water flows, thereby reducing scouring and bank erosion. This map assigns Erosion Control / Sediment Retention functions to wetlands with (a) slope < 3%; (b) emergent vegetation; and (c) close proximity to a river, stream, or lake.

FINFISH HABITAT

Wetlands with documented finfish populations, including wetlands adjacent to a river, stream, or lake.

AND/OR

SHELLFISH HABITAT

Inland wetlands and streams can directly affect the status of coastal shellfish harvest areas. Fecal coliform bacteria and waterborne nutrients resulting from land use changes away from the coast can travel via surface water to harvestable flats. One failed septic system near a stream could close a mudflat several miles away. Excessive nutrients can reduce water clarity and stimulate epiphytic growth that degrades eelgrass meadows. Conservation of freshwater wetlands and stream buffers in coastal watersheds is a key component in marine resource conservation. This map assigns a Shellfish Habitat function to wetlands within 0.5 miles of (a) identified shellfish habitat, (b) identified shellfish closure areas, or (c) mapped eelgrass beds OR palustrine wetlands directly connected by a stream of < 0.5 mile in length to (a) identified shellfish habitat, (b) identified shellfish closure areas, or (c) mapped eelgrass beds.

PLANT/ANIMAL HABITAT

Nearly all wildlife species, and many of Maine's plant species, depend on wetlands during some part of their life cycle. For the purposes of this map, wetlands containing open water or emergent vegetation, 3 or more wetland vegetation classes (see below), and within ¼ mile of a known rare, threatened, or endangered plant or animal occurrence, within ¼ mile of a mapped significant or essential habitat, or within ¼ mile of a rare or exemplary natural community have been assigned this function. Rare element occurrences and mapped habitats can be found on Map 2 High Value Plant & Animal Habitats.

OTHER FUNCTIONS

CULTURAL/EDUCATIONAL. Wetlands within ¼ mile of a boat ramp or school have been assigned this value as these wetlands are likely candidates for use as outdoor classrooms, or similar social benefit. Wetlands rated for other functions listed above may also demonstrate cultural/educational values although not expressly shown.

OR

NO DOCUMENTED FUNCTION. The basis of this characterization is high altitude aerial photos. Photo quality often limits the information that can be interpreted from small wetland features, or those with dense canopy cover. Although not assigned a function under this study, ground surveys may reveal that these wetlands have multiple functions and values.

Wetland Class: Fill Color

Aquatic Bed (floating or submerged aquatic vegetation), Open Water

Emergent (herbaceous vegetation), Emergent/Forested Mix (woody vegetation >20 ft tall), Emergent/Shrub-Scrub Mix (woody vegetation <20 ft tall)

Forested, Forested/Shrub-scrub

Shrub-scrub

Other (rocky shore, streambed, unconsolidated shore, reef, rocky bottom)

National Wetlands Inventory (NWI) maps (the basis of wetlands shown on this map) are interpreted from high altitude photographs. NWI Wetlands are identified by vegetation, hydrology, and geography in accordance with "Classification of Wetlands and Deepwater Habitats" (FWS/OBS-79/31, Dec 1979). The aerial photographs document conditions for the year they were taken. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State, or local government. NWI maps depict general wetland locations, boundaries, and characteristics. They are not a substitute for on-ground, site-specific wetland delineation.

Data Sources

DATA SOURCE INFORMATION
(note: italicized file names can be downloaded from Maine Office of GIS)
TOWNSHIP BOUNDARIES
Maine Office of GIS (2015); *metwp24*
ROADS
Maine Office of GIS, Maine Department of Transportation (2015); *medotpub*
HYDROLOGY
Maine Office of GIS, U.S. Geological Survey (2010); *NHD*
DEVELOPED
Maine Office of GIS, Maine Department of Inland Fisheries and Wildlife (2015)
NATIONAL WETLANDS INVENTORY (NWI)
Maine Office of GIS (2015); *NWI*
DRAINAGE DIVIDES
Maine Office of GIS (2015); *medrdvd*

DATA SOURCE CONTACT INFORMATION
Maine Office of GIS: http://www.maine.gov/megis/
Maine Department of Transportation: http://www.maine.gov/mdot/
Maine Department of Agriculture, Conservation and Forestry:
http://www.maine.gov/dacf/planning/index.html
Maine Geological Survey: http://www.maine.gov/doc/nrimc/mgs/mgs.htm

DIGITAL DATA REQUEST
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State of Maine
The Nature Conservancy
Protecting nature. Preserving life.
Maine Audubon
Maine Coast Heritage Trust
A Statewide Land Conservation Organization
MaineDOT

Feet 5,000 2,500 0 0.5 1 Miles
Meters 1,000 500 0 0.5 1 Kilometers

Scale: 1:24,000
Projection: UTM 19N
Datum: NAD 1983

Supported in part by Maine Outdoor Heritage Fund lottery ticket sales

Map Prepared by Maine Department of Inland Fisheries & Wildlife
October 2016

Supported in part by Loon Conservation Plate funds

FIGURE 4

Beginning with HABITAT

An Approach to Conserving Maine's Natural Space for Plants, Animals, and People

www.beginningwithhabitat.org

Primary Map 2

High Value Plant & Animal Habitats

Presque Isle

This map is non-regulatory and is intended for planning purposes only

LEGEND

Beginning with Habitat (BwH) is a voluntary tool intended to assist landowners, resource managers, planners, and municipalities in identifying and making informed decisions about areas of potential natural resource concern. This data includes the best available information provided through BwH's coalition partners as of the map date, and is intended for information purposes only. It should not be interpreted as a comprehensive analysis of plant and animal occurrences or other local resources, but rather as an initial screen to flag areas where agency consultation may be appropriate. Habitat data sets are updated continuously as more accurate and current data becomes available. However, as many areas have not been completely surveyed, features may be present that are not yet mapped, and the boundaries of some depicted features may need to be revised. Local knowledge is critical in providing accurate data. If errors are noted in the current depiction of resources, please contact our office. Some habitat features depicted on this map are regulated by the State of Maine through the Maine Endangered Species Act (Essential Habitats and threatened and endangered species occurrences) and Natural Resources Protection Act (Significant Wildlife Habitat). We recommend consultation with MDIFW Regional Biologists or MNAP Ecologists if activities are proposed within resource areas depicted on this map. Consultation early in the planning process usually helps to resolve regulatory concerns and minimize agency review time. For MDIFW and MNAP contact information, visit http://www.beginningwithhabitat.org/contacts/index.html.

⬚	Organized Township Boundary
⬚	Unorganized Township
▭	Selected Town or Area of Interest
▨	Developed: Impervious surfaces such as buildings and roads

Rare, Threatened, or Endangered Wildlife

▨	Known rare, threatened, or endangered species occurrence and/or the associated habitats based on species sightings.

Consult with an MDIFW regional biologist to determine the relative importance and conservation needs of the specific location and supporting habitat. For more information regarding individual species visit our website, http://www.maine.gov/ifw/wildlife/species/endangered_species/state_list.htm, for species specific fact sheets.

The Federal Endangered Species Act requires actions authorized, funded, or carried out by federal agancies be reviewed by the U. S. Fish and Wildlife Service. If your project occurs near an occurrence of the Atlantic Salmon, Roseate Tern, Piping Plover, Canada Lynx, New England Cottontail, Fubish's Lousewort, or Small-whorled Pagonia contact the Maine Field Office, USFWS, 1168 Main St., Old Town, ME 04468.

Rare or Exemplary Plants and Natural Communities

▧	Rare Plant Locations

Known rare, threatened, or endangered plant occurrences are based on field observations. Consult with a Maine Natural Areas Program (MNAP) Ecologist to determine conservation needs of particular species. For more information regarding rare plants, the complete list of tracked species and fact sheets for those species can be found at: http://www.maine.gov/doc/nrimc/mnap/features/plantlist.htm

▨	Rare or Exemplary Natural Community Locations

The MNAP has classified and distinguished 98 different natural community types that collectively cover the state's landscape. These include such habitats as floodplain forests, coastal bogs, alpine summits, and many others. Each type is assigned a rarity rank of 1 (rare) through 5 (common). Mapped rare natural communities or ecosystems, or exemplary examples of common natural communities or ecosystems, are based on field surveys and aerial photo interpretation. Consult with an MNAP Ecologist to determine conservation needs of particular communities or ecosystems.

Essential Wildlife Habitats

▩	Roseate Tern Nesting Area *or* Piping Plover-Least Tern Nesting, Feeding, & Brood-Rearing Area

Maine's Department of Inland Fisheries & Wildlife (MDIFW, www.state.me.us/ifw) maps areas currently or historically providing habitat essential to the conservation of endangered or threatened species as directed by the Maine Endangered Species Act (12 MRSA, Chapter 925, Subchapter 3, Sections 12804 and 12806) and regulations (MDIFW Rules, Chapter 8.05). Identification of Essential Habitat areas is based on species observations and confirmed habitat use. If a project occurs partly or wholly within an Essential Habitat, it must be evaluated by MDIFW before state and/or municipal permits can be approved or project activities can take place.

Significant Wildlife Habitats

▤	Candidate Deer Wintering Area

Forested area possibly used by deer for shelter during periods of deep snow and cold temperatures. Assessing the current value of a deer wintering area requires on-site investigation and verification by IF&W staff. Locations depicted should be considered as approximate only.

▥	Inland Waterfowl / Wading Bird

Freshwater breeding, migration/staging, and wintering habitats for inland waterfowl or breeding, feeding, loafing, migration, or roosting habitats for inland wading birds.

▦	Seabird Nesting Island

An island, ledge, or portion thereof in tidal waters with documented, nesting seabirds or suitable nesting habitat for endangered seabirds.

○	Shorebird Areas

Coastal staging areas that provide feeding habitat like tidal mud flats or roosting habitat like gravel bars or sand spits for migrating shorebirds

▧	Tidal Waterfowl / Wading Bird

Breeding, migrating/staging, or wintering areas for coastal waterfowl or breeding, feeding, loafing, migrating, or roosting areas for coastal wading birds. Tidal Waterfowl/Wading Bird habitats include aquatic beds, eelgrass, emergent wetlands, mudflats, seaweed communities, and reefs.

▨	Significant Vernal Pools

A pool depression used for breeding by amphibians and other indicator species and that portion of the critical terrestrial habitat within 250 ft of the spring or fall high water mark. A vernal pool must have the following characteristics: natural origin, nonpermanent hydroperiod, lack permanently flowing inlet or outlet, and lack predatory fish.

Maine's Natural Resources Protection Act

Maine's Natural Resources Protection Act (NRPA, 1988) is administered by the Maine Department of Environmental Protection (MDEP; http://www.maine.gov/dep/blwq/docstand/nrpapage.htm) and is intended to prevent further degradation and loss of natural resources in the state, including the above Significant Wildlife Habitats that have been mapped by MDIFW. MDEP has regulatory authority over most Significant Wildlife Habitat types. The regional MDEP office should be consulted when considering a project in these areas.

Atlantic Salmon Spawning/Rearing Habitat

∿	Atlantic Salmon Rearing Habitat
∿	Atlantic Salmon Spawning Habitat
∿	Atlantic Salmon Limited Spawning Habitat

Mapped by Atlantic Salmon Commission (ASC) and US Fish & Wildlife Service (USFWS) from field surveys on selected Penobscot and Kennebec River tributaries and the Dennys, Ducktrap, East Machias, Machias, Pleasant, Narraguagus, and Sheepscot Rivers.

Data Sources

DATA SOURCE INFORMATION

TOWNSHIP BOUNDARIES
  Maine Office of GIS: *Metwp24* (2013)
ROADS
  Maine Office of GIS, Maine Department of Transportation: *Medotpub* (2015)
HYDROLOGY
  U.S. Geological Survey National Hydrography Dataset (NHD) Maine (2012)
DEVELOPED
  Maine Office of GIS, Maine Department of Inland Fisheries and Wildlife, and multiple other agencies: *Imperv* (2015)
ESSENTIAL & SIGNIFICANT WILDLIFE HABITATS
  Maine Office of GIS, Maine Department of Inland Fisheries & Wildlife; *DWA, ETSC, Ehplvtrn, Ehrtern, IWWH, Sni, Shorebird, TWWH* (2003-2015)
RARE NATURAL COMMUNITIES & PLANTS
  Maine Natural Areas Program: *MNAP_eos* (2015)
ATLANTIC SALMON HABITAT
  Maine Office of GIS, Maine Atlantic Salmon Commission, U.S. Fish & Wildlife Service: *Ashab3* (2013)

DATA SOURCE CONTACT INFORMATION

Maine Office of GIS: http://www.maine.gov/megis/catalog/
Maine Natural Areas Program: http://www.maine.gov/dacf/mnap/index.html
Maine Department of Inland Fisheries & Wildlife: http://www.maine.gov/ifw/
U.S. Fish & Wildlife Service, Gulf of Maine Program: http://gulfofmaine.fws.gov
Maine Atlantic Salmon Commission: http://www.maine.gov/asc/
Maine Department of Transportation: http://www.maine.gov/mdot/

DIGITAL DATA REQUEST

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http://www.beginningwithhabitat.org/the_maps/gis_data_request.html

Feet 5,000 2,500 0 0.5 1 Miles
Meters 1,000 500 0 0.5 1 Kilometers

1:24,000 Scale
Projection: UTM 19N
Datum: NAD 1983

Supported in part by Maine Outdoor Heritage Fund lottery ticket sales

Map Prepared by Maine Department of Inland Fisheries & Wildlife
October 2016

Supported in part by Loon Conservation Plate funds

FIGURE 5

Beginning with HABITAT

An Approach to Conserving Maine's Natural Space for Plants, Animals, and People

www.beginningwithhabitat.org

Primary Map 3

Undeveloped Habitat Blocks & Connectors and Conserved Lands

Presque Isle

This map is non-regulatory and is intended for planning purposes only

Scale: 1:24,000
Projection: UTM 19N
Datum: NAD 1983

LEGEND

This map highlights undeveloped natural areas likely to provide core habitat blocks and habitat connections that facilitate species movements between blocks. Undeveloped habitat blocks provide relatively undisturbed habitat conditions required by many of Maine's species. Habitat connections provide necessary opportunities for wildlife to travel between preferred habitat types in search for food, water, and mates. Roads and development fragment habitat blocks and can be barriers to moving wildlife. By maintaining a network of interconnected blocks towns and land trusts can protect a wide variety of Maine's species—both rare and common—to help ensure rich species diversity long into the future. Maintaining a network of these large rural open spaces also protects future opportunities for forestry, agriculture, and outdoor recreation.

Organized Township Boundary

Unorganized Township

Selected Town or Area of Interest

Habitat Blocks

Development Buffer (*pale transparency*)
250-500 foot buffer around improved roads and developed areas based on development intensity.

Undeveloped Habitat Block
Remaining land outside of Development Buffers. Blocks greater than 100 acres are labeled with their estimated acreage.

Approximate Road Crossing Habitat Connections

Represented habitat connections identified through computer modeling highlight locations where quality habitat is likely to occur on both sides of a given road between undeveloped habitat blocks greater than 100 acres and between higher value wetlands.These representations are approximate and have not been field verified.

Undeveloped Block Connectors
Likely road crossing areas linking undeveloped habitat blocks greater than 100 acres. The threat of habitat fragmentation and animal mortality corresponds to traffic volume.

Yellow lines represent habitat road crossings with daily traffic volumes less than 2000 vehicles per day.

Red lines represent habitat road crossings with daily traffic volumes greater than 2000 vehicles per day.

Riparian Connectors
Likely crossing locations for wetland dependent species moving between waterways and wetlands divided by roads

Blue lines represent riparian road crossings with daily traffic volumes less than 2000 vehicles per day.

Purple lines represent riparian road crossings with daily traffic volumes greater than 2000 vehicles per day.

Highway Bridge Connectors
Highway bridges along I-95 and I-295 that span riparian habitat connecting adjacent but separated habitat blocks.These are locations where species are likely to take advantage of infrastructure to move between habitat blocks.

Conserved Lands

The State of Maine's conserved lands database includes lands in federal, state, and non-profit ownership. It does not include many privately owned conservation lands, especially those protected by local land trusts, or town owned conservation lands. For the most accurate and current information about land ownership, consult with the local assessor and/or other local land management agencies. If public access potential to any of the properties displayed here is uncertain, landowners should be contacted to determine if permission is necessary.

Ownership Type (*transparent layers*)

Federal
National parks, forests, and wildlife refuges. (Includes Canadian conserved lands.)

State
Wildlife Management Areas and other properties managed by the Department of Inland Fisheries and Wildlife, state parks, and parcels managed by the Bureau of Parks & Lands.

Municipal
Town parks, water district properties, community forests, etc.

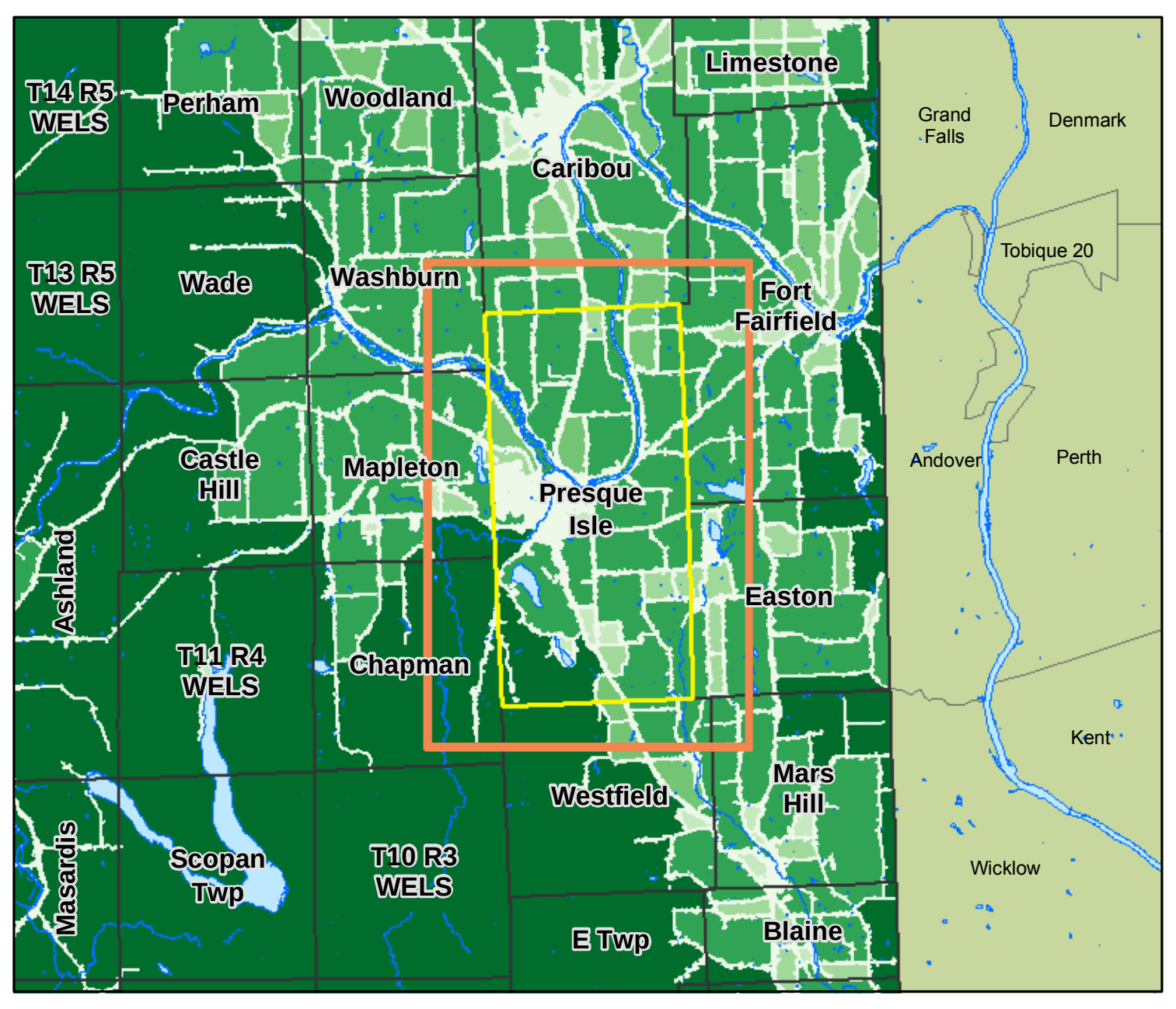
Private Conservation
Properties owned and managed by private (usually non-profit) organizations such as The Nature Conservancy, Maine Coast Heritage Trust; Trust for Public Land, and local land trusts.

Easement
Voluntary legal agreements that allow landowners to realize economic benefit by permanently restricting the amount and type of future development and other uses on all or part of their property as they continue to own and use it.

Aerial Imagery

Aerial imagery is often the best tool available to visualize existing patterns of development and resulting changes in the natural landscape. By depicting undeveloped habitat blocks, habitat connectors and conserved lands with aerial photos, the map user can more easily identify opportunities to expand the size and ecological effectiveness of local conservation efforts.

Regional Undeveloped Blocks



▢	Developed Areas	▨	500-1,000 acres
▨	0 - 250 acres	▨	1,000-5,000 acres
▨	250-500 acres	■	> 5,000 acres

1 : 325,000 **1 inch equals 6 miles**

Data Sources

DATA SOURCE INFORMATION
TOWNSHIP BOUNDARIES
Maine Office of GIS: *metwp24* (2013)
ROADS
Maine Office of GIS, Maine Department of Transportation): *medotpub* (2015)
HYDROLOGY
U.S. Geological Survey: *NHD_Maine* (2012)
UNDEVELOPED HABITAT BLOCKS, DEVELOPMENT BUFFER, CONNECTORS
Maine Department of Inland Fisheries and Wildlife (2015)
CONSERVATION LANDS
Maine Department of Agriculture, Conservation, and Forestry, Land Use Planning Commission, Maine Department of Inland Fisheries and Wildlife: *Conserved Lands* (2015)
AERIAL IMAGERY
U.S. Department of Agriculture: *NAIP 2013* - state-wide 1-meter color orthoimagery

DATA SOURCE CONTACT INFORMATION
Maine Office of GIS - http://www.maine.gov/megis/catalog/
Maine Dept. of Agriculture, Conservation and Forestry - http://www.maine.gov/dacf/
Maine Dept. of Inland Fisheries & Wildlife - http://www.maine.gov/ifw/
Maine Department of Transportation - http://www.maine.gov/mdot/
Maine Department of Environmental Protection - http://www.maine.gov/dep/

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State of Maine
The Nature Conservancy
Protecting nature. Preserving life.
Maine Audubon
Maine Coast Heritage Trust
A Statewide Land Conservation Organization
MaineDOT
Supported in part by Maine Outdoor Heritage Fund lottery ticket sales
Map Prepared by Maine Department of Inland Fisheries & Wildlife
October 2016
Supported in part by Loon Conservation Plate funds

FIGURE 6

Beginning with HABITAT

An Approach to Conserving Maine's Natural Space for Plants, Animals, and People

www.beginningwithhabitat.org

Supplementary Map

Natural Resource Co-occurrence

Presque Isle

This map is non-regulatory and is intended for planning purposes only

Legend

This map represents the concentration of selected environmental asset data layers overlaid on the landscape. Its purpose is to highlight a given area's relative conservation values as an aid in planning. It offers a generalized and subjective view and should be considered as a starting point for discussion. The layers on this map include buffer zones around water features, important natural communities, listed plant and animal species, areas of undeveloped land, and conserved properties. Some of these layer attributes have been weighted based on qualitative features, such as rarity or size, and are noted below. Cooccurrence modeling is extremely flexible, allowing for the addition, substitution, and relative weighting of data and attributes that best reflect the particularities and priorities of a given area or community. This map draws on data that is depicted on the standard Beginning with Habitat map set, but should still be considered as both supplementary and as work in development.

⬚	**Organized Township Boundary**
⬚	**Unorganized Township**
⬚	**Selected Town or Area of Interest**
▨	**Developed: Impervious surfaces such as buildings and roads**
▨	**Conservation Land**

Selected Resource Layers and Assigned Values

Geographic Information System (GIS) software provides a ready means to help identify areas of high resource cooccurrence. The selected data layers of interest are assigned a relative weight, or value, and then overlaid on one another. The values are then summed, classified, and symbolized, revealing the concentration of attributes in a given landscape. (Some of the layers listed may not apply to, or be present on, the area represented by this map.)

Rare and Exemplary Natural Communities
S1 (Critically Imperiled). Value of 4
S2 (Imperiled). Value of 4
S3 (Rare). Value of 3
S4 and S5 with A or B viability (Exemplary). Value of 3

Rare Plants
S1 (Endangered). Value of 3
S1S2 - S2 (Threatened). Value of 2
S2S3 - S3 (Special Concern). Value of 1

Listed Animals
Endangered Species (with buffer). Value of 3
Threatened Species (with buffer). Value of 2
Species of Special Concern (with buffer). Value of 1

Significant Wildlife Habitats
Shorebird Habitat. Value of 3
Seabird Nesting Islands. Value of 3
Essential Wildlife Habitat. Value of 3
Wading Bird and Waterfowl Habitats (inland and tidal). Value of 2
Deer Wintering Areas. Value of 1
Significant Vernal Pools (with 500' buffer). Value of 1
Atlantic Salmon Habitat. Value of 2
Heritage BrookTrout Waters. Value of 2
Shellfish Beds. Value of 1

Riparian Zones and Water Resources
Tidal waters 250' buffer. Value of 2
Great Ponds 250' buffer. Value of 1
Rivers 250' buffer. Value of 1
Streams 75' buffer. Value of 1
Wetlands greater than 10 acres plus 250' buffer. Value of 1
Wetlands less than10 acres plus75' buffer. Value of 1
Groundwater Aquifers. Value of 1

Undeveloped Habitat Blocks
Areas over 1200 acres. Value of 3
Areas of 600 to 1200 acres. Value of 2
Areas of 200 to 600 acres. Value of 1

Sum of Attribute Values

🟩	0
🟩	1-2
🟩	3
🟩	4-5
🟩	6-8
🟩	9-12
🟩	Over 12

Focus Areas

Focus Areas of Statewide Ecological Significance
(note: not present in all regions)

Focus Areas of Statewide Ecological Significance have been designated based on an unusually rich convergence of rare plant and animal occurrences, high value habitat, and relatively intact natural landscapes (the combined elements of Beginning with Habitat Maps 1-3). Focus area boundaries were drawn by MNAP and MDIFW biologists, generally following drainage divides and/or major fragmenting features such as roads. Focus Areas are intended to draw attention to these truly special places in hopes of building awareness and garnering support for land conservation by landowners, municipalities, and local land trusts. For descriptions of specific Focus Areas, consult the Beginning with Habitat notebook or the following website: http://www.maine.gov/dacf/mnap/focusarea/index.htm

Data and Information Sources

DATA SOURCES
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Maine Office of GIS: *Metwp24* (2013)
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Maine Office of GIS, Maine Department of Inland Fisheries & Wildlife; *DWA, ETSC, Ehplvtrn, Ehrtern, IWWH, Sni, Shorebird, TWWH* (2003-2015)
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Maine Natural Areas Program: *MNAP_eos* (2015)
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Maine Office of GIS, Maine Atlantic Salmon Commission, U.S. Fish & Wildlife Service: *Ashab3* (2013)

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Maine Department of Inland Fisheries & Wildlife: http://www.maine.gov/ifw/
U.S. Fish & Wildlife Service, Gulf of Maine Program: http://gulfofmaine.fws.gov
Maine Atlantic Salmon Commission: http://www.maine.gov/asc/
Maine Department of Transportation: http://www.maine.gov/mdot/

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N S W E
Feet 5,000 2,500 0 0.5 1 Miles
Meters 1,000 500 0 0.5 1 Kilometers

1:24,000 Scale
Universal Transverse Mercator (UTM) Projection
North American Datum (NAD) 1983

Supported in part by Maine Outdoor Heritage Fund lottery ticket sales

Map Prepared by Maine Department of Inland Fisheries & Wildlife
October 2016

Supported in part by Loon Conservation Plate funds

FIGURE 7

TABLES

TABLE 1
Summary of Soil Analytical Data for Risk Assessment
Former Loring AFB Laundry Annex
Presque Isle, Maine

Sample ID	Sample Depth (ft bgs)	Sampling Date	Benzene (VPH/VOC) mg/kg	Ethylbenzene (VOC/VPH) mg/kg	Toluene (VOC/VPH) mg/kg	Xylenes (total) (VOC/VPH) mg/kg	Naphthalene (VOC/VPH) mg/kg	Naphthalene (EPH/SVOC) mg/kg	2-Methyl-naphthalene mg/kg	Acenaphthene mg/kg	Acenaphthylene mg/kg	Anthracene mg/kg	Benzo(a)-anthracene mg/kg	Benzo(b)-fluoranthene mg/kg	Benzo(k)-fluoranthene mg/kg	Benzo(g,h,i)-perylene mg/kg
LASB-5-1	6-8	11/02/16	0.042 U	0.042 U	0.042 **U**	0.042 U	0.042 U	0.11 UJ	0.11 UJ	0.11 U	0.11 U	0.11 U	**0.052 J**	**0.091 J**	0.11 U	**0.072 J**
LASB-5-1/Dup	6-8	11/02/16	0.041 U	0.041 U	0.041 U	0.041 U	0.041 U	0.12 UJ	0.11 U	0.12 U	0.12 U	0.12 U	**0.052 J**	**0.091 J**	**0.14 J**	**0.13 J**
LASB-5-2	9-11	11/02/16	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-6-1	12-14	11/02/16	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.13 UJ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
LASB-6-2	14-16	11/02/16	0.036 U	0.036 U	0.036 U	0.036 U	0.036 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-7-1	6-8	11/02/16	**0.034 J**	**0.019 J**	**0.1**	**0.15 J**	**0.054 J**	**0.20 J**	**0.3 J**	0.20 UJ	**0.3 J**	**0.16 J**	1.1 J	**0.7**	**0.7 J**	**0.5 J**
LASB-7-2	8-10	11/02/16	0.23 U	0.23 U	**0.063 J**	0.23 U	0.23 U	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.11 J	0.29 UJ	0.29 UJ
LASB-8-1	12-14	11/02/16	1.9 U	**4.4**	1.9 U	**81.7**	**29**	**15 J**	**1.8**	0.16 U	0.16 U	0.16 U	0.12 J	0.12 J	**0.14 J**	**0.11 J**
LASB-9-1	12-14	11/02/16	**0.03 J**	0.13 U	**0.049 J**	0.13 U	**0.028 J**	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	**0.29 J**	**0.33 J**	**0.40**	**0.33 J**
LASB-10-1	12-14	11/02/16	0.036 U	0.036 U	0.036 U	0.036 U	0.036 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-11-1	6-8	11/02/16	1.2 U	1.2 U	1.2 U	**23**	**22**	**7.2 J**	**0.60**	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
LASB-12-1	6-8	07/20/17	0.046 U	0.046 U	0.046 U	0.046 U	0.046 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	**0.0019 J**	**0.0021 J**	0.0019 U	**0.0011 J**
LASB-12-2	8.5-10.5	07/20/17	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U
LASB-13A-1	6-8	07/20/17	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 UJ	0.0022 U
LASB-13A-2	8-10	07/20/17	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	**0.0010 J**	**0.0012 J**	0.0018 U	0.0018 U
LASB-14A-1	6-8	07/20/17	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	**0.0039 J**	**0.004 J**	**0.0031 J**	**0.0032 J**
LASB-14A-1/Dup	6-8	07/20/17	0.047 U	0.047 U	0.047 U	0.047 U	**0.020 J**	0.0022 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	**0.0039 J**	**0.004 J**	**0.0031 J**	**0.0032 J**
LASB-14A-2	8-10	07/20/17	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	**0.0015 J**	**0.0017 J**	0.0022 U	**0.0010 J**
LASB-15-B-1	12-14	07/20/17	0.053 U	0.053 U	0.053 U	0.053 U	**0.14 J**	**0.0084**	**0.0021 J**	**0.00092 J**	**0.0011 J**	**0.0026 J**	**0.010**	**0.010**	**0.0028 J**	**0.0044**
LASB-17-B-1	8-12	07/20/17	0.091 U	0.091 U	0.091 U	**1.9**	**0.078 J**	**0.0068 J**	**0.0020 J**	0.0031 UJ	**0.012 J**	**0.0074 J**	**0.042 J**	**0.047 J**	**0.017 J**	**0.024 J**
LASB-18-1	12-14	07/20/17	0.046 U	0.046 U	0.046 U	0.046 U	0.046 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	**0.0014 J**	**0.0017 J**	0.0018 U	**0.0011 J**
LASB-19A-1	9-11	07/20/17	0.039 U	0.039 U	0.039 U	0.039 U	0.039 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	**0.011**	**0.027**	**0.023**	**0.021**	**0.022**
Arithmetic Mean Concentration			**0.098**	**0.26**	**0.10**	**4.9**	**2.4**	**1.0**	**0.15**	**0.039**	**0.048**	**0.042**	**0.10**	**0.087**	**0.088**	**0.075**
Maximum Detected Concentration			**0.034**	**4.4**	**1.9 J**	**81.7**	**29**	**15**	**1.8**	**0.29**	**0.30 J**	**0.29**	**1.10 J**	**0.70**	**0.70 J**	**0.50**
Maine DEP Soil Background Concentrations (Urban) [1]			NE	NE	NE	NE	0.22	0.22	0.16	0.20	0.39	0.40	1.6	2.0	0.76	0.79
Human Health Screening Level [2]			1.2	5.8	490	58	2	2	24	360	NE	1,800	1.1	1.1	11	NE
Exposure Point Concentration [3]			**Not COPC**	**Not COPC**	**Not COPC**	**31.4**	**12.7**	**Use VOC/VPH**	**Not COPC**	**Not COPC**	**Not COPC**	**Not COPC**	**Not COPC**	**Not COPC**	**Not COPC**	**Not a COPC; see text**

🟨	Exceeds Screening Level.
Bold	Detected value.
ft bgs	Feet below ground surface.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
J	Estimated concentration below reporting limit or due to quality control limitations.
UJ	Estimated non-detect value.
ND	Not detected at reporting limit shown.
NE	Not established.
COPC	Chemical of potential concern.
VOC/VPH	Highest detected concentration or lowest reporting limit from volatile organic compound (VOC) and volatile petroleum hydrocarbon (VPH) analysis.
SVOC/EPH	Highest detected concentration or lowest reporting limit from semi-volatile organic compound (SVOC) and extractable petroleum hydrocarbon (EPH) analysis.
"-"	Not analyzed.
[1].	MaineDEP (October 2018). Maine Remedial Action Guidelines (RAGS) for Sites Contaminated with Hazardous Substances. Urban background.
[2].	USEPA (May 2020). Regional Screening Level (RSL) Table, unless otherwise noted. (TR=1E-06, HQ=0.1).
[3].	95th percentile upper concentration limit (95% UCL).

TABLE 1
Summary of Soil Analytical Data for Risk Assessment
Former Loring AFB Laundry Annex
Presque Isle, Maine

Sample ID	**Sample Depth** (ft bgs)	**Sampling Date**	**Benzo(a)pyrene** mg/kg	**Chrysene** mg/kg	**Dibenzo(a,h)-anthracene** mg/kg	**Fluoranthene** mg/kg	**Fluorene** mg/kg	**Indeno(1,2,3-cd)-pyrene** mg/kg	**Phenanthrene** mg/kg	**Pyrene** mg/kg
LASB-5-1	6-8	11/02/16	**0.081 J**	**0.10 J**	**0.11 U**	**0.071 J**	0.11 U	0.057 U	0.11 U	**0.092 J**
LASB-5-1/Dup	6-8	11/02/16	**0.12 J**	**0.16 J**	**0.082 J**	**0.15 J**	0.11 U	**0.098 J**	0.11 U	**0.17 J**
LASB-5-2	9-11	11/02/16	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-6-1	12-14	11/02/16	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
LASB-6-2	14-16	11/02/16	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-7-1	6-8	11/02/16	**0.82 J**	**1.4 J**	**0.20 J**	**1.6 J**	**0.072 J**	**0.4 J**	**1.0 J**	**1.9 J**
LASB-7-2	8-10	11/02/16	0.10 J	**0.15 J**	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	**0.20 J**
LASB-8-1	12-14	11/02/16	**0.12 J**	**0.21 J**	**0.095 J**	**0.4**	**0.14 J**	0.079 J	**0.4**	**0.5**
LASB-9-1	12-14	11/02/16	**0.40 J**	**0.50**	**0.18 J**	**0.50**	0.20 U	**0.24 J**	**0.31 J**	**0.60**
LASB-10-1	12-14	11/02/16	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-11-1	6-8	11/02/16	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
LASB-12-1	6-8	07/20/17	**0.0016 J**	**0.0015 J**	0.0019 U	**0.0023 J**	0.0019 U	**0.001 J**	**0.00089 J**	**0.0021 J**
LASB-12-2	8.5-10.5	07/20/17	0.0021 U	0.0021 U	0.0021 U	**0.0012 J**	0.0021 U	0.0021 U	0.0021 U	**0.0011 J**
LASB-13A-1	6-8	07/20/17	0.0022 U	0.0022 UJ	0.0022 UJ	**0.0012 J**	0.0022 U	0.0022 U	0.0022 U	**0.0012 J**
LASB-13A-2	8-10	07/20/17	**0.00087 J**	**0.0009 J**	0.0018 U	**0.0011 J**	0.0018 U	0.0018 U	0.0018 U	**0.0012 J**
LASB-14A-1	6-8	07/20/17	**0.0034 J**	**0.0036 J**	**0.0026 J**	**0.0026 J**	0.0021 U	**0.0035 J**	**0.00096 J**	**0.0026 J**
LASB-14A-1/Dup	6-8	07/20/17	**0.0022 U**	**0.0036 J**	0.0022 U	**0.0026 J**	0.0021 U	**0.0035 J**	**0.00096 J**	**0.0026 J**
LASB-14A-2	8-10	07/20/17	**0.0013 J**	**0.0014 J**	0.0022 U	**0.0023 J**	0.0022 U	**0.001 J**	**0.0018 J**	**0.0024 J**
LASB-15-B-1	12-14	07/20/17	**0.007**	**0.0082**	**0.0011 J**	**0.0211**	**0.0013 J**	**0.0042**	**0.0111**	**0.021**
LASB-17-B-1	8-12	07/20/17	**0.0359** J	**0.0363 J**	**0.0065 J**	**0.073 J**	**0.0036 J**	**0.0217 J**	**0.027 J**	**0.068 J**
LASB-18-1	12-14	07/20/17	**0.0013 J**	**0.0012 J**	0.0018 U	**0.002 J**	0.0018 U	**0.0009 J**	**0.0014 J**	**0.0021 J**
LASB-19A-1	9-11	07/20/17	**0.024**	**0.023**	**0.022**	**0.022**	0.0019 U	**0.025**	**0.0090**	**0.023**
Arithmetic Mean Concentration			**0.092**	**0.14**	**0.050**	**0.16**	**0.040**	**0.062**	**0.11**	**0.19**
Maximum Detected Concentration			**0.82 J**	**1.4**	**0.20 J**	**1.6**	**0.29**	**0.40 J**	**1.0**	**1.9**
Maine DEP Soil Background Concentrations (Urban) [1]			1.6	2.3	0.23	3.23	0.29	0.74	1.6	2.8
Human Health Screening Level [2]			0.11	110	0.11	240	240	1.1	NE	180
Exposure Point Concentration [3]			**0.21**	**Not COPC**	**0.14**	**Not COPC**	**Not COPC**	**Not COPC**	**Not a COPC; see text**	**Not COPC**

🟨	Exceeds Screening Level.
Bold	Detected value.
ft bgs	Feet below ground surface.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
J	Estimated concentration below reporting limit or due to quality control limitations.
UJ	Estimated non-detect value.
ND	Not detected at reporting limit shown.
NE	Not established.
COPC	Chemical of potential concern.
VOC/VPH	Highest detected concentration or lowest reporting limit from volatile organic compound (VOC) and volatile petroleum hydrocarbon (VPH) analysis.
SVOC/EPH	Highest detected concentration or lowest reporting limit from semi-volatile organic compound (SVOC) and extractable petroleum hydrocarbon (EPH) analysis.
"-"	Not analyzed.
[1].	MaineDEP (October 2018). Maine Remedial Action Guidelines (RAGS) for Sites Contaminated with Hazardous Substances. Urban background.
[2].	USEPA (May 2020). Regional Screening Level (RSL) Table, unless otherwise noted. (TR=1E-06, HQ=0.1).
[3].	95th percentile upper concentration limit (95% UCL).

TABLE 2
Summary of Groundwater Analytical Data
Former Loring AFB Laundry Annex
Presque Isle, Maine

Well ID	Sample ID	Depth to Groundwater ft bgs	Sampling Date	Acetone [2] µg/L	Benzene (VOC/VPH) µg/L	Bromodichloro-methane [2] µg/L	2-Butanone µg/L	Carbon Disulfide µg/L	Chloroform [2] µg/L	1,2-Dibromo-3-chloropropane µg/L	Ethylene Dibromide µg/L	Ethylbenzene (VOC/VPH) µg/L	Toluene [2] (VOC/VPH) µg/L
LAMW-1A	LAMW-01A051515	11.55	05/15/15	1.2 U	**0.22 J**	0.25 U	**4.0**	**0.31 J**	**0.076 J**	0.024 U	0.024 U	0.25 U	**1.3**
LAMW-3A	LAMW-03A-051515	12.29	05/15/15	1.2 U	0.25 U	0.25 U	1.2 U	0.25 U	**0.10 J**	0.024 U	0.024 U	0.25 U	**10**
LAMW-4A	LAMW-04A-051515	35.09	05/15/15	**2.2 J**	0.25 U	**0.61**	1.2 U	0.25 U	**6.4**	0.024 U	0.024 U	0.25 U	**20**
LAMW-5A	LAMW-05A-051515/DUP	8.55	05/15/15	**2.2 J**	0.25 U	0.25 U	1.2 U	0.25 U	**0.20 J**	0.02 U	0.02 U	0.25 U	**0.45 J**
Maximum Detected Concentration (2015)				**2.2 J**	**0.22 J**	**0.61**	**4.0**	**0.31 J**	**6.4**	**ND**	**ND**	**ND**	**20**
Groundwater Screening Values [3]				1,400	0.46	0.13	560	81	0.22	0.2 M	0.05 M	1.5	110

All detected and other selected analytes are presented

Value	Exceeds screening concentration (2015 data only). Data from 1996 and 1997 not applied.
ft bgs	Feet below ground surface (measured from top if riser pipe).
µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated concentration.
ND	Not detected (group).
NE	Not established.
LAWX-X/Dup	The highest concentration in either the original sample and sample duplicate is presented.
Bold type	Detections are emphasized in bold type.
1.4 U	(italics) Reporting limit is above one or more screening criteria.
[1].	PCBs and pesticides also analyzed for in Nov 1996 and March 1997; none detected.
[2].	The following analytes were detected in the equipment blank for the 5/15/15 samples: Acetone = 4.3 µg/L Bromodichloromethane = 0.15J µg/L Chloroform = 0.2J µg/L Toluene = 0.11J µg/L Xylenes = 3.6 µg/L
[3].	Values are RSLs from US EPA Regional Screening Levels (RSLs) Generic Tables (May 2020) unless otherwise noted.
[4].	US EPA does not have RSLs for these specific hydrocarbon fractions; values presented are MaineDEP residential RAGs for water (MaineDEP 2018).

TABLE 2
Summary of Groundwater Analytical Data
Former Loring AFB Laundry Annex
Presque Isle, Maine

Well ID	Sample ID	Depth to Groundwater ft bgs	Sampling Date	1,2,4-Trimethyl-benzene µg/L	Vinyl chloride µg/L	Xylenes (total) [2] (VOC/VPH) µg/L	Naphthalene µg/L	2-Methyl-naphthalene µg/L	Acenaphthene µg/L	Acenaph-thylene µg/L	Anthracene µg/L	Benzo(a)-anthracene µg/L	Benzo(b)-fluoranthene µg/L
LAMW-1A	LAMW-01A051515	11.55	05/15/15	**0.051** J	*0.50 U*	**0.074** J	*1.6 U*	1.6 U	2.1 U	1.6 U	1.6 U	*1.6 U*	*1.6 U*
LAMW-3A	LAMW-03A-051515	12.29	05/15/15	0.25 U	*0.50 U*	0.75 U	*1.4 U*	1.4 U	1.8 U	1.4 U	1.4 U	*1.4 U*	*1.4 U*
LAMW-4A	LAMW-04A-051515	35.09	05/15/15	0.25 U	*0.50 U*	0.75 U	*1.4 U*	1.4 U	1.8 U	1.4 U	1.4 U	*1.4 U*	*1.4 U*
LAMW-5A	LAMW-05A-051515/DUP	8.55	05/15/15	0.25 U	*0.50 U*	0.75 U	*1.4 U*	1.4 U	1.8 U	1.4 U	1.4 U	*1.4 U*	*1.4 U*
Maximum Detected Concentration (2015)				**0.051 J**	**ND**	**0.074 J**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Groundwater Screening Values [3]				5.6	0.019	19	0.17	3.6	53	NE	180	0.03	0.25

All detected and other selected analytes are presented

Value	Exceeds screening concentration (2015 data only). Data from 1996 and 1997 not applied.
ft bgs	Feet below ground surface (measured from top if riser pipe).
µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated concentration.
ND	Not detected (group).
NE	Not established.
LAWX-X/Dup	The highest concentration in either the original sample and sample duplicate is presented.
Bold type	Detections are emphasized in bold type.
1.4 U	(italics) Reporting limit is above one or more screening criteria.
[1].	PCBs and pesticides also analyzed for in Nov 1996 and March 1997; none detected.
[2].	The following analytes were detected in the equipment blank for the 5/15/15 samples: Acetone = 4.3 µg/L Bromodichloromethane = 0.15J µg/L Chloroform = 0.2J µg/L Toluene = 0.11J µg/L Xylenes = 3.6 µg/L
[3].	Values are RSLs from US EPA Regional Screening Levels (RSLs) Generic Tables (May 2020) unless otherwise noted.
[4].	US EPA does not have RSLs for these specific hydrocarbon fractions; values presented are MaineDEP residential RAGs for water (MaineDEP 2018).

TABLE 2
Summary of Groundwater Analytical Data
Former Loring AFB Laundry Annex
Presque Isle, Maine

Well ID	Sample ID	Depth to Groundwater ft bgs	Sampling Date	Benzo(k)-fluoranthene µg/L	Benzo(g,h,i)-perylene µg/L	Benzo(a)-pyrene µg/L	Chrysene µg/L	Dibenzo(a,h)-anthracene µg/L	Fluoranthene µg/L	Fluorene µg/L	Indeno(1,2,3-cd)-pyrene µg/L	Phenanthrene µg/L	Pyrene µg/L
LAMW-1A	LAMW-01A051515	11.55	05/15/15	*1.6 U*	1.6 U	*1.6 U*	1.6 U	*1.6 U*	1.6 U	1.6 U	*1.6 U*	1.6 U	1.6 U
LAMW-3A	LAMW-03A-051515	12.29	05/15/15	*1.4 U*	1.4 U	*1.4 U*	1.4 U	*1.4 U*	1.4 U	1.4 U	*1.4 U*	1.4 U	1.4 U
LAMW-4A	LAMW-04A-051515	35.09	05/15/15	*1.4 U*	1.4 U	*1.4 U*	1.4 U	*1.4 U*	1.4 U	1.4 U	*1.4 U*	1.4 U	1.4 U
LAMW-5A	LAMW-05A-051515/DUP	8.55	05/15/15	*1.4 U*	1.4 U	*1.4 U*	1.4 U	*1.4 U*	1.4 U	1.4 U	*1.4 U*	1.4 U	1.4 U
Maximum Detected Concentration (2015)				**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Groundwater Screening Values [3]				2.5	NE	0.025	25	0.025	80	29	0.25	NE	12

All detected and other selected analytes are presented

Value	Exceeds screening concentration (2015 data only). Data from 1996 and 1997 not applied.
ft bgs	Feet below ground surface (measured from top if riser pipe).
µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
J	Estimated concentration.
ND	Not detected (group).
NE	Not established.
LAWX-X/Dup	The highest concentration in either the original sample and sample duplicate is presented.
Bold type	Detections are emphasized in bold type.
1.4 U	(italics) Reporting limit is above one or more screening criteria.
[1].	PCBs and pesticides also analyzed for in Nov 1996 and March 1997; none detected.
[2].	The following analytes were detected in the equipment blank for the 5/15/15 samples: Acetone = 4.3 µg/L Bromodichloromethane = 0.15J µg/L Chloroform = 0.2J µg/L Toluene = 0.11J µg/L Xylenes = 3.6 µg/L
[3].	Values are RSLs from US EPA Regional Screening Levels (RSLs) Generic Tables (May 2020) unless otherwise noted.
[4].	US EPA does not have RSLs for these specific hydrocarbon fractions; values presented are MaineDEP residential RAGs for water (MaineDEP 2018).

TABLE 3
Summary of Sediment Analytical Data
Former Loring AFB Laundry Annex
Presque Isle, Maine

Sample ID	Sampling Date	Acetone mg/kg		2-Butanone mg/kg		Styrene mg/kg	
Upstream							
LASED1-3	10/25/99	**0.337**		**0.0695**		0.017	U
LASED1-4	05/16/00	0.155	UJ	0.0637	UJ	**0.00672**	**J**
LASED1-1202	12/04/02	-		-		-	
LASED1-0403	04/20/03	-		-		-	
LASED1-0903	09/17/03	-		-		-	
LASED1-0504	05/10/04	-		-		-	
Downstream							
LASED2-3/DUP	10/25/99	**0.0408**	**J**	0.0303	UJ	0.0076	U
LASED2-4/DUP	05/16/00	**0.485**	**JB**	0.112	UB	0.0112	UJ
LASED2-1202/DUP	12/04/02	-		-		-	
LASED2-0403/DUP	04/20/03	-		-		-	
LASED2-0903/DUP	09/17/03	-		-		-	
LASED2-0504	05/10/04	-		-		-	
EPA Region III BTAG Freshwater Sediment Screening Benchmark [1]		**NE**		**NE**		**0.56**	
EPA Region 4 Freshwater Sediment Screening Benchmark [2]		**0.065**		**7.6**		**0.126**	

Value	Exceeds one or more sediment comparison values.

Data obtained from previously-prepared summary tables; laboratory reports not reviewed.

mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
UB	Not detected in sample at concentration less than 10x amount detected in trip blank.
UJ	Not detected at estimated reporting limit or due to sample limitations.
J	Estimated concentration below reporting limit.
NE	Not established.
[1].	https://www.epa.gov/sites/production/files/2015-09/documents/r3_btag_fw_sediment_benchmarks_8-06.pdf.
[2].	EPA (2018). Region 4 Ecological Risk Assessment Supplemental Guidance – March 2018 Update (https://www.epa.gov/sites/production/files/2018-03/documents/ era_regional_supplemental_guidance_report-march-2018_update.pdf).

TABLE 4
Summary of Surface Water Analytical Data
Former Loring AFB Laundry Annex
Presque Isle, Maine, Maine

Sample ID	Sampling Date	Acetone µg/L	
Upstream			
LASW1-3	10/25/99	**20**	**JB**
LASW1-4	05/16/00	20	U
LASW1-1202	12/04/02	--	
LASW1-0403	04/20/03	--	
LASW1-0903	09/17/03	--	
LASW1-0504	05/10/04	--	
Downstream			
LASW2-3	10/25/99	**20**	**JB**
LASW2-4	05/16/00	20	U
LASW2-1202	12/04/02	--	
LASW2-0403	04/20/03	--	
LASW2-0903	09/17/03	--	
LASW2-0504	05/10/04	--	
EPA National Recommended Water Quality Criteria - Aquatic Life [1]		NE	
EPA Region III BTAG Freshwater Screening Benchmarks [2]		NE	
EPA Region 4 Surface Water Screening Values, Chronic [3]		1,700	

Only detected constituents are presented.
Data for 10/25/99, 5/16/00, 4/20/03, and 9/17/04 obtained from previously-prepared summary tables; laboratory reports not reviewed.

µg/L	Micrograms per liter.
U	Not detected at reporting limit shown.
UJ	Not detected at estimated reporting limit due to data quality limitations.
J	Estimated concentration below reporting limit or due to data quality limitations.
JB	Estimated concentration; also detected in trip blank.
NE	Not established.
"--	Not analyzed.
[1].	EPA (2018a) National Recommended Water Quality Criteria for Aquatic Life.
[2].	EPA (2006a) EPA Region III BTAG Freshwater Screening Values (https://www.epa.gov/sites/production/files/2015-09/documents/r3_btag_fw_benchmarks_07-06.pdf). No screening values
[3]	US Environmental Protection Agency (EPA) (2018). Region 4 Ecological Risk Assessment Supplemental Guidance – March 2018 Update (https://www.epa.gov/sites/ production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf).

TABLE 5

Summary of Soil Analytical Data for the SLERA

Former Loring AFB Laundry Annex
Presque Isle, Maine

Sample ID	Sample Depth (ft bgs)	Sampling Date	Benzene (VPH/VOC) mg/kg	Ethylbenzene (VOC/VPH) mg/kg	Toluene (VOC/VPH) mg/kg	Xylenes (total) (VOC/VPH) mg/kg	Naphthalene (VOC/VPH) mg/kg	Naphthalene (EPH/SVOC) mg/kg	2-Methyl-naphthalene mg/kg	Acenaphthene mg/kg	Acenaphthylene mg/kg	Anthracene mg/kg	Benzo(a)-anthracene mg/kg	Benzo(b)-fluoranthene mg/kg	Benzo(k)-fluoranthene mg/kg
LASB-5-1	6-8	11/02/16	0.042 U	0.042 U	0.042 **U**	0.042 U	0.042 U	0.11 UJ	0.11 UJ	0.11 U	0.11 U	0.11 U	**0.052 J**	**0.091 J**	0.11 U
LASB-5-1/Dup	6-8	11/02/16	0.041 U	0.041 U	0.041 U	0.041 U	0.041 U	0.12 UJ	0.12 U	0.12 U	0.12 U	0.12 U	**0.052 J**	**0.091 J**	**0.14 J**
LASB-5-2	9-11	11/02/16	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-6-1	12-14	11/02/16	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U	0.13 UJ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
LASB-6-2	14-16	11/02/16	0.036 U	0.036 U	0.036 U	0.036 U	0.036 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-7-1	6-8	11/02/16	**0.034 J**	**0.019 J**	**0.1**	**0.15 J**	**0.054 J**	**0.20 J**	**0.3 J**	0.20 UJ	**0.3 J**	**0.16 J**	1.1 J	**0.70**	**0.7 J**
LASB-7-2	8-10	11/02/16	0.23 U	0.23 U	**0.063 J**	0.23 U	0.23 U	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.11 J	0.29 UJ
LASB-8-1	12-14	11/02/16	1.9 U	**4.4**	1.9 U	**82**	**29**	**15 J**	**1.8**	0.16 U	0.16 U	0.16 U	0.12 J	0.12 J	**0.14 J**
LASB-9-1	12-14	11/02/16	**0.03 J**	0.13 U	**0.049 J**	0.13 U	**0.028 J**	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	**0.29 J**	**0.33 J**	**0.40**
LASB-10-1	12-14	11/02/16	0.036 U	0.036 U	0.036 U	0.036 U	0.036 U	0.11 UJ	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-11-1	6-8	11/02/16	1.2 U	1.2 U	1.2 U	**23**	**22**	**7.2 J**	**0.60**	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
LASB-12-1	6-8	07/20/17	0.046 U	0.046 U	0.046 U	0.046 U	0.046 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	**0.0019 J**	**0.0021 J**	0.0019 U
LASB-12-2	8.5-10.5	07/20/17	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U
LASB-13A-1	6-8	07/20/17	0.078 U	0.078 U	0.078 U	0.078 U	0.078 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 UJ
LASB-13A-2	8-10	07/20/17	0.037 U	0.037 U	0.037 U	0.037 U	0.037 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	**0.0010 J**	**0.0012 J**	0.0018 U
LASB-14A-1	6-8	07/20/17	0.081 U	0.081 U	0.081 U	0.081 U	0.081 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	**0.0039 J**	**0.004 J**	**0.0031 J**
LASB-14A-1/Dup	6-8	07/20/17	0.047 U	0.047 U	0.047 U	0.047 U	**0.020 J**	0.0022 U	0.0021 U	0.0021 U	0.0021 U	0.0021 U	**0.0039 J**	**0.004 J**	**0.0031 J**
LASB-14A-2	8-10	07/20/17	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U	**0.0015 J**	**0.0017 J**	0.0022 U
LASB-15-B-1	12-14	07/20/17	0.053 U	0.053 U	0.053 U	0.053 U	**0.14 J**	**0.0084**	**0.0021 J**	**0.00092 J**	**0.0011 J**	**0.0026 J**	**0.010**	**0.010**	**0.0028 J**
LASB-17-B-1	8-12	07/20/17	0.091 U	0.091 U	0.091 U	**1.9**	**0.078 J**	**0.0068 J**	**0.0020 J**	0.0031 UJ	**0.012 J**	**0.0074 J**	**0.042 J**	**0.047 J**	**0.017 J**
LASB-18-1	12-14	07/20/17	0.046 U	0.046 U	0.046 U	0.046 U	0.046 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	0.0018 U	**0.0014 J**	**0.0017 J**	0.0018 U
LASB-19A-1	9-11	07/20/17	0.039 U	0.039 U	0.039 U	0.039 U	0.039 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	**0.011**	**0.027**	**0.023**	**0.021**
Arithmetic Mean Concentration			**0.098**	**0.26**	**0.10**	**4.9**	**2.4**	**1.0**	**0.15**	**0.039**	**0.048**	**0.042**	**0.10**	**0.087**	**0.088**
Maximum Detected Concentration			**0.034**	**4.4**	**0.10**	**81.7**	**29**	**15**	**1.8**	**0.00092**	**0.30 J**	**0.16 J**	**1.1 J**	**0.70**	**0.70 J**
Maine DEP Soil Background Concentrations (Urban) [1]			NE	NE	NE	NE	0.22	0.22	0.089	0.20	0.39	0.40	1.6	1.9	0.76
EPA EcoSSL - Plants [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA EcoSSL - Soil Invertebrates [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA EcoSSL - Avian [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA EcoSSL - Mammalian [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Region 4 Ecological Soil Screening Values [3]			**0.12**	**0.27**	**0.15**	**0.10**	**Total LMW 29**	**Total LMW 29**	**Total LMW 29**	**Total LMW 29**	**Total LMW 29**	**Total LMW 29**	**Total HMW 1.1**	**Total HMW 1.1**	**Total HMW 1.1**

🟨	Exceeds Screening Level.
Bold	Detected value.
ft bgs	Feet below ground surface.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
J	Estimated concentration below reporting limit or due to quality control limitations.
UJ	Estimated non-detect value.
ND	Not detected at reporting limit shown.
NE	Not established.
COPC	Chemical of potential concern.
VOC/VPH	Highest detected concentration or lowest reporting limit from volatile organic compound (VOC) and volatile petroleum hydrocarbon (VPH) analysis.
SVOC/EPH	Highest detected concentration or lowest reporting limit from semi-volatile organic compound (SVOC) and extractable petroleum hydrocarbon (EPH) analysis.
LMW	low molecular weight PAHs
HMW	high molecular weight PAHs
"-"	Not analyzed.
[1].	MaineDEP, AMEC (2012). Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Metals in background Soils in Maine.
[2].	EPA EcoSSLs from individual chemical documents (available for LMW PAHs [29 mg/kg] and HMW PAHs [100 mg/kg] and inorganics)
[3].	EPA Region 4 Ecological Soil Screening Levels, EPA (2018).

TABLE 5

Summary of Soil Analytical Data for the SLERA

Former Loring AFB Laundry Annex
Presque Isle, Maine

Sample ID	Sample Depth (ft bgs)	Sampling Date	Benzo(g,h,i)-perylene mg/kg	Benzo(a)pyrene mg/kg	Chrysene mg/kg	Dibenzo(a,h)-anthracene mg/kg	Fluoranthene mg/kg	Fluorene mg/kg	Indeno(1,2,3-cd)-pyrene mg/kg	Phenanthrene mg/kg	Pyrene mg/kg
LASB-5-1	6-8	11/02/16	**0.072** J	**0.081** J	**0.10** J	**0.11** U	**0.071** J	0.11 U	0.057 U	0.11 U	**0.092** J
LASB-5-1/Dup	6-8	11/02/16	**0.13** J	**0.12** J	**0.16** J	**0.082** J	**0.15** J	0.11 U	**0.098** J	0.11 U	**0.17** J
LASB-5-2	9-11	11/02/16	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-6-1	12-14	11/02/16	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
LASB-6-2	14-16	11/02/16	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-7-1	6-8	11/02/16	**0.5** J	**0.82** J	**1.4** J	**0.20** J	**1.6** J	**0.072** J	**0.4** J	**1.0** J	**1.9** J
LASB-7-2	8-10	11/02/16	0.29 UJ	0.10 J	**0.15** J	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	0.29 UJ	**0.20** J
LASB-8-1	12-14	11/02/16	**0.11** J	**0.12** J	**0.21** J	**0.095** J	**0.4**	**0.14** J	0.079 J	**0.4**	**0.5**
LASB-9-1	12-14	11/02/16	**0.33** J	**0.40** J	**0.50**	**0.18** J	**0.50**	0.20 U	**0.24** J	**0.31** J	**0.60**
LASB-10-1	12-14	11/02/16	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
LASB-11-1	6-8	11/02/16	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
LASB-12-1	6-8	07/20/17	**0.0011** J	**0.0016** J	**0.0015** J	0.0019 U	**0.0023** J	0.0019 U	**0.001** J	**0.00089** J	**0.0021** J
LASB-12-2	8.5-10.5	07/20/17	0.0021 U	0.0021 U	0.0021 U	0.0021 U	**0.0012** J	0.0021 U	0.0021 U	0.0021 U	**0.0011** J
LASB-13A-1	6-8	07/20/17	0.0022 U	0.0022 U	0.0022 UJ	0.0022 UJ	**0.0012** J	0.0022 U	0.0022 U	0.0022 U	**0.0012** J
LASB-13A-2	8-10	07/20/17	0.0018 U	**0.00087** J	**0.0009** J	0.0018 U	**0.0011** J	0.0018 U	0.0018 U	0.0018 U	**0.0012** J
LASB-14A-1	6-8	07/20/17	**0.0032** J	**0.0034** J	**0.0036** J	**0.0026** J	**0.0026** J	0.0021 U	**0.0035** J	**0.00096** J	**0.0026** J
LASB-14A-1/Dup	6-8	07/20/17	**0.0032** J	**0.0022** U	**0.0036** J	0.0022 U	**0.0026** J	0.0021 U	**0.0035** J	**0.00096** J	**0.0026** J
LASB-14A-2	8-10	07/20/17	**0.0010** J	**0.0013** J	**0.0014** J	0.0022 U	**0.0023** J	0.0022 U	**0.001** J	**0.0018** J	**0.0024** J
LASB-15-B-1	12-14	07/20/17	**0.0044**	**0.007**	**0.0082**	**0.0011** J	**0.0211**	**0.0013** J	**0.0042**	**0.0111**	**0.021**
LASB-17-B-1	8-12	07/20/17	**0.024** J	**0.0359** J	**0.0363** J	**0.0065** J	**0.073** J	**0.0036** J	**0.0217** J	**0.027** J	**0.068** J
LASB-18-1	12-14	07/20/17	**0.0011** J	**0.0013** J	**0.0012** J	0.0018 U	**0.002** J	0.0018 U	**0.0009** J	**0.0014** J	**0.0021** J
LASB-19A-1	9-11	07/20/17	**0.022**	**0.024**	**0.023**	**0.022**	**0.022**	0.0019 U	**0.025**	**0.0090**	**0.023**
Arithmetic Mean Concentration			**0.075**	**0.092**	**0.14**	**0.050**	**0.16**	**0.040**	**0.062**	**0.11**	**0.18**
Maximum Detected Concentration			**0.50** J	**0.82** J	**1.4**	**0.29** J	**1.6**	**0.29**	**0.4** J	**1.0** J	**1.9**
Maine DEP Soil Background Concentrations (Urban) [1]			0.79	1.6	2.2	0.28	3.2	0.29	0.74	1.6	2.8
EPA EcoSSL - Plants [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA EcoSSL - Soil Invertebrates [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA EcoSSL - Avian [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE
EPA EcoSSL - Mammalian [2]			NE	NE	NE	NE	NE	NE	NE	NE	NE
Region 4 Ecological Soil Screening Values [3]			**Total HMW 1.1**	**Total HMW 1.1**	**Total HMW 1.1**	**Total HMW 1.1**	**Total HMW 1.1**	**Total LMW 29**	**Total HMW 1.1**	**Total LMW 29**	**Total HMW 1.1**

🟨	Exceeds Screening Level.
Bold	Detected value.
ft bgs	Feet below ground surface.
mg/kg	Milligrams per kilogram.
U	Not detected at reporting limit shown.
J	Estimated concentration below reporting limit or due to quality control limitations.
UJ	Estimated non-detect value.
ND	Not detected at reporting limit shown.
NE	Not established.
COPC	Chemical of potential concern.
VOC/VPH	Highest detected concentration or lowest reporting limit from volatile organic compound (VOC) and volatile petroleum hydrocarbon (VPH) analysis.
SVOC/EPH	Highest detected concentration or lowest reporting limit from semi-volatile organic compound (SVOC) and extractable petroleum hydrocarbon (EPH) analysis.
LMW	low molecular weight PAHs
HMW	high molecular weight PAHs
"-"	Not analyzed.
[1].	MaineDEP, AMEC (2012). Summary Report for Evaluation of Concentrations of Polycyclic Aromatic Hydrocarbons (PAHs) and Metals in background Soils in Maine.
[2].	EPA EcoSSLs from individual chemical documents (available for LMW PAHs [29 mg/kg] and HMW PAHs [100 mg/kg] and inorganics)
[3].	EPA Region 4 Ecological Soil Screening Levels, EPA (2018).

APPENDIX A

Toxicity Profiles

Toxicological Profile for Xylenes

Xylene (dimethylbenzene) is a colorless, flammable liquid that is used as a solvent in the printing, rubber, and leather industries and as a cleaner and paint thinner. It occurs naturally in petroleum and coal tar. Xylene is absorbed following oral, dermal, or inhalation exposure; can be stored in adipose tissue; and is eliminated in the urine after conjugation with glycine.

Human exposure to xylene by either oral or inhalation routes can cause death due to respiratory failure accompanied by pulmonary congestion (Sandmeyer, 1981). Nonlethal levels of xylene vapor may cause eye (Carpenter et al., 1975), nose, and throat (ATSDR, 1993) irritation, and contact with liquid may result in dermatitis (Sittig, 1985). Chronic occupational exposure to xylene has been associated with headaches, chest pain, electrocardiographic abnormalities, dyspnea, cyanosis of hands, fever, leukopenia, malaise, impaired lung function, and confusion (Hipolito, 1980).

Long-term gavage studies with mixed xylenes in laboratory animals resulted in decreased body weight gain in male rats given 500 mg/kg/day and hyperactivity in male and female mice given 1000 mg/kg/day (NTP, 1986). A chronic oral reference dose (RfD) of 2 mg/kg/day for mixed xylenes was calculated from a no-observed-adverse-effect level (NOAEL) of 250 mg/kg/day derived from a chronic gavage study with rats (EPA, 1994a). The critical effects were hyperactivity, decreased body weight, and increased mortality (males). An RfD of 2 mg/kg/day is also reported for the *m*- and *o*-xylene isomers (EPA, 1994b).

Inhalation of 3000 mg/m^3 of the *o*-, *p*-, or *m*-xylene isomer by rats on gestation days 7-14 resulted in decreased fetal weights, skeletal anomalies, and altered fetal enzyme activities (Hood and Ottley, 1988). Rib anomalies and cleft palate occurred in mouse fetuses following maternal oral exposure of 2.06 g/kg/day of mixed xylenes on gestation days 6-15 (Marks et al., 1982).

Oral (NTP, 1986) and topical (Berenblum, 1941; Pound, 1970) carcinogenic studies with xylene in laboratory animals gave negative results. EPA (1994a) has placed xylene in weight-of-evidence group D, not classifiable as to human carcinogenicity. No significant increase in tumor incidence was observed in rats or mice of both sexes following oral administration of technical grade xylene

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September 1994

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Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under contract No. DE-AC05-84OR21400

Toxicological Profile for Naphthalene

Naphthalene (CAS Reg. No. 91-20-3), a white solid with a characteristic odor of mothballs, is a polycyclic aromatic hydrocarbon composed of two fused benzene rings. The principal end use of naphthalene is as a raw material for the production of phthalic anhydride. It is also used as an intermediate for synthetic resins, celluloid, lampblack, smokeless powder, solvents, and lubricants. Naphthalene is used directly as a moth repellant, insecticide, anthelmintic, and intestinal antiseptic (ATSDR, 1990; U.S. EPA, 1986).

Naphthalene can be absorbed by the oral, inhalation, and dermal routes of exposure and can cross the placenta in amounts sufficient to cause fetal toxicity. The most commonly observed effect of naphthalene toxicity following acute oral or inhalation exposure in humans is hemolytic anemia associated with decreased hemoglobin and hematocrit values, increased reticulocyte counts, presence of Heinz bodies, and increased serum bilirubin levels (ATSDR, 1990). Hemolytic anemia has been observed in an infant dermally exposed to naphthalene (Schafer, 1951) and in infants whose mothers were exposed to naphthalene during pregnancy (Anziulewicz et al., 1959; Zinkham and Childs, 1958). Infants and individuals having a congenital deficiency of erythrocyte glucose-6-phosphate dehydrogenase are especially susceptible to naphthalene-induced hemolytic anemia (Wintrobe et al., 1974).

Acute oral and subchronic inhalation exposure of humans to naphthalene has resulted in neurotoxic effects (confusion, lethargy, listlessness, vertigo), gastrointestinal distress, hepatic effects (jaundice, hepatomegaly, elevated serum enzyme levels), renal effects, and ocular effects (cataracts, optical atrophy). Cataracts have been reported in individuals occupationally exposed to naphthalene (Ghetti and Mariani, 1956) and in rabbits and rats exposed orally to naphthalene (Van Heyningen and Pirie, 1976; Fitzhugh and Buschke, 1949). A number of deaths have been reported following intentional ingestion of naphthalene-containing mothballs (ATSDR, 1990). The estimated lethal dose of naphthalene is 5-15 g for adults and 2-3 g for children. Naphthalene is a primary skin irritant and is acutely irritating to the eyes of humans (Sandmeyer, 1981).

Increased mortality, clinical signs of toxicity, kidney and thymus lesions, and signs of anemia were observed in rats treated by gavage with 400 mg/kg of naphthalene for 13 weeks (NTP, 1980a). No adverse effects occurred at 50 mg/kg. Transient clinical signs of toxicity were seen in mice exposed by gavage to 53 mg/kg for 13 weeks (NTP, 1980b). Subchronic oral exposure to 133 mg/kg/day for 90 days produced decreased spleen weights in female mice (Shopp et al., 1984). Reduced numbers of pups/litter were observed when naphthalene was administered orally to pregnant mice (Pflasterer et al., 1985). Negative results in a two-year feeding study with rats receiving 10-20 mg naphthalene/kg/day (Schmahl, 1955) and equivocal results in a mouse lung tumor bioassay (Adkins et al., 1986) suggest that naphthalene is not a potential carcinogen.

U.S. EPA has placed naphthalene in weight-of-evidence group C, possible human carcinogenicity.

JANUARY 1993

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Prepared for: Oak Ridge Reservation Environmental Restoration Program.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Benzo(a)pyrene

Benzo[*a*]pyrene is a polycyclic aromatic hydrocarbon (PAH) that can be derived from coal tar. Benzo[*a*]pyrene occurs ubiquitously in products of incomplete combustion of fossil fuels and has been identified in ambient air, surface water, drinking water, waste water, and char-broiled foods (IARC, 1983). Benzo[*a*]pyrene is primarily released to the air and removed from the atmosphere by photochemical oxidation and dry deposition to land or water. Biodegradation is the most important transformation process in soil or sediment (ATSDR, 1990).

Benzo[*a*]pyrene is readily absorbed following inhalation, oral, and dermal routes of administration (ATSDR, 1990). Following inhalation exposure, benzo[*a*]pyrene is rapidly distributed to several tissues in rats (Sun et al., 1982; Weyand and Bevan, 1986). The metabolism of benzo[*a*]pyrene is complex and includes the formation of a proposed ultimate carcinogen, benzo[*a*]pyrene 7,8 diol-9,10-epoxide (IARC, 1983). The major route of excretion is hepatobiliary followed by elimination in the feces (EPA, 1991).

No data are available on the systemic (non-carcinogenic) effects of benzo[*a*]pyrene in humans. In mice, genetic differences appear to influence the toxicity of benzo[*a*]pyrene. Subchronic dietary administration of 120 mg/kg benzo[*a*]pyrene for up to 180 days resulted in decreased survival due to hematopoietic effects (bone narrow depression) in a "nonresponsive" strain of mice (i.e., a strain whose cytochrome P-450 mediated enzyme activity is not induced as a consequence of PAH exposure). No adverse effects were noted in "responsive" mice (i.e., a strain capable of inducing increased cytochrome P-450 mediated enzyme activity as a consequence of PAH exposure) (Robinson et al., 1975). Immunosuppression has been reported in mice administered daily intraperitoneal injections of 40 or 160 mg/kg of benzo[*a*]pyrene for 2 weeks, with more pronounced effects apparent in "nonresponsive" mice (Blanton et al., 1986; White et al., 1985). In utero exposure to benzo[*a*]pyrene has produced adverse developmental/reproductive effects in mice. Dietary administration of doses as low as 10 mg/kg during gestation caused reduced fertility and reproductive capacity in offspring (Mackenzie and Angevine, 1981), and treatment by gavage with 120 mg/kg/day during gestation caused stillbirths, resorptions, and malformations (Legraverend et al., 1984). Similar effects have been reported in intraperitoneal injection studies (ATSDR, 1990).

Numerous epidemiologic studies have shown a clear association between exposure to various mixtures of PAHs containing benzo[*a*]pyrene (e.g., coke oven emissions, roofing tar emissions, and cigarette smoke) and increased risk of lung cancer and other tumors. However, each of the mixtures also contained other potentially carcinogenic PAHs; therefore, it is not possible to evaluate the contribution of benzo[*a*]pyrene to the carcinogenicity of these mixtures (IARC, 1983; EPA, 1991). An extensive data base is available for the carcinogenicity of benzo[*a*]pyrene in experimental animals. Dietary administration of benzo[*a*]pyrene has produced papillomas and carcinomas of the forestomach in mice (Neal and Rigdon, 1967), and treatment by gavage has produced mammary tumors in rats (McCormick et al., 1981) and pulmonary adenomas in mice (Wattenberg and Leong, 1970). Exposure by inhalation and intratracheal instillation has resulted in benign and malignant tumors of the respiratory and upper digestive tracts of hamsters (Ketkar et al., 1978; Thyssen et al., 1981). Numerous topical application studies have shown that benzo[*a*]pyrene induces skin tumors in several species, although mice appear to be the most sensitive species. Benzo[*a*]pyrene is a complete carcinogen and also an initiator of skin tumors (IARC, 1973; EPA, 1991). Benzo[*a*]pyrene has also been reported to induce tumors in animals when administered by other routes, such as intravenous, intraperitoneal, subcutaneous, intrapulmonary, and transplacental.

Based on United States Environmental Protection Agency (EPA) guidelines, benzo[*a*]pyrene was assigned to weight-of-evidence group B2, probable human carcinogen.

December 1994

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Prepared for: OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM.

*Managed by Martin Marietta Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400.

Toxicity Profile for Dibenzo(a,h)anthracene

Dibenz[*a*,*h*]anthracene is a polycyclic aromatic hydrocarbon (PAH) with five aromatic rings. No commercial production or use of dibenz[*a*,*h*]anthracene is known. It occurs as a component of coal tars, shale oils, and soots (IARC, 1985) and has been detected in gasoline engine exhaust, coke oven emissions, cigarette smoke, charcoal broiled meats, vegetation near heavily traveled roads, and surface water and soils near hazardous waste sites (ATSDR, 1993; IARC, 1983).

Dibenz[*a*,*h*]anthracene is poorly absorbed from the gastrointestinal tract and is primarily excreted via feces (Chang, 1943). Following absorption, dibenz[*a*,*h*]anthracene is distributed to various tissues, with highest accumulation in the liver and kidneys (Daniel et al., 1967). Dibenz[*a*,*h*]anthracene is metabolized by mixed function oxidases to dihydrodiols. Epoxidation of the 3,4-dihydrodiol may lead to the formation of a diol-epoxide, the putative ultimate carcinogenic metabolite of dibenz[*a*,*h*]anthracene (Buening et al., 1979).

No human studies were available to evaluate the toxicity of dibenz[*a*,*h*]anthracene. In animals, depressed immune responses were observed in mice following single or multiple subcutaneous injections of dibenz[*a*,*h*]anthracene (White et al., 1985). Weekly subcutaneous. injections of 0.05% dibenz[*a*,*h*]anthracene for 40 weeks produced lymphoid tissue changes, decreased spleen weights, and liver and kidney lesions in mice (Hoch-Ligeti, 1941). Weekly intramuscular injections of 20 mg/kg promoted the development of arteriosclerotic plaques in chickens (Penn and Snyder, 1988).

No epidemiologic studies or case reports addressing the carcinogenicity of dibenz[*a*,*h*]anthracene in humans were available. In animals, dibenz[*a*,*h*]anthracene has produced tumors by different routes of administration, having both local and systemic carcinogenic effects.

After oral administration, dibenz[*a*,*h*]anthracene produced tumors at several sites. Male and female mice fed dibenz[*a*,*h*]anthracene (0.85 mg/day for males, 0.76 mg/day for females) in an aqueous olive oil emulsion developed pulmonary adenomatosis, alveologenic carcinomas of the lung, hemangio-endotheliomas of the pancreas and mesentery/abdominal lymph nodes, and mammary carcinomas (females) after 200 days (Snell and Stewart, 1962). A single oral dose of 1.5 mg dibenz[*a*,*h*]anthracene in polyethylene glycol produced a low incidence of forestomach papillomas in mice (Berenblum and Haran, 1955). Mammary carcinomas developed in mice treated by gavage with a total dose of 15 mg over a 15-week period (Biancifiori and Caschera, 1962).

Carcinogenic as well as tumor-initiating activity of dibenz[*a*,*h*]anthracene has been demonstrated in topical application studies with mice. Repeated dermal application of 0.001 to 0.01% solutions produced a high incidence of skin papillomas and carcinomas in mice (Wynder and Hoffmann, 1959; Van Duuren et al., 1967). In initiation-promotion assays, the compound was active as an initiator of skin carcinogenesis in mice (Buening et al., 1979; Platt et al., 1990). However, no skin tumors were observed in Syrian golden hamsters that received topical dibenz[*a*,*h*]anthracene applications over a 10-week period (Shubik et al., 1960).Injection site sarcomas developed in mice injected subcutaneously with dibenz[*a*,*h*]anthracene (Pfeiffer, 1977). In newborn mice, a single subcutaneous injection of dibenz[*a*,*h*]anthracene induced local sarcomas and lung adenomas (Platt et al., 1990) and three intraperitoneal injections induced a high incidence of pulmonary tumors (Buening et al., 1979). A number of earlier studies have also demonstrated the carcinogenicity of dibenz[*a*,*h*]anthracene when administered by various parenteral routes in several animal species (IARC, 1973).

Based on no human data and sufficient evidence for carcinogenicity in animals, EPA has assigned dibenz[*a*,*h*]anthracene a weight-of-evidence classification of B2, probable human carcinogen (EPA, 1995).

October 1997

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Prepared for OAK RIDGE RESERVATION ENVIRONMENTAL RESTORATION PROGRAM

*Managed by Lockheed Martin Energy Systems, Inc., for the U.S. Department of Energy under Contract No. DE-AC05-84OR21400

APPENDIX B

ProUCL OUTPUT FILES

ProUCL Output Files
Former Loring AFB Laundry Annex
Presque Isle, Maine

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ProUCL Output                  8-Jul-20

UCL Statistics for Data Sets with Non-Detects

User Selected Options
Date/Time of Computation          ProUCL 5.17/8/2020 1:04:55 PM
From File                         ProUCL worksheet_a.xls
Full Precision                    OFF
Confidence Coefficient                95%
Number of Bootstrap Operations       2000

Benzo(a)Pyrene

General Statistics
Total Number of Observations                              22 Number of Distinct Observations                          17
Number of Detects                                         14 Number of Non-Detects                                     8
Number of Distinct Detects                                12 Number of Distinct Non-Detects                            5
Minimum Detect                                      8.70E-04 Minimum Non-Detect                                   0.0021
Maximum Detect                                          0.82 Maximum Non-Detect                                     0.14
Variance Detects                                      0.0515 Percent Non-Detects                                  36.36%
Mean Detects                                           0.123 SD Detects                                            0.227
Median Detects                                        0.0299 CV Detects                                            1.851
Skewness Detects                                       2.677 Kurtosis Detects                                      7.419
Mean of Logged Detects                                -3.904 SD of Logged Detects                                  2.312

Normal GOF Test on Detects Only
Shapiro Wilk Test Statistic                            0.594 Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value                         0.874 Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic                              0.362 Lilliefors GOF Test
5% Lilliefors Critical Value                           0.226 Detected Data Not Normal at 5% Significance Level
Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs
KM Mean                                               0.0837 KM Standard Error of Mean                            0.0407
KM SD                                                 0.183    95% KM (BCA) UCL                                     0.16
  95% KM (t) UCL                                      0.154    95% KM (Percentile Bootstrap) UCL                   0.155
  95% KM (z) UCL                                      0.151    95% KM Bootstrap t UCL                              0.298
90% KM Chebyshev UCL                                   0.206 95% KM Chebyshev UCL                                  0.261
97.5% KM Chebyshev UCL                                 0.338 99% KM Chebyshev UCL                                  0.489

Gamma GOF Tests on Detected Observations Only
A-D Test Statistic                                     0.512 Anderson-Darling GOF Test
5% A-D Critical Value                                  0.819 Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic                                      0.16 Kolmogorov-Smirnov GOF
5% K-S Critical Value                                  0.246 Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only
k hat (MLE)                                            0.369 k star (bias corrected MLE)                           0.338
Theta hat (MLE)                                        0.332 Theta star (bias corrected MLE)                       0.363
nu hat (MLE)                                           10.34 nu star (bias corrected)                              9.458
Mean (detects)                                         0.123

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates
Minimum                                             8.70E-04 Mean                                                 0.0825
Maximum                                                 0.82 Median                                                 0.01
```

SD	0.187	CV	2.261
k hat (MLE)	0.406	k star (bias corrected MLE)	0.381
Theta hat (MLE)	0.203	Theta star (bias corrected MLE)	0.216
nu hat (MLE)	17.88	nu star (bias corrected)	16.78
Adjusted Level of Significance (β)	0.0386		
Approximate Chi Square Value (16.78, α)	8.512	Adjusted Chi Square Value (16.78, β)	8.074
95% Gamma Approximate UCL (use when n>=50)	0.163	95% Gamma Adjusted UCL (use when n<50)	0.171

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0837	SD (KM)	0.183
Variance (KM)	0.0334	SE of Mean (KM)	0.0407
k hat (KM)	0.21	k star (KM)	0.211
nu hat (KM)	9.231	nu star (KM)	9.305
theta hat (KM)	0.399	theta star (KM)	0.396
80% gamma percentile (KM)	0.113	90% gamma percentile (KM)	0.253
95% gamma percentile (KM)	0.425	99% gamma percentile (KM)	0.894

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.31, α)	3.512	Adjusted Chi Square Value (9.31, β)	3.251
95% Gamma Approximate KM-UCL (use when n>=50)	0.222	95% Gamma Adjusted KM-UCL (use when n<50)	0.24

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.92	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.155	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0801	Mean in Log Scale	-4.538
SD in Original Scale	0.188	SD in Log Scale	2.106
95% t UCL (assumes normality of ROS data)	0.149	95% Percentile Bootstrap UCL	0.151
95% BCA Bootstrap UCL	0.188	95% Bootstrap t UCL	0.325
95% H-UCL (Log ROS)	0.732		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.577	KM Geo Mean	0.0103
KM SD (logged)	2.208	95% Critical H Value (KM-Log)	4.549
KM Standard Error of Mean (logged)	0.535	95% H-UCL (KM -Log)	1.052
KM SD (logged)	2.208	95% Critical H Value (KM-Log)	4.549
KM Standard Error of Mean (logged)	0.535		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0918	Mean in Log Scale	-4.056
SD in Original Scale	0.184	SD in Log Scale	2.189
95% t UCL (Assumes normality)	0.159	95% H-Stat UCL	1.64

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.24

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.17/8/2020 1:07:10 PM
From File	ProUCL worksheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	22	Number of Distinct Observations	16
Number of Detects	8	Number of Non-Detects	14
Number of Distinct Detects	8	Number of Distinct Non-Detects	8
Minimum Detect	0.0011	Minimum Non-Detect	0.0018
Maximum Detect	0.2	Maximum Non-Detect	0.29
Variance Detects	0.00648	Percent Non-Detects	63.64%
Mean Detects	0.0736	SD Detects	0.0805
Median Detects	0.0518	CV Detects	1.093
Skewness Detects	0.75	Kurtosis Detects	-1.104
Mean of Logged Detects	-3.727	SD of Logged Detects	2.004

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.842	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.241	Lilliefors GOF Test
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0332	KM Standard Error of Mean	0.0145
KM SD	0.059	95% KM (BCA) UCL	0.0586
95% KM (t) UCL	0.0582	95% KM (Percentile Bootstrap) UCL	0.0572
95% KM (z) UCL	0.0571	95% KM Bootstrap t UCL	0.068
90% KM Chebyshev UCL	0.0768	95% KM Chebyshev UCL	0.0966
97.5% KM Chebyshev UCL	0.124	99% KM Chebyshev UCL	0.178

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.36	Anderson-Darling GOF Test
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.202	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.308	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.559	k star (bias corrected MLE)	0.433
Theta hat (MLE)	0.132	Theta star (bias corrected MLE)	0.17
nu hat (MLE)	8.939	nu star (bias corrected)	6.92
Mean (detects)	0.0736		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0011	Mean	0.0345
Maximum	0.2	Median	0.01
SD	0.0558	CV	1.617
k hat (MLE)	0.705	k star (bias corrected MLE)	0.64
Theta hat (MLE)	0.0489	Theta star (bias corrected MLE)	0.054
nu hat (MLE)	31.04	nu star (bias corrected)	28.14
Adjusted Level of Significance (β)	0.0386		
Approximate Chi Square Value (28.14, α)	17.04	Adjusted Chi Square Value (28.14, β)	16.39
95% Gamma Approximate UCL (use when n>=50)	0.057	95% Gamma Adjusted UCL (use when n<50)	0.0592

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0332	SD (KM)	0.059
Variance (KM)	0.00348	SE of Mean (KM)	0.0145
k hat (KM)	0.316	k star (KM)	0.303
nu hat (KM)	13.9	nu star (KM)	13.34
theta hat (KM)	0.105	theta star (KM)	0.109
80% gamma percentile (KM)	0.051	90% gamma percentile (KM)	0.0977
95% gamma percentile (KM)	0.151	99% gamma percentile (KM)	0.29

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.34, α)	6.123	Adjusted Chi Square Value (13.34, β)	5.76
95% Gamma Approximate KM-UCL (use when n>=50)	0.0723	95% Gamma Adjusted KM-UCL (use when n<50)	0.0768

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.9	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.23	Lilliefors GOF Test
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0286	Mean in Log Scale	-5.47
SD in Original Scale	0.0582	SD in Log Scale	1.983
95% t UCL (assumes normality of ROS data)	0.0499	95% Percentile Bootstrap UCL	0.0498
95% BCA Bootstrap UCL	0.056	95% Bootstrap t UCL	0.0719
95% H-UCL (Log ROS)	0.182		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.321	KM Geo Mean	0.00489
KM SD (logged)	1.966	95% Critical H Value (KM-Log)	4.127
KM Standard Error of Mean (logged)	0.522	95% H-UCL (KM -Log)	0.199
KM SD (logged)	1.966	95% Critical H Value (KM-Log)	4.127
KM Standard Error of Mean (logged)	0.522		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0498	Mean in Log Scale	-4.41
SD in Original Scale	0.0603	SD in Log Scale	2.142
95% t UCL (Assumes normality)	0.0719	95% H-Stat UCL	0.957

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0582

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.17/8/2020 1:08:43 PM
From File	ProUCL worksheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

NaphthaleneVPH

General Statistics

Total Number of Observations	22	Number of Distinct Observations	19
Number of Detects	7	Number of Non-Detects	15
Number of Distinct Detects	7	Number of Distinct Non-Detects	13
Minimum Detect	0.02	Minimum Non-Detect	0.034
Maximum Detect	29	Maximum Non-Detect	0.23
Variance Detects	158.1	Percent Non-Detects	68.18%
Mean Detects	7.331	SD Detects	12.57
Median Detects	0.078	CV Detects	1.715
Skewness Detects	1.339	Kurtosis Detects	-0.161
Mean of Logged Detects	-1.209	SD of Logged Detects	3.099

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.645	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.431	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.35	KM Standard Error of Mean	1.703
KM SD	7.396	95% KM (BCA) UCL	5.296
95% KM (t) UCL	5.281	95% KM (Percentile Bootstrap) UCL	5.309
95% KM (z) UCL	5.152	95% KM Bootstrap t UCL	564
90% KM Chebyshev UCL	7.46	95% KM Chebyshev UCL	9.774
97.5% KM Chebyshev UCL	12.99	99% KM Chebyshev UCL	19.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.048	Anderson-Darling GOF Test
5% A-D Critical Value	0.813	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.394	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.341	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.226	k star (bias corrected MLE)	0.224
Theta hat (MLE)	32.5	Theta star (bias corrected MLE)	32.71
nu hat (MLE)	3.158	nu star (bias corrected)	3.138
Mean (detects)	7.331		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.34
Maximum	29	Median	0.01
SD	7.574	CV	3.237
k hat (MLE)	0.172	k star (bias corrected MLE)	0.179
Theta hat (MLE)	13.59	Theta star (bias corrected MLE)	13.07
nu hat (MLE)	7.574	nu star (bias corrected)	7.875
Adjusted Level of Significance (β)	0.0386		
Approximate Chi Square Value (7.87, α)	2.663	Adjusted Chi Square Value (7.87, β)	2.441
95% Gamma Approximate UCL (use when n>=50)	6.919	95% Gamma Adjusted UCL (use when n<50)	7.546

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.35	SD (KM)	7.396
Variance (KM)	54.71	SE of Mean (KM)	1.703
k hat (KM)	0.101	k star (KM)	0.117
nu hat (KM)	4.442	nu star (KM)	5.169
theta hat (KM)	23.28	theta star (KM)	20
80% gamma percentile (KM)	2.012	90% gamma percentile (KM)	6.618
95% gamma percentile (KM)	13.44	99% gamma percentile (KM)	34.39

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.17, α)	1.231	Adjusted Chi Square Value (5.17, β)	1.096
95% Gamma Approximate KM-UCL (use when n>=50)	9.867	95% Gamma Adjusted KM-UCL (use when n<50)	11.09

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.777	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.311	Lilliefors GOF Test
5% Lilliefors Critical Value	0.304	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.342	Mean in Log Scale	-3.367
SD in Original Scale	7.573	SD in Log Scale	2.286
95% t UCL (assumes normality of ROS data)	5.121	95% Percentile Bootstrap UCL	5.305
95% BCA Bootstrap UCL	6.293	95% Bootstrap t UCL	628
95% H-UCL (Log ROS)	4.865		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.917	KM Geo Mean	0.0541
KM SD (logged)	2.005	95% Critical H Value (KM-Log)	4.195
KM Standard Error of Mean (logged)	0.472	95% H-UCL (KM -Log)	2.535
KM SD (logged)	2.005	95% Critical H Value (KM-Log)	4.195
KM Standard Error of Mean (logged)	0.472		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.353	Mean in Log Scale	-2.879
SD in Original Scale	7.569	SD in Log Scale	2.066
95% t UCL (Assumes normality)	5.13	95% H-Stat UCL	3.299

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	19.3

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.17/8/2020 1:09:36 PM
From File	ProUCL worksheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

NaphthaleneEPH

General Statistics

Total Number of Observations	22	Number of Distinct Observations	13
Number of Detects	5	Number of Non-Detects	17
Number of Distinct Detects	5	Number of Distinct Non-Detects	9
Minimum Detect	0.0068	Minimum Non-Detect	0.0018
Maximum Detect	15	Maximum Non-Detect	0.29
Variance Detects	44.1	Percent Non-Detects	77.27%
Mean Detects	4.483	SD Detects	6.641
Median Detects	0.2	CV Detects	1.481
Skewness Detects	1.317	Kurtosis Detects	0.631
Mean of Logged Detects	-1.34	SD of Logged Detects	3.626

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.776	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.341	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.021	KM Standard Error of Mean	0.81
KM SD	3.397	95% KM (BCA) UCL	2.375
95% KM (t) UCL	2.415	95% KM (Percentile Bootstrap) UCL	2.375
95% KM (z) UCL	2.353	95% KM Bootstrap t UCL	49.1
90% KM Chebyshev UCL	3.451	95% KM Chebyshev UCL	4.551
97.5% KM Chebyshev UCL	6.079	99% KM Chebyshev UCL	9.079

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.436	Anderson-Darling GOF Test
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.242	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.384	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.25	k star (bias corrected MLE)	0.233

Theta hat (MLE)	17.92	Theta star (bias corrected MLE)	19.21
nu hat (MLE)	2.501	nu star (bias corrected)	2.334
Mean (detects)	4.483		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0068	Mean	1.027
Maximum	15	Median	0.01
SD	3.476	CV	3.386
k hat (MLE)	0.191	k star (bias corrected MLE)	0.195
Theta hat (MLE)	5.385	Theta star (bias corrected MLE)	5.266
nu hat (MLE)	8.388	nu star (bias corrected)	8.577
Adjusted Level of Significance (β)	0.0386		
Approximate Chi Square Value (8.58, α)	3.074	Adjusted Chi Square Value (8.58, β)	2.832
95% Gamma Approximate UCL (use when n>=50)	2.865	95% Gamma Adjusted UCL (use when n<50)	3.109

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.021	SD (KM)	3.397
Variance (KM)	11.54	SE of Mean (KM)	0.81
k hat (KM)	0.0903	k star (KM)	0.108
nu hat (KM)	3.975	nu star (KM)	4.766
theta hat (KM)	11.3	theta star (KM)	9.427
80% gamma percentile (KM)	0.791	90% gamma percentile (KM)	2.802
95% gamma percentile (KM)	5.892	99% gamma percentile (KM)	15.58

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.77, α)	1.046	Adjusted Chi Square Value (4.77, β)	0.924
95% Gamma Approximate KM-UCL (use when n>=50)	4.654	95% Gamma Adjusted KM-UCL (use when n<50)	5.265
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.865	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.229	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.019	Mean in Log Scale	-10.09
SD in Original Scale	3.478	SD in Log Scale	5.699
95% t UCL (assumes normality of ROS data)	2.295	95% Percentile Bootstrap UCL	2.382
95% BCA Bootstrap UCL	3.055	95% Bootstrap t UCL	83.6
95% H-UCL (Log ROS)	4.20E+08		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.083	KM Geo Mean	0.0062
KM SD (logged)	2.586	95% Critical H Value (KM-Log)	5.225
KM Standard Error of Mean (logged)	0.627	95% H-UCL (KM -Log)	3.349
KM SD (logged)	2.586	95% Critical H Value (KM-Log)	5.225
KM Standard Error of Mean (logged)	0.627		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.046	Mean in Log Scale	-4.099
SD in Original Scale	3.47	SD in Log Scale	2.916
95% t UCL (Assumes normality)	2.319	95% H-Stat UCL	47.31

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.415

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	ProUCL 5.17/8/2020 1:10:43 PM
From File	ProUCL worksheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

XylenesVPH

General Statistics

Total Number of Observations	22	Number of Distinct Observations	20
Number of Detects	4	Number of Non-Detects	18
Number of Distinct Detects	4	Number of Distinct Non-Detects	16
Minimum Detect	0.146	Minimum Non-Detect	0.034
Maximum Detect	81.7	Maximum Non-Detect	0.23
Variance Detects	1454	Percent Non-Detects	81.82%
Mean Detects	26.56	SD Detects	38.13
Median Detects	12.2	CV Detects	1.436
Skewness Detects	1.613	Kurtosis Detects	2.42
Mean of Logged Detects	1.559	SD of Logged Detects	2.798

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.811	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.292	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.857	KM Standard Error of Mean	4.285
KM SD	17.41	95% KM (BCA) UCL	N/A
95% KM (t) UCL	12.23	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	11.91	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	17.71	95% KM Chebyshev UCL	23.54
97.5% KM Chebyshev UCL	31.62	99% KM Chebyshev UCL	47.49

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.223	Anderson-Darling GOF Test
5% A-D Critical Value	0.694	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.22	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.415	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.385	k star (bias corrected MLE)	0.263
Theta hat (MLE)	69.03	Theta star (bias corrected MLE)	101
nu hat (MLE)	3.078	nu star (bias corrected)	2.103
Mean (detects)	26.56		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.838
Maximum	81.7	Median	0.01
SD	17.82	CV	3.684
k hat (MLE)	0.152	k star (bias corrected MLE)	0.161
Theta hat (MLE)	31.9	Theta star (bias corrected MLE)	30
nu hat (MLE)	6.672	nu star (bias corrected)	7.095
Adjusted Level of Significance (β)	0.0386		

Approximate Chi Square Value (7.10, α)	2.223	Adjusted Chi Square Value (7.10, β)	2.025
95% Gamma Approximate UCL (use when n>=50)	15.44	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.857	SD (KM)	17.41
Variance (KM)	303	SE of Mean (KM)	4.285
k hat (KM)	0.0779	k star (KM)	0.0976
nu hat (KM)	3.426	nu star (KM)	4.293
theta hat (KM)	62.38	theta star (KM)	49.79
80% gamma percentile (KM)	3.25	90% gamma percentile (KM)	12.79
95% gamma percentile (KM)	28.23	99% gamma percentile (KM)	78.12

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.29, α)	0.841	Adjusted Chi Square Value (4.29, β)	0.736
95% Gamma Approximate KM-UCL (use when n>=50)	24.81	95% Gamma Adjusted KM-UCL (use when n<50)	28.32
95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.966	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.211	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.829	Mean in Log Scale	-8.802
SD in Original Scale	17.82	SD in Log Scale	5.254
95% t UCL (assumes normality of ROS data)	11.37	95% Percentile Bootstrap UCL	12.17
95% BCA Bootstrap UCL	15.97	95% Bootstrap t UCL	213.5
95% H-UCL (Log ROS)	17330975		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.48	KM Geo Mean	0.0838
KM SD (logged)	2.167	95% Critical H Value (KM-Log)	4.477
KM Standard Error of Mean (logged)	0.534	95% H-UCL (KM -Log)	7.284
KM SD (logged)	2.167	95% Critical H Value (KM-Log)	4.477
KM Standard Error of Mean (logged)	0.534		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.855	Mean in Log Scale	-2.671
SD in Original Scale	17.82	SD in Log Scale	2.341
95% t UCL (Assumes normality)	11.39	95% H-Stat UCL	12.37

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	12.23

APPENDIX C

RAGS D Tables

TABLE 3-1
EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
LAUNDRY ANNEX

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Routes: Oral, dermal, inhalation

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL of Mean [1]	Maximum Concentration (Qualifier)	Exposure Point Concentration			
						Value	Units	Statistic	Rationale
Soil	Benzo(a)pyrene	mg/Kg	0.092	0.24	0.82	0.24	mg/kg	ProUCL	95% UCL of the mean
	Dibenzo(a,h)-anthracene	mg/Kg	0.050	0.058	0.20	0.058	mg/kg	ProUCL	
	B(a)P RPF	mg/Kg		0.30		0.30	mg/kg	ProUCL	
	Naphthalene (VOC/VPH)	mg/Kg	2.4	19	29	19.3	mg/kg	ProUCL	
	Xylenes (total)	mg/Kg	4.9	12	81.7	12.2	mg/kg	ProUCL	

Notes:

[1] Calculated by ProUCL

B(a)P RPF   Benzo(a)Pyrene Relative Potency Factors for Carcinogenic Polycyclic Aromatic Hydrocarbons

	RPF
Benzo(a)pyrene	1
Dibenzo(a,h)-anthracene	1

mg/Kg	milligrams chemical/kilogram soil
ProUCL	USEPA ProUCL 5.1 output

Table 3-2 ASTM model for volatiles in air estimations

Volatilization Factor - Surface Soil to Outdoor Air

Lower VFss calculated by either equation

Eq 1

$$VF_{ss} = \frac{2 \cdot W_s \cdot \rho_s}{U_{air} \cdot \delta_{air}} \cdot \sqrt{\frac{D^{eff}_s \cdot H}{\pi \cdot \left(\theta_{ws} + K_s \cdot \rho_s + H \cdot \theta_{as}\right) \cdot \tau}} \cdot CF$$

OR

Eq 2

$$VF_{ss} = \frac{W_s \cdot \rho_s \cdot d}{U_{air} \cdot \delta_{air} \cdot \tau} \cdot CF$$

VF_{ss} = Volatilization factor, surface soil to ambient air [(mg/m^3)/(mg/kg)]
W_s = Width of soil source (cm)
ρ_s = Bulk soil density (g/cm^3)
U_{air} = Ambient air wind speed (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
D^{eff}_s = Effective diffusivity in vadose zone soil (cm^2/s)
H = Henry's Law Constant (cm^3/cm^3)
π = Pi (3.14)

θ_{ws} = Water content in vadose zone soil (cm^3/cm^3)
K_s = Soil sorption coefficient (cm^3/g) (= Koc x foc)
K_{oc} = Organic carbon water partition coefficient (cm^3/g)
f_{oc} = Fraction of soil organic carbon (g/g)
θ_{as} = Air content in vadose zone soil (cm^3/cm^3)
τ = Averaging time for vapor flux (s)
CF = Unit conversion factor [(cm^3-kg)/(m^3-g)]
d = Lower depth of surficial soil (cm)

Equation 1:

Constituent	**W_s (cm)**	**ρ_s (g/cm^3)**	**U_{air} (cm/s)**	**δ_{air} (cm)**	**D^{eff}_s (cm^2/s)**	**H (cm^3/cm^3)**	**π (unitless)**	**θ_{ws} (cm^3/cm^3)**	**K_{oc} (cm^3/g)**	**f_{oc} (g/g)**	**θ_{as} (cm^3/cm^3)**	**τ (s)**	**CF [cm^3-kg)/(m^3-g)]**	**VF_{ss} ng/m^3)/(mg/kg)]**
C9-C12 Aliphatic Hydrocarbor	6,401	1.7	492	198	5.46E-03	6.38E+01	3.14	0.12	1.50E+05	0.01	0.26	3.15E+07	1000	2.62E-04
C9-C10 Aromatic Hydrocarbor	6,401	1.7	492	198	5.46E-03	3.24E-01	3.14	0.12	1.78E+03	0.01	0.26	3.15E+07	1000	1.71E-04
C9-C18 Aliphatic Hydrocarbor	6,401	1.7	492	198	5.46E-03	6.77E+01	3.14	0.12	6.80E+05	0.01	0.26	3.15E+07	1000	1.27E-04
Xylenes	6,401	1.7	492	198	6.08E-03	2.75E-01	3.14	0.12	2.49E+02	0.01	0.26	3.15E+07	1000	4.37E-04
Naphthalene	6,401	1.7	492	198	4.61E-03	1.96E-02	3.14	0.12	1.19E+03	0.01	0.26	3.15E+07	1000	4.73E-05
Benzo(a)pyrene	-	-	-	-	-	-	-	-	-	-	-	-	-	NC
Dibenzo(a,h)anthracene	-	-	-	-	-	-	-	-	-	-	-	-	-	NC

Equation 2:

Constituent	**Ws (cm)**	**ρs (g/cm3)**	**d (cm)**	**Uair (cm/s)**	**δair (cm)**	**τ (s)**	**CF [(cm3-kg)/(m3-g)]**	**VFss [(mg/m3)/(mg/kg)]**
All	6,401	1.7	100	492	198	3.15E+07	1000	3.54E-04

NC = Not calculated (not volatile)

Constituent	**Csoil (mg/kg)**	**VFss [(mg/m3)/(mg/kg)]**	**Cair (mg/m3)**
Xylenes	12.2	3.54E-04	4.33E-03
Naphthalene	19.3	4.73E-05	9.13E-04
Benzo(a)pyrene	0.24	NC	-
Dibenzo(a,h)anthracene	0.058	NC	-
Total			

NC = Not calculated (not volatile).

TABLE 4
EXPOSURE ASSUMPTIONS - VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
LAUNDRY ANNEX

Scenario Timeframe:	Current and Future
Exposure Medium:	Soil
Receptor Population:	Utility Worker

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Utility Worker	Adult	Soil	IRuw	Ingestion Rate	100	mg/day	EPA, 2014, outdoor worker	Intake (oral) (mg/Kg-day) = (CS x IR x CF x FI x ED)/(BW x AT x CF2)
				FI	Fraction Ingested from Site	100%		Assume 100% from the site	
Dermal	Utility Worker	Adult	Soil	RAFd	Dermal Relative Absorption Factor	10%		EPA, 2004, default for semi-volatiles	Intake (dermal) (mg/Kg-day) = (CS x SA x AF x RAFd x CF1 x EF x ED)/(BW x CF2 x AT)
				RAFd	Dermal Relative Absorption Factor	13%		EPA, 2004, default for PAHs	
				SAw	Surface Area, Worker	3,527	cm^2/day	EPA, 2014	
				AFw	Adherence Factor, Worker	0.12	mg/cm^2	EPA, 2014, worker soil adherence factor	
Inhalation (volatiles)	Utility Worker	Adult	Soil	Cair	Chemical Concentration in Air	See Table 3.2	mg/m^3	Note: For volatile concentrations in air, used the ASTM 2015 model.	Inhalation exposure concentration (volatiles) (mg/m3) = (Cair x ET x EF x ED)/(AT x CF2)
Inhalation (particulates)				PEF	Particulate Emission Factor	1.32E+09	m^3/kg	MEDEP, 2018	Inhalation exposure concentration (particulates) (mg/m3) = (CS x (1/PEF) x ET x EF x ED)/(AT x CF3)
				CF3	Time Conversion Factor	8.76E+03	hours/year		
Parameters common to exposure pathways	Utility Worker	Adult	Soil	CS	Chemical Concentration in Soil	See Table 3.1	mg/Kg		
				CF1	Units conversion factor	0.000001	Kg/mg		
				CF2	Time conversion factor	365	days/year		
				BWw	Body Weight	80	Kg	EPA, 2014, for worker	
				EFw	Exposure Frequency, Worker	183	days/year	MEDEP, 2018, Climate-specific data for days when ground is neither frozen of snow covered in the Portland area, adjusted to 5 days/week	
				ETw	Exposure Time, Worker	8	hours/day	EPA, 2011 Tab 16-20 outdoor construction Northeast	
				EDw	Exposure Duration, Worker	1	year	Estimate of 1 year over a lifetime for a utility worker, based on small size of lot	
				AT-C	Averaging Time - Cancer	70	years	EPA, 1989	
				AT-NC	Averaging Time - Noncancer	1	year	Equal to ED. EPA, 1989	

References used:

MEDEP, 2018	Maine Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances, Effective Date: October 19, 2018.
USEPA, 2014	OSWER Directive 9200.1-120, Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. February 6, 2014.
USEPA, 2004	Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), EPA/540/R/99/005 OSWER 9285.7-02EP, July 2004 (Exhibit 3-4).
USEPA, 2011	Exposure Factors Handbook, EPA/600/R-09/052F, September 2011.
ASTM, 2015	American Society for Testing and Materials (ASTM). Standard Guide for Risk-Based Corrective Action (ASTM E-2081-00).

From EPA EFH:

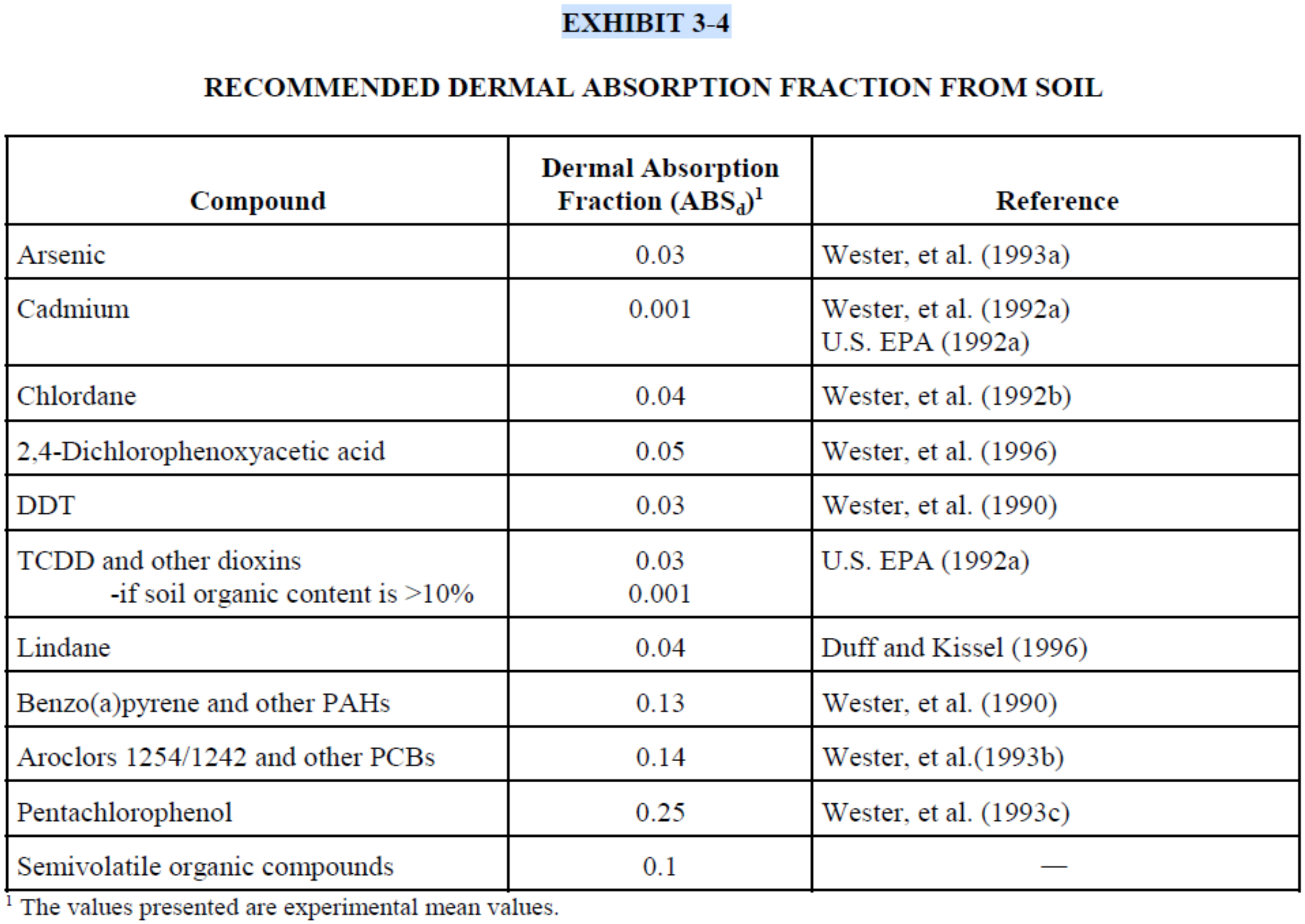

EXHIBIT 3-4

RECOMMENDED DERMAL ABSORPTION FRACTION FROM SOIL

Compound	Dermal Absorption Fraction (ABS_d)[1]	Reference
Arsenic	0.03	Wester, et al. (1993a)
Cadmium	0.001	Wester, et al. (1992a) U.S. EPA (1992a)
Chlordane	0.04	Wester, et al. (1992b)
2,4-Dichlorophenoxyacetic acid	0.05	Wester, et al. (1996)
DDT	0.03	Wester, et al. (1990)
TCDD and other dioxins -if soil organic content is >10%	0.03 0.001	U.S. EPA (1992a)
Lindane	0.04	Duff and Kissel (1996)
Benzo(a)pyrene and other PAHs	0.13	Wester, et al. (1990)
Aroclors 1254/1242 and other PCBs	0.14	Wester, et al.(1993b)
Pentachlorophenol	0.25	Wester, et al. (1993c)
Semivolatile organic compounds	0.1	—

[1] The values presented are experimental mean values.

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

LAUNDRY ANNEX

Chemical of Potential Concern	CAS #	Chronic Oral RfD		Subchronic Oral RfD			Oral Absorption Efficiency for Dermal RfD	Absorbed RfD for Dermal		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors		
		Value	Units	Value	Units			Value	Units			Source(s)	Date checked
Benzo(a)pyrene	50-32-8	3.00E-04	mg/kg-day	3.00E-04	mg/kg-day	[1]	1	3.00E-04	mg/kg-day	Developmental	--	IRIS	17-Jun-20
Dibenzo(a,h)-anthracene	53-70-3	Not assessed in IRIS										IRIS	17-Jun-20
Naphthalene	91-20-3	2.0E-02	mg/kg-day	2.0E-02	mg/kg-day	[1]	1	2.0E-02	mg/kg-day	Decreased mean terminal body weight in males	3000	IRIS	17-Jun-20
Xylenes (total)	1330-20-7	2.0E-01	mg/kg-day	2.0E-01	mg/kg-day	[1]	1	2.0E-01	mg/kg-day	Decreased body weight, increased mortality	1000	IRIS	17-Jun-20

Notes:	[1] No subchronic values available; used chronic value
IRIS	Integrated Risk Information System (https://cfpub.epa.gov/ncea/iris/search/index.cfm)
CAS #	Chemical Abstract System number
mg/kg-dy	milligrams per kilogram of body weight per day

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
LAUNDRY ANNEX

Chemical of Potential Concern	CAS #	Chronic Inhalation RfC		Subchronic Inhalation RfC			Primary Target Organ(s)	Combined Uncertainty/Modifying Factors		
		Value	Units	Value	Units				Source(s)	Date checked
Benzo(a)pyrene	50-32-8	2.0E-06	mg/m3	2.0E-06	mg/m3	[1]	Developmental	3000	IRIS	17-Jun-20
Dibenzo(a,h)-anthracene	53-70-3	Not assessed in IRIS							IRIS	17-Jun-20
Naphthalene	91-20-3	3.0E-03	mg/m3	3.0E-03	mg/m3	[1]	Nervous system, Respiratory	3000	IRIS	17-Jun-20
Xylenes (total)	1330-20-7	1.0E-01	mg/m3	1.0E-01	mg/m3	[1]	Nervous system	300	IRIS	17-Jun-20

Notes:	[1] No subchronic values available; used chronic value
CAS #	Chemical Abstract System number
IRIS	Integrated Risk Information System (https://cfpub.epa.gov/ncea/iris/search/index.cfm)
RfC	reference concentration
mg/m^3	milligrams per cubic meter in air

TABLE 6.1
CANCER TOXICITY DATA -- ORAL/DERMAL
LAUNDRY ANNEX

Chemical of Potential Concern	CAS #	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description		
		Value	Units		Value	Units		Source(s)	Date checked
Benzo(a)pyrene*	50-32-8	1	$(mg/kg\text{-}day)^{-1}$	1	1	$(mg/kg\text{-}day)^{-1}$	B2/carcinogenic to humans	IRIS	17-Jun-20
Dibenzo(a,h)-anthracene	53-70-3	Not assessed in IRIS; Used B(a)P RPF to evaluate					B2/Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	17-Jun-20
Naphthalene	91-20-3	Not assessed for caricnogenicity in IRIS					C/Possible human carcinogen; carcinogenic potential cannot be determined	IRIS	17-Jun-20
Xylenes (total)	1330-20-7	Not assessed for caricnogenicity in IRIS					D/Data are inadequate for an assessment of human carcinogenic potential	IRIS	17-Jun-20

Notes:

*	Mutagenic mode of action
CAS #	Chemical Abstract System number
IRIS	Integrated Risk Information System (https://cfpub.epa.gov/ncea/iris/search/index.cfm)
RPF	Relative Potency Factor
mg/kg-day	Milligrams per kilogram of body weight per day

TABLE 6.2
CANCER TOXICITY DATA -- INHALATION
LAUNDRY ANNEX

Chemical of Potential Concern	CAS #	Unit Risk		Inhalation Cancer Slope Factor		Weight of Evidence/ Cancer Guideline Description		
		Value	Units	Value	Units		Source(s)	Date checked
Benzo(a)pyrene*	50-32-8	6.0E-04	$(\mu g/m^3)^{-1}$			B2/carcinogenic to humans	IRIS	17-Jun-20
Dibenzo(a,h)-anthracene	53-70-3	Not assessed in IRIS; Used B(a)P RPFs to evaluate				B2/Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals	IRIS	17-Jun-20
Naphthalene	91-20-3	Not assessed in IRIS				C/Possible human carcinogen; carcinogenic potential cannot be determined	IRIS	17-Jun-20
Xylenes (total)	1330-20-7	Not assessed in IRIS				D/Data are inadequate for an assessment of human carcinogenic potential	IRIS	17-Jun-20

Notes:

*	Mutagenic mode of action
CAS #	Chemical Abstract System number
B2	Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals
IRIS	Integrated Risk Information System (https://cfpub.epa.gov/ncea/iris/search/index.cfm)
RPF	Relative Potency Factor
$\mu g/m^3$	Micrograms per cubic meter in air

TABLE 7.1 RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

LAUNDRY ANNEX

Scenario Timeframe: Current/Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil	Soil	Subsurface Soil	Ingestion	Benzo(a)pyrene RPF	0.30	mg/Kg	2.7E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	2.7E-09	- -	- -	- -	- -	- -
				Benzo(a)pyrene	0.24	mg/Kg	- -	- -	- -	- -	- -	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	5.0E-04
				Dibenzo(a,h)-anthracene	0.058	mg/Kg	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
				Naphthalene	19.3	mg/Kg	- -	- -	- -	- -	- -	1.2E-05	mg/kg-day	2.0E-02	mg/kg-day	6.0E-04
				Xylenes (total)	12.2	mg/Kg	- -	- -	- -	- -	- -	7.7E-06	mg/kg-day	2.0E-01	mg/kg-day	3.8E-05
				Exposure Route Total							**2.7E-09**					**1.1E-03**
			Dermal	Benzo(a)pyrene RPF	0.30	mg/Kg	1.5E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1.5E-09	- -	- -	- -	- -	- -
				Benzo(a)pyrene	0.24	mg/Kg	- -	- -	- -	- -	- -	8.3E-08	mg/kg-day	3.0E-04	mg/kg-day	2.8E-04
				Dibenzo(a,h)-anthracene	0.058	mg/Kg	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
				Naphthalene	19	mg/Kg	- -	- -	- -	- -	- -	6.7E-06	mg/kg-day	3.0E-03	mg/kg-day	2.2E-03
				Xylenes (total)	12	mg/Kg	- -	- -	- -	- -	- -	3.2E-06	mg/kg-day	2.0E-01	mg/kg-day	1.6E-05
				Exposure Route Total							**1.5E-09**					**2.5E-03**
			Inhalation of Particulates	Benzo(a)pyrene RPF	0.30	mg/Kg	5.4E-13	mg/m3	6.0E-04	(µg/m3)-1	3.2E-16	- -	- -	- -	- -	- -
				Benzo(a)pyrene	0.24	mg/Kg	- -	- -	- -	- -	- -	3.0E-11	mg/m3	2.0E-06	mg/m3	1.5E-05
				Dibenzo(a,h)-anthracene	0.06	mg/Kg	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
				Naphthalene	19.3	mg/Kg	- -	- -	- -	- -	- -	2.4E-09	mg/m3	3.0E-03	mg/m3	8.1E-07
				Xylenes (total)	12.2	mg/Kg	- -	- -	- -	- -	- -	1.5E-09	mg/m3	1.0E-01	mg/m3	1.5E-08
				Exposure Route Total							**3.2E-16**					**1.6E-05**
			Inhalation of Volatiles	Naphthalene	4.3E-03	mg/m3	- -	- -	- -	- -	- -	7.2E-04	mg/m3	3.0E-03	mg/m3	2.4E-01
				Xylenes (total)	9.1E-04	mg/m3	- -	- -	- -	- -	- -	1.5E-04	mg/m3	1.0E-01	mg/m3	1.5E-03
				Exposure Route Total							**- -**					**2.4E-01**
		Exposure Point Total									**4E-09**					**0.2**
	Exposure Medium Total										**4E-09**					**0.2**
										Total Estimated Receptor Cancer Risks	**4E-09**				**Total Estimated Non-Cancer Receptor Hazards**	**0.2**

Notes:

EPC Exposure Point Concentration

RPF Relative Potency Factors for Carcinogenic Polycyclic Aromatic Hydrocarbons

	RPF
Benzo(a)pyrene	1.0
Dibenzo(a,h)-anthracene	1.0

Intake (oral) (mg/Kg-day) =

$$\frac{\text{CS x IR x CF1 x FI x ED}}{\text{BW x AT x CF2}}$$

CS = EPC soil (mg/kg)
IR = Ingestion Rate (mg/day)
CF1 = Unit conversion factor (Kg/mg)
FI = Fraction Ingested (unitless-assume 100%)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body weight (kg)
AT = Averaging time (years) [noncancer is ED and cancer is 70 years]
CF2 = Time conversion factor (days/yr)

Inhalation exposure concentration (particulates) (mg/m3) =

$$\frac{\text{CS x (1/PEF) x ET x EF x ED}}{\text{AT x CF3}}$$

CS = EPC soil (mg/kg)
PEF = Particulate emission factor (m^3/kg)
ET = Exposure time (hr/day)
EF = Exposure frequency (day/yr)
ED = Exposure duration (yr)
CF3 = Time conversion factor (hours/yr)
AT = Averaging time (years) [noncancer is ED and cancer is 70 years]

Inhalation exposure concentration (volatiles) (mg/m3) =

$$\frac{\text{Cair x ET x EF x ED}}{\text{AT x CF3}}$$

Cair = Concentration in air (mg/m3)
ET = Exposure time (hr/day)
EF = Exposure frequency (day/yr)
ED = Exposure duration (yr)
CF3 = Time conversion factor (hr/yr)
AT = Averaging time (years) [noncancer is ED and cancer is 70 years]

Intake (dermal) (mg/Kg-day) =

$$\frac{\text{CS x SA x AF x RAFd x CF1x EF x ED}}{\text{BW x CF2 x AT}}$$

CS = EPC soil (mg/kg)
SA = Exposed skin surface area (cm^2/day)
AF = Soil adherence factor (mg/cm^2)
RAFd = Dermal Relative Absorption Factor (unitless)
EF = Exposure frequency (days/yr)
ED = Exposure duration (yr)
CF1 = Units conversion factor (kg/mg)
CF2 = Time conversion factor (days/yr)

BW = Body weight (kg)

AT = Averaging time (years) [noncancer is ED and cancer is 70 years]

TABLE 9 RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

LAUNDRY ANNEX

Scenario Timeframe	Current/Future
Receptor Population	Utility Worker
Receptor Age	Adult

Medium	Exposure Medium	Exposure Point Concentration mg/Kg	Chemical of Potential Concern	Carcinogenic Risk					Non-Carcinogenic Hazard Quotient					
				Ingestion	Dermal	Inhalation Particulates	Inhalation Volatiles	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Dermal	Inhalation Particulates	Inhalation Volatiles	Exposure Routes Total
	Soil	0.30	Benzo(a)pyrene RPF	3E-09	1E-09	3E-16	[4]	4E-09	[3]	[3]	[3]	[3]	[3] [4]	
		0.24	Benzo(a)pyrene	[1]	[1]	[1]	[4]			5.0E-04	2.8E-04	1.5E-05	[4]	7.9E-04
		0.06	Dibenzo(a,h)-anthracene	[1]	[1]	[1]	[4]		[3]	[3]	[3]	[3]	[4]	
		19.30	Naphthalene	[2]	[2]	[2]	[2]			6.0E-04	2.2E-03	8.1E-07	2.4E-01	2.4E-01
		12.23	Xylenes (Total)	[2]	[2]	[2]	[2]			3.8E-05	1.6E-05	1.5E-08	1.5E-03	1.6E-03
		Exposure Point Total						4E-09		0.001	0.003	0.00002	0.2	0.2
	Exposure Medium Total							4E-09						0.2
Receptor Total								4E-09			Receptor HI Total			0.2

Notes:

[1] Calculated as part of the benzo(a)pyrene RPF

[2] Not calculated (not classified as a carcinogen)

[3] Not applicable or not calculated (not classified or evaluated as a non-carcinogen)

[4] Not volatile, so not calculated

APPENDIX D

Backup for Calculations of EPCs for Volatiles in Air

Risk Characterization
Construction/Utility Workers
Former Loring AFB Laundry Annex
Presque Isle, Maine

Volatilization Factor - Surface Soil to Outdoor Air

Lower VFss calculated by either equation

Eq 1

$$VF_{ss} = \frac{2 \cdot W_s \cdot \rho_s}{U_{air} \cdot \delta_{air}} \cdot \sqrt{\frac{D^{eff}_s \cdot H}{\pi \cdot \left(\theta_{ws} + K_s \cdot \rho_s + H \cdot \theta_{as}\right) \cdot \tau}} \cdot CF$$

OR

Eq 2

$$VF_{ss} = \frac{W_s \cdot \rho_s \cdot d}{U_{air} \cdot \delta_{air} \cdot \tau} \cdot CF$$

VF_{ss} = Volatilization factor, surface soil to ambient air [(mg/m^3)/(mg/kg)]
W_s = Width of soil source (cm)
ρ_s = Bulk soil density (g/cm^3)
U_{air} = Ambient air wind speed (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
D^{eff}_s = Effective diffusivity in vadose zone soil (cm^2/s)
H = Henry's Law Constant (cm^3/cm^3)
π = Pi (3.14)

θ_{ws} = Water content in vadose zone soil (cm^3/cm^3)
K_s = Soil sorption coefficient (cm^3/g) (= Koc x foc)
K_{oc} = Organic carbon water partition coefficient (cm^3/g)
f_{oc} = Fraction of soil organic carbon (g/g)
θ_{as} = Air content in vadose zone soil (cm^3/cm^3)
τ = Averaging time for vapor flux (s)
CF = Unit conversion factor [(cm^3-kg)/(m^3-g)]
d = Lower depth of surficial soil (cm)

Equation 1:

Constituent	W_s (cm)	ρ_s (g/cm^3)	U_{air} (cm/s)	δ_{air} (cm)	D^{eff}_s (cm^2/s)	H (cm^3/cm^3)	π (unitless)	θ_{ws} (cm^3/cm^3)	K_{oc} (cm^3/g)	f_{oc} (g/g)	θ_{as} (cm^3/cm^3)	τ (s)	CF [cm^3-kg)/(m^3-g)]	VF_{ss} [(mg/m^3)/(mg/kg)]
Xylenes	6,401	1.7	492	198	6.08E-03	2.75E-01	3.14	0.12	2.49E+02	0.01	0.26	3.15E+07	1000	4.37E-04
Naphthalene	6,401	1.7	492	198	4.61E-03	1.96E-02	3.14	0.12	1.19E+03	0.01	0.26	3.15E+07	1000	4.73E-05
Benzo(a)pyrene	-	-	-	-	-	-	-	-	-	-	-	-	-	NC
Dibenzo(a,h)anthracene	-	-	-	-	-	-	-	-	-	-	-	-	-	NC

Equation 2:

Constituent	Ws (cm)	ρ_s (g/cm^3)	d (cm)	U_{air} (cm/s)	δ_{air} (cm)	τ (s)	CF [(cm^3-kg)/(m^3-g)]	VF_{ss} [(mg/m^3)/(mg/kg)]
All	6,401	1.7	100	492	198	3.15E+07	1000	3.54E-04

NC = Not calculated (not volatile)

Risk Characterization
Construction/Utility Workers

Former Loring AFB Laundry Annex
Presque Isle, Maine

Effective Diffusivity through Vadose Zone Soil

$$D^{eff}_s = D_{air} \cdot \left(\frac{\theta_{as}^{3.33}}{\theta_T^{2}}\right) + D_{wat} \cdot \left(\frac{1}{H}\right) \cdot \left(\frac{\theta_{ws}^{3.33}}{\theta_T^{2}}\right)$$

$D^{eff}s$ = Effective diffusivity through vadose zone soil (cm^2/s)
D_{air} = Diffusion coefficient in air (cm^2/s)
D_{wat} = Diffusion coefficient in water (cm^2/s)
H = Henry's Law Constant (cm^3/cm^3)
θ_{as} = Air content in vadose zone soil (cm^3/cm^3)
θ_{ws} = Water content in vadose zone soil (cm^3/cm^3)
θ_T = Total soil porosity (cm^3/cm^3)

Constituent	**D_{air} (cm^2/s)**	**D_{wat} (cm^2/s)**	**θ_{as} (cm^3/cm^3)**	**θ_{ws} (cm^3/cm^3)**	**θ_T (cm^3/cm^3)**	**H (cm^3/cm^3)**	**D^{eff}_s (cm^2/s)**
Xylenes	7.80E-02	8.75E-06	0.26	0.12	0.38	2.75E-01	6.08E-03
Naphthalene	5.90E-02	7.50E-06	0.26	0.12	0.38	1.96E-02	4.61E-03
Benzo(a)pyrene	-	-	-	-	-	-	NC
Dibenzo(a,h)anthracene	-	-	-	-	-	-	NC

NC Not calculated (not volatile).

Risk Characterization
Construction/Utility Workers
Former Loring AFB Laundry Annex
Presque Isle, Maine

Constituent Properties

Constituent	Soil Exposure Point Concentrations C_S (mg/kg)	Henry's Law Constant H (cm^3/cm^3)		Organic Carbon/Water Partition Coefficient K_{oc} (cm^3/g)		Diffusion Coefficient in Air D_{air} (cm^2/s)		Diffusion Coefficient in Water D_{wat} (cm^2/s)	
Xylenes	12.2	2.75E-01	[2]	2.49E+02	[2]	7.80E-02	[2]	8.75E-06	[2]
Naphthalene	19.3	1.96E-02	[2]	1.19E+03	[2]	5.90E-02	[2]	7.50E-06	[2]
Benzo(a)pyrene	0.24	--	[4]	--	[4]	--	[4]	--	[4]
Dibenzo(a,h)anthracene	0.058	--	[4]	--	[4]	--	[4]	--	[4]

NC Not calculated.

"--" Not detected or not applicable.

[1]. MassDEP (2014). Method 1 Numerical Standards and supporting documentation.

[2]. U.S. EPA (2005) Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA-R-05-006); companion chemical database (HHRAP_chem_export.xlsx).
Values for total xylenes are average of values for o-, m-, and p-xylene.

[3]. MaineDEP (2018) Maine Remedial Action Guidelines (RAGS) for Sites Contaminated with Hazardous Substances (October).

[4]. Not needed; constituent not appreciably volatile.

Risk Characterization
Construction/Utility Workers

Former Loring AFB Laundry Annex
Presque Isle, Maine

Site Factors

Notation	Definition	Value	Units	Reference
θ_T	Total soil porosity	0.38	cm^3/cm^3	ASTM (2015) default value.
ρ_s	Bulk soil density	1.7	g/cm^3	ASTM (2015) default value.
f_{oc}	Soil organic carbon content	0.01	g/g	Assumed value.
θ_{ws}	Water content in vadose zone soil	0.12	cm^3/cm^3	ASTM (2015) default value.
θ_{as}	Air content in vadose zone soil	0.26	cm^3/cm^3	θ_T - θ_{as}
d	Lower depth of surficial soil sample	100	cm	ASTM (2015) default value.
U_{air}	Wind speed	492	cm/s	Annual average wind speed of Caribou, ME (11 mph) (NCDC 1998).
δ_{air}	Mixing zone of ambient air	198	cm	6.5 feet assumed value.
W_S	Width of soil source area	6,401	cm	210 feet; approximate length of affected area
τ	Averaging time for vapor flux (adult)	3.15E+07	s	One year.

ASTM (2015) Standard Guide for Risk-Based Corrective Action. E-2081-00.

NCDC (November 1998). Climatic Wind Data for the United States.

US EPA (2004). Users Guide for Evaluating Subsurface Vapor Intrusion into Buildings (February).

APPENDIX D

PETROLEUM ASSESSMENT REPORT

Petroleum Assessment Report

Former Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

ME FUDS Site #DO1ME0132 02

Prepared by:
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742

May 2021

EXECUTIVE SUMMARY

U.S. Army Corps of Engineers (USACE) New England District (CENAE) prepared a Remedial Investigation (RI) Report for the Former Loring Air Force Base (AFB) Laundry Annex located on Central Drive in Presque Isle, Aroostook County, Maine (Site). The Formerly Used Defense Sites (FUDS) property consists of two areas. One area (0.24 acres) is the former dry-cleaning building located on the west side of Central Drive, which for purposes of this RI will be considered the 'Site'. The other area is the former laundry building and stream plant (1.06 acres) the east side of Central Drive. The former laundry building and steam plant has been beneficially re-used by the current property owner and are not eligible for inclusion in the FUDS Program.

This Petroleum Assessment Report has been prepared by CENAE concurrently with the RI report and is included as an Appendix to evaluate the other available petroleum data for the Site (i.e., the hydrocarbon fractions and grouped analyses). The RI report focuses on evaluation of hazardous substances including compounds that are regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and present as a consequence of petroleum released at the Site. The RI has evaluated these compounds in a conservative and comprehensive manner that is protective of human health and the environment. Petroleum releases are exempt from the federal response authority under CERCLA, and therefore petroleum data, mainly hydrocarbon fraction results analyzed by extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH), is being evaluated in this appended report according to Maine Department of Environmental Protection (DEP) petroleum cleanup guidelines: the Maine DEP Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (Maine DEP, 2018) and Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (Maine DEP, 2014).

The Site comprises an undeveloped portion of a larger 0.46-acre parcel and is located on the west side of Central Drive, next to railroad tracks. The Site previously contained a dry-cleaning building associated with Loring Air Force Base, and currently no buildings are on the Site.

Data collected between 1992 and 2017 identified petroleum impacted subsurface soil in the area beneath the former building. A conceptual site model (CSM) for the Site is presented in the RI Report and summarizes available data to present a clear understanding of the potential source areas, contaminants of potential concern (COPCs), extent of contamination, migration pathways, and contaminant persistence.

The Site is currently undeveloped and unused. The Site is located in a Light Industrial Zone where commercial or industrial use permitted; however, residential use is not. The property was conveyed to the City of Presque Isle (CoPI) by the United States federal government through the General Services Administration by a quit claim deed on November 25, 1974, as part of a larger parcel. Transfer of the property was subject to restricting the future use of the property for public airport purposes. Property thus transferred cannot be used, leased, sold, salvaged or disposed for other than airport purposes without written consent of the Administer of the Federal Aviation Administration (FAA). This use is further restricted by municipal zoning ordinance.

Due to deed and zoning restrictions, the parcel’s current and future use is limited to “green space”, parking and snow storage for the adjacent Building 306. Commercial/Industrial uses will not be permitted by zoning due to the small lot size and setbacks. The zone does not permit residential housing or childcare businesses on adjacent property and such uses are not anticipated by CoPI in the foreseeable future.

The Site is within the bounds of the CoPI Site Location of Development Permit. This permit does not materially affect development procedures for the Site with respect to management of any excavated subsurface soil.

There is no current exposure to petroleum in surface soil at the Site because soil from 0 to 6 feet bgs is known to be non-native fill, and future exposure to deeper soil would occur only during subsurface excavation. Based on the parcel’s future use limitations and on a review of other potential receptors, contaminated media, and exposure pathways, construction and possible future commercial workers (landscapers) were the only receptors evaluated.

Petroleum analytical results for soils at depth that would be accessible to a construction worker (for example underground utility maintenance) exceed the Maine DEP RAGs for the construction worker exposure scenario. These elevated concentrations are located at depths below at least 2 feet of soil fill with no known evidence of contamination, including at the surface, which therefore prevents direct contact exposure under current use scenarios.

The property frontage is also restricted by a 30-foot road right of way (ROW). The existing utilities (stormwater catch basins and utility poles) are within the ROW. Any additional future utilities would also logically be installed within the ROW. The extent of petroleum contamination is interpreted to lie outside of the ROW, and therefore any future utility maintenance would not contact petroleum contaminated soil. Since the property would be further restricted as green space and parking/snow storage, subsurface excavation would not occur on the property.

Due to deed and zoning restrictions (as stated above), no actions are required for petroleum impacted soil to protect human health or the environment. Therefore, No Further Action (NFA) is required for the project.

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FIGURES

TABLES

LIST OF ACRONYMS

AFB – Air Force Base
bgs – below ground surface
CENAE – Corp of Engineers New England District
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CoPI – City of Presque Isle
Credere – Credere Associates, LLC
CSM – conceptual site model
DEP – Department of Environmental Protection (Maine)
EPA – U.S. Environmental Protection Agency
EPH – Extractable Petroleum Hydrocarbons
FUDS – Formerly Used Defense Site
HHRA – Human Health Risk Assessment
MACTEC – MACTEC Engineering and Consulting, Inc.
MCL – Maximum Contaminant Level
MEE – Maine Environmental Engineering
MEG – Maximum Exposure Guideline
NFA – No Further Action
PAH – polycyclic aromatic hydrocarbons
PCB – polychlorinated biphenyls
Petroleum Guidelines – Remediation Guidelines for Petroleum Contaminated Sites in Maine (Maine DEP)
PID – photoionization detector
ppm – parts per million
RAG – Remedial Action Guideline for Sites Contaminated with Hazardous Substances (Maine DEP)
ROW – Right of Way
RI – Remedial Investigation
RSL – Regional Screening Level
R. Weston – Roy F. Weston, Inc.
TPH-GRO – total petroleum hydrocarbons-gasoline range organics
TPH-DRO – total petroleum hydrocarbons-diesel range organics
µg/L – micrograms per Liter
USACE – U.S. Army Corp of Engineers
USGS – U.S. Geological Survey
UST – underground storage tank
VOC – volatile organic compounds
VPH – volatile petroleum hydrocarbons
Weston – Weston Solutions, Inc.

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE) New England District (CENAE) prepared a Remedial Investigation (RI) report for the Former Loring Air Force Base (AFB) Laundry Annex (Formerly Used Defense Sites [FUDS] project DO1ME0132 02) located on Central Drive in Presque Isle, Aroostook County, Maine (Site). A Site Location Plan is provided as **Figure 1**.

This Petroleum Assessment Report has been prepared concurrent with the RI report (USACE, 2023). The RI report focuses on evaluation of hazardous substances and compounds regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). As response actions for petroleum releases are exempt from CERCLA, petroleum data, mainly hydrocarbon fraction results analyzed by extractable petroleum hydrocarbons (EPH) and volatile petroleum hydrocarbons (VPH), were evaluated in this Petroleum Assessment Report according to Maine Department of Environmental Protection (DEP) petroleum cleanup guidelines: the Maine DEP Remedial Action Guidelines (RAGs) for Sites Contaminated with Hazardous Substances (Maine DEP, 2018a) and Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (Petroleum Guidelines; Maine DEP, 2014).

1.1 PURPOSE

The purpose of this Petroleum Assessment Report is to evaluate the petroleum fraction results pertinent to the Maine DEP petroleum cleanup guidelines. As the compounds evaluated (EPH and VPH fractions) herein relate to the CERCLA contaminants and sources in the RI, the RI will be referenced for discussion of the conceptual Site model (CSM) and this report will focus primarily on exposure assessment under the Maine DEP Guidelines via comparison to the RAGs and Petroleum Guidelines.

1.2 PROJECT BACKGROUND

1.2.1 Current Site Description

The Site is a FUDS, which consists of two areas. One area (0.24 acres) is the former dry-cleaning building located on the west side of Central Drive, which for purposes of this document and the RI, are referred as the 'Site'. The other area is the former laundry building and stream plant (1.06 acres) located on the east side of Central Drive. The Site layout is provided on **Figure 2**. The former laundry building and steam plant (1.06 acre lot) were located on the east side of Central Drive (current Map 46, Block 35, Lot 1165; CoPI, 2020), hydrologically upgradient of the former dry cleaning building, and are not assessed in this report because the buildings were beneficially reused by the Maine State Department of Educational and Cultural Services (the current owner) after transfer of ownership (in May 1974) and are not eligible for inclusion under the FUDS program. This area of the FUDS property will not be discussed further.

The Site comprises an undeveloped portion of a larger 0.46-acre parcel identified by the CoPI as Map 46, Block 35, Lot 11-050 (CoPI, 2020), which is located on the west side of Central Drive. The former Site building was demolished in the early 1980s and associated foundation was removed in 1998. The Site is currently undeveloped consisting of a grass covered open space. Four newly installed (2015) flush-mount monitoring wells with concrete pads and one flush-mount monitoring well of unknown origin are also currently present at the Site, which are associated with RI activities. Four prior wells were destroyed during foundation removal. A culverted stream crosses under the Site from north to the southwest of the Site.

The surrounding area comprises the Northern Maine Community College campus and light industrial buildings to the northeast and east, a commercial/industrial building to the southeast, Aroostook Valley Railroad tracks bordering the Site to the southwest, a bulk oil storage tank to the northwest, and the Maine DEP Presque Isle office to the north. The adjoining railroad tracks were constructed to support movement of supplies throughout the AFB and were added sometime after 1935 (U.S. Geological Survey [USGS], 1935). The area west of the Site, Taxiway Street and Central Drive, is registered with the Maine DEP to have formerly contained approximately 32 underground storage tanks (USTs) associated with the former AFB (Maine DEP, 2018b). Location information is limited to building number designations, which in most cases do not correspond to current buildings or building numbers.

The property was conveyed to the CoPI by the United States federal government through the General Services Administration by a quit claim deed on November 25, 1974, as part of a larger parcel. Transfer of the property was subject to restricting the future use of the property for public airport purposes. Property thus transferred cannot be used, leased, sold, salvaged or disposed for other than airport purposes without written consent of the Administer of the Federal Aviation Administration (FAA). This use restriction is further restricted by municipal zoning ordinance.

The transfer deed and Municipal Zoning Ordinance restricts future use of the parcel to its current use, which is limited to “green space”, parking and snow storage for the adjacent Building 306. Commercial/Industrial uses will not be permitted by zoning due to the small lot size and setbacks. The zone does not permit residential housing or childcare businesses on adjacent property and such uses are not anticipated by CoPI in the foreseeable future.

A Site Location Plan is provided as **Figure 1**, and a Detailed Site Plan is provided as **Figure 2**.

1.2.2 Site History

Prior to 1941, the Site was an undeveloped portion of the Presque Isle AFB. In 1941, the DoD obtained the property and constructed the dry-cleaning building on the west side of Central Drive, which was part of the Presque Isle AFB at the time. The Site and adjoining parcel east of Central Drive were reassigned as the Loring AFB Laundry Annex in July 1961. The Laundry Annex operated as a laundry facility and serviced 17,000 Air Force personnel and dependents between 1941 and 1974. In 1974, these government excess properties were transferred to the State of Maine and City of Presque Isle (CENAE, 1992). The dry-cleaning building Site (0.24-acre lot) has been owned by the City of Presque Isle and managed by the Presque Isle Industrial Council since November 25, 1974 (Aroostook, 1974).

The Site buildings were referred to as Buildings 314 and 315 (Aroostook, 1974). The Site dry cleaning building served as the dry-cleaning facility for the Laundry Annex. The building was demolished in the early 1980s; however, the foundation and an associated UST of unspecified contents remained through 1998 (CENAE, 1992). Based on building plans, it was originally thought two petroleum USTs were present: a 275-gallon and 1,000-gallon UST; however, a June 11, 1994 investigation found only a 100-gallon UST, which was removed on August 3, 1994, from beneath the foundation slab (Maine Environmental Engineering [MEE], 1997). These USTs are registered under Maine DEP Tank ID 18835 (Maine DEP, 2018b).

Pertinent historical details are depicted on the **Figure 2** Detailed Site Plan.

2. ENVIRONMENTAL SUMMARY

The complete CSM including the full summary of prior reports, physical setting, nature and extent of contamination, and contaminant fate and transport including cross sections and figures indicating the inferred extent of contamination is provided in the associated RI.

The Site was formerly a dry-cleaning facility with heating fuel stored in a 100-gallon fuel oil UST located near the eastern corner of the former Site building. The UST was removed in 1994 (MEE, 1997). The subsequent subsurface investigation assessed for the presence of volatile organic compounds (VOCs), total petroleum hydrocarbons-gasoline range organics (TPH-GRO) and TPH-diesel range organics (TPH-DRO), polychlorinated biphenyls (PCBs), and pesticides in soil and groundwater and VOCs in soil gas at the Site.

Soil gas concentrations of VOCs were below the detection limit of the field instruments. Vinyl chloride in groundwater was found to exceed the 1992 Maine Maximum Exposure Guideline (MEG; Maine Department of Health and Human Services [DHS], 1992; *note: Environmental Protection Agency [EPA] Maximum Contaminant Levels [MCLs; EPA, 2017] at the time not referenced in R. Weston, 1997 report*) in the eastern portion of the Site (LAMW-3) during the May 1997 sampling round, and GRO and DRO were found to exceed the 1997 RAGs and 1995/2000 Petroleum Guidelines in the center of the former Site building (LAMW-4), in the vicinity of the former UST (LAMW-3), and southeast of the UST (LAMW-1; R. Weston, 1997). The exact location of the removed UST was not confirmed after it was found, and a second suspected UST was not confirmed. The two possible locations of the former UST are depicted on **Figure 2**. Upon return to the Site for subsequent sampling rounds, it was determined that the monitoring wells had been destroyed during removal of the foundation slab in 1998. Maine DEP did not require new wells be installed and recommended sediment and surface water sampling upgradient and downgradient of the drainage culvert to assess if Site contamination potentially impacted sediment and surface water in the area (R. Weston, 1999).

Sample results for upstream and downstream sediment samples collected between October 1999 and May 2004 indicated similar DRO concentrations upstream and downstream of the Site. Surface water concentrations were mostly below the laboratory reporting limits with a single exception of an estimated detected concentration at the downstream sample location in May 2000 (*Note: Data quality of October 1999 samples insufficient to assess if DRO was present at that time*). Therefore, it was concluded the former fuel oil UST at the Site was not entirely the source of DRO in sediment and surface water (Weston Solutions, Inc [Weston], 2004). Sampling associated with the Site was then discontinued from the Loring Maine FUDS monitoring program (Weston, 2005).

An additional closeout investigation was conducted at the Site in May 2015 to assess current concentrations of TPH-DRO in soil and groundwater, confirm the prior detection of vinyl chloride in groundwater, and assess groundwater in bedrock at the Site. This investigation included installation and sampling of two overburden/bedrock interface monitoring wells and two bedrock monitoring wells. Groundwater analytical results indicated low levels of VOCs (including both petroleum compounds and other VOCs) and VPH below the applicable MCLs and MEGs at the time, and no evidence of residual petroleum contamination (i.e., low photoionization detector [PID] readings and no odors) was noted in the soil boring logs (AECOM/Battelle, 2015).

A preliminary screening of the historical data that included VOCs, GRO, DRO, VPH and EPH was done in 2016 and results were compared to available screening values. Results of the screening indicated groundwater concentrations were below screening levels. Historical TPH-GRO and TPH-DRO soil analysis used in prior investigations are not readily compared against current screening values that are based on VPH and EPH. A risk based approach for the Maine DEP was developed for DRO/GRO for the Loring AFB UST petroleum program to allow comparison of GRO and DRO to VPH and EPH fractions for sites where Maine DEP was transitioning from the older GRO/DRO to the newer VPH/EPH analytical methods (MACTEC, 2010). Consideration of these adapted concentrations as screening values indicated some historical data results were greater than these screening values.

Based on results of this screening step, it was concluded existing soil data did not define the nature and extent of petroleum contamination for an adequate CSM to inform subsequent evaluations on potential exposure to the remaining petroleum. The lack of current analytical data by the MassDEP VPH and EPH methods that are used in Maine DEP's current RAGs was also identified as a data gap.

To fill this data gap and better understand the extent of remaining petroleum, Credere Associates, LLC (Credere) completed a supplemental soil delineation investigation at the Site in November 2016 and July 2017. In November 2016, samples collected from borings LASB-8 and LASB-11 contained concentrations of VPH and EPH petroleum fractions and target compounds (i.e., polycyclic aromatic hydrocarbons [PAHs]) above EPA Regional Screening Levels (RSLs; EPA, 2020) and/or the Maine DEP RAGs/Petroleum Guidelines. Additionally, several other samples were identified to have PAHs above the screening criteria. Based on these exceedances, a step-out delineation program was implemented in July 2017 to delineate the horizontal and vertical extent of petroleum impacted soil. Soil field screening with a PID and oleophilic dye tests were used to identify evidence of contamination. (Lack of consistent oleophilic dye tests and reliance on the PID is inconsistent with Maine DEP's field screening SOP [Maine DEP, 2012].) Borings were stepped out in 10-foot intervals until the full boring contained less than 10 parts per million (ppm) on the PID, then delineation analytical samples were collected from predefined depths based on previously observed evidence of contamination or analytical results. With the exception of a few PAHs, EPH and VPH petroleum fractions and target compounds were well below the Maine DEP RAGs/Petroleum Guidelines in the perimeter soil samples and petroleum-impacted soil was considered delineated.

Prior investigations and monitoring results are summarized in more detail in the RI. Cumulative soil, groundwater, sediment, and surface water analytical data is tabulated on **Tables 1 through 4** for detected compounds.

2.1 EXTENT OF CONTAMINATION

The extent of soil contamination is mirrored by the RI Section 3.4 because the data used to determine the extent are represented by the CERCLA COPCs that are collocated with petroleum fractions. However, as historical groundwater, surface and sediment results were analyzed exclusively as GRO and DRO grouped analyses, discussion of the historical GRO/DRO results are provided. The extent of contamination is shown on **Figures 3 through 5**.

Soil

The current horizontal extent of the petroleum impacted soil was inferred to extend north to LASB-17B, east to LASB-19A and LASB-5, southeast to LASB-13A, south to LASB-10 and LASB-14A, and west to the Site boundary. The horizontal extent is depicted on **Figure 5** with the associated analytical data and PID results used for the delineation. The extent line is conservatively drawn to the location of clean borings considering both PID results and analytical results.

Vertically within the delineated horizontal extent (i.e., the extent shown on **Figure 5**), there is approximately 4 feet of soil with no evidence of the presence of COPCs (based on lack of visual evidence of contamination and field screening results) at the surface overlying the impacted soil. This is consistent with the anticipated source of the COPCs being the subsurface UST, which would likely have released at least 3 to 4 feet below the surface. Based on field screening and analytical results, impacted soil generally is considered to extend to bedrock. Impacted soil appears to be limited to a thinner interval in LASB-17A and LASB-17B that does not extend to bedrock.

Based on the horizontal delineated area of 4,085 square feet (ft^2) and an average depth to bedrock of 15 feet bgs, a total of approximately 2,000 to 2,500 cubic yards (cy) of overburden soil is present in the delineated area. Based on a thickness of 4 feet in the delineated area, the surface soil where no evidence of COPCs is observed overlying the impacted soil is calculated to be approximately 550-650 cy. Therefore, 1,500 to 1,700 cy of impacted soil is estimated to be present at the Site[1] (total volume minus the surface volume).

Past migration of COPCs was likely influenced by overburden geology with slow migration rates through the fine-grained overburden from the former tank westward. By 1996, historical data between the source area (LAMW-3) and downgradient areas (LAMW-4, LASB-1, and LASB-3), indicated a stable, mature plume. As shown on **Figures 3** and **4**, based on the fill thicknesses at the Site, a relatively flat contact is present beneath the former Site building between the surficial fill material and the native till. This contact may have facilitated lateral movement over the short distances that have occurred (approximately 60 feet).

---

[1] Actual calculations based on assumptions include a total of 2,269 cy of soil within area, 605 cy of fill with no evidence of contamination near the surface, and 1,664 cy of impacted soil.

It is presumed that product that may have migrated down through the finer grained silt would have been continually smeared by rising and falling perched groundwater and eventually sorbed to the fine-grained material.

Given the depth of perched groundwater below the fill and native soil intervals and near the bedrock interface, the initial migration of a release from the 100-gallon UST was likely influenced by overburden geology. COPCs and associated petroleum constituents likely migrated in overburden preferentially through granular fill at the surface spreading out over the relatively flat silty native soil interface and then downward into the soil column. After building demolition, precipitation infiltrating down through the silty native soil carried dissolved constituents toward the water table, where they partitioned to soil organic matter along that migration pathway, and or were retained by capillary forces including diffusion into fine grained soils. Historical DRO concentrations did not show an apparent decreasing trend between the source area (LAMW-3) and downgradient of the plume (LAMW-4, LASB-1, and LASB-3), indicating a mature plume had apparently been established by the time the Site was assessed in 1996.

The perched groundwater near the bedrock interface would be influenced by precipitation and groundwater rise and fall relatively quickly. Non-aqueous phase product that would have been percolating down through the finer grained silt, and or fractured till would have been continually smeared by this rising and falling perched water and eventually sorbed to the fine-grained material.

As the Site has been mostly undisturbed since 1998, vapor from the sorbed petroleum may have remained in the fine-grained soil pore space as evidenced by the relatively high PID readings and limited analytical concentrations in some locations (e.g., LASB-15B).

Groundwater

GRO and DRO concentrations in groundwater exceeded the 1992 Maine DEP Maximum Exposure Guidelines (MEG) in monitoring wells LAMW-3 and LAMW-4 in November 1996 and May 1997, and DRO exceeded the MEG in LAMW-1 in May 1997. However, sampling of newly installed wells in May 2015 indicated only trace levels of VOCs, and results for EPH and VPH petroleum fractions and target compounds were below the laboratory reporting limits with the exception of trace toluene below the screening levels in LAMW-4A. Based on results of samples analyzed using current analytical methods and after a period of 20 years, concentrations of COPCs in groundwater have attenuated to the point where impacted groundwater is no longer present at the Site.

Surface Water and Sediment

Concentrations of petroleum by GRO/DRO in sediment were consistently detected above the 10 mg/kg 2000 Petroleum Guidelines in both upgradient and downgradient samples between 1999 and 2004. Initially, results from 1999 and 2000 seemed to indicate higher concentrations at the downgradient locations; however, results from December 2002 through May 2004 did not show a significant difference in concentrations between the upstream and downstream sediment locations. VOCs were also analyzed but only compounds evaluated to be laboratory contaminants at the time were detected (2-butanone, acetone, methylene chloride and styrene), no petroleum related BTEX compounds were detected either upstream or downstream. Although concentrations exceeded the Petroleum Guideline cleanup goal at the time, sampling of sediment was discontinued in 2004 since the Site did not appear to be the only potential contributing source to the DRO concentrations in sediment based on the similar upstream concentrations. As concentrations could not be attributed to an onsite petroleum source, there is potential these concentrations reflect background sediment concentrations in the drainage system of this industrialized area.

Surface water results were consistently below the laboratory reporting limits for DRO apart from the single downgradient location in May 2000, which was an estimated concentration. The detected concentration was only slightly above the reporting limit and can likely be attributed to suspended organics in the sample during collection.

Therefore, the detected surface water and sediment DRO concentrations appear to be background to the stream/drainage system reflecting the organic carbon naturally occurring in the stream system within the DRO carbon range (C_{10} to C_{28}) and are not considered to be associated with the Site.

3. PETROLEUM EXPOSURE EVALUATION

Petroleum hydrocarbons are not regulated under CERCLA and were not evaluated in the HHRA discussed in the RI. Alternatively, the hydrocarbon fraction results were evaluated through comparison to the Maine DEP RAGs (Maine DEP, 2018a) and Petroleum Guidelines (Maine DEP, 2014). Results are compared to the RAGs and Petroleum Guidelines in **Tables 1 through 4**. Complete historical results (i.e., lab reports) are available in a variety of historical monitoring reports and more recent data is reported in the 2015 Final Trip Report (AECOM/Battelle, 2015), November 2016 Additional Investigation Trip Report (Credere, 2017) and July 2017 Additional Investigation Trip Report (Credere, 2018). COPCs that are discussed in the RI are not further discussed herein.

3.1 SELECTION OF RAG SCENARIOS

The Maine DEP RAGs consider accessible soil to be within the top 2 feet of soil. As the source of the release at the Site is believed to be a former UST that would have released petroleum at 3 to 4 feet below ground surface (bgs), there is no known source of petroleum impacts in the surficial accessible soil. Potentially accessible soil results collected from within 2 to 15 feet bgs were compared to the construction worker RAGs and the commercial worker RAGs considering the reworking of contaminated soil to the surface during any future utility or redevelopment (i.e., parking lot) work. Soil below 15 feet bgs is considered inaccessible and has only conservatively been compared to the construction worker RAGs.

3.2 COMPARISON OF RESULTS

Results in two samples, LASB-8-1 from 12 to 14 feet bgs and LASB11-1 from 6 to 8 feet bgs, contained C9-C12 aliphatics exceeding the construction worker RAG. These results did not exceed the commercial worker RAG; therefore, would not be a concern if relocated at the surface. Based on the depth of this area of contamination, this soil would not be readily accessible and there would be no exposure under current conditions. Exposure to future construction of commercial workers is possible if soil were brought closer to the surface or exposed in an excavation. However, this future exposure is unlikely due to deed language and zoning restrictions which restrict the future use to “green space”, parking and snow storage. Commercial/industrial uses would not be permitted. In addition, the road right of way where utilities are present is outside the area of petroleum contaminated soil, so utility maintenance workers would also be unlikely to contact petroleum impacted soil.

The current subsurface utilities (stormwater catch basins) and utility poles are located within the road ROW which extends 30 feet on the front property line. The petroleum contamination is located outside of the ROW and utility maintenance workers would not be exposed to petroleum impacted soils based on current CSM and extent of contamination. It is logical any future utilities would be within this ROW. The likelihood of future soil excavation outside the ROW is remote. Residential uses and childcare facilities are not permitted.

4. SUMMARY AND CONCLUSIONS

4.1 SUMMARY

The Site has been assessed for the purposes of conducting an RI under CERCLA. CERCLA contaminants were evaluated as part of the RI and associated HHRA prepared in parallel to this Petroleum Assessment Report. Petroleum hydrocarbons are not considered CERCLA contaminants and were not evaluated in the HHRA discussed in the RI, although some specific compounds associated with petroleum were evaluated in the HHRA. Alternatively, the hydrocarbon fraction results were evaluated through comparison to the Maine DEP RAGs (Maine DEP, 2018a) and Petroleum Guidelines (Maine DEP, 2014).

The Maine DEP RAGs consider accessible soil to be within the top 2 feet of soil. The source of the release at the Site was a former UST that would have released petroleum at 3 to 4 feet bgs, there is no known source of petroleum impacts in the surficial accessible soil. Potentially accessible soil results collected from within 2 to 15 feet bgs were compared to the construction worker RAGs and the commercial worker RAGs considering the reworking of contaminated soil to the surface during any future utility or redevelopment (i.e., parking lot) work. Soil below 15 feet bgs is considered inaccessible and has only conservatively been compared to the construction worker RAGs.

Results in two samples, LASB-8-1 from 12 to 14 feet bgs and LASB11-1 from 6 to 8 feet bgs, contained C9-C12 aliphatics exceed the construction worker RAG. These results did not exceed the commercial worker RAG; therefore, would not be a concern if relocated at the surface. Based on the depth of this area of contamination, this soil would not be readily accessible and there would be not exposure under current conditions. Exposure to future construction or commercial workers is possible if soil outside of the road ROW were brought closer to the surface or exposed in excavation. However, this future exposure potential is restricted under CoPI zoning restrictions that limit the Site use to green space, parking and snow storage. Results do not indicate the presence of petroleum in groundwater, surface water and sediment that is associated with the Site release.

4.2 CONCLUSIONS

Achievement of Objective

The objective of this Petroleum Assessment Report was to evaluate exposure to petroleum compounds/fractions that are not covered by CERCLA. There is sufficient data for the Site to adequately evaluate the location, extent of soil contamination and scenarios where exposure may occur, which provides an adequate evaluation of exposure risks to petroleum. This objective has been achieved and the assessment concludes that there is no unacceptable risk of human exposure to petroleum posed by the Site. Future use of the property is governed by deeded restriction that only allows the site to be used for public airport purposes. The Site is too small by zoning standards to support construction of commercial or industrial buildings suited to for use for public airport purposes. Based on the transfer deed and CoPI zoning restrictions, future Site use is limited to its current use of “green space”, parking and snow storage. Based on these considerations, NFA is appropriate.

Recommendations

Given the location of remaining soil contamination, concentrations, and existing administrative controls (deed restrictions municipal ordinance), NFA is protective of human health and the environment and a NFA determination is recommended for the Site.

5. REFERENCES

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FIGURES

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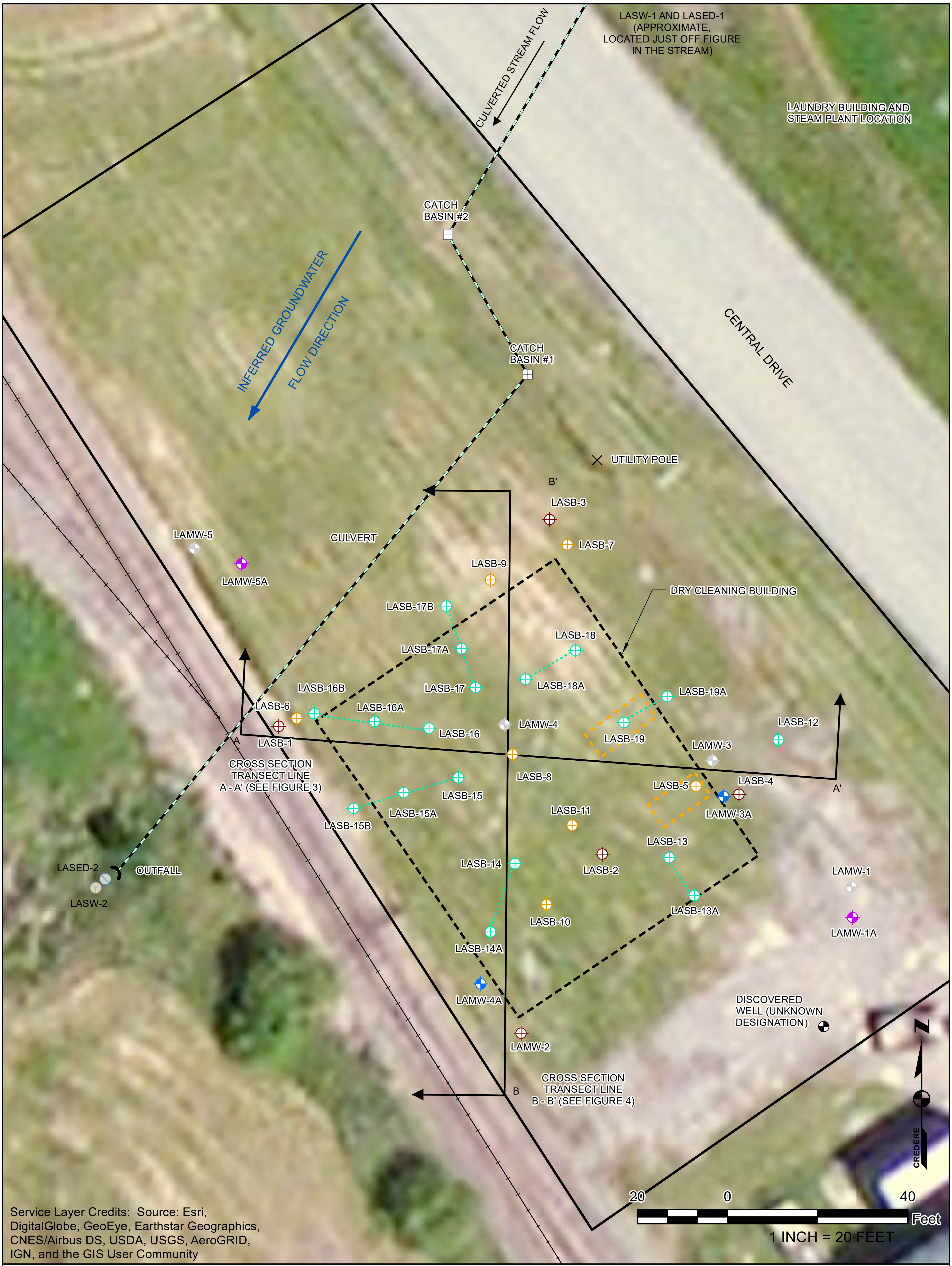
FIGURE 1
LAUNDRY ANNEX LOCATION PLAN

LORING AFB LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

1,000 0 2,000
Feet
1 INCH = 2,000 FEET

Topographic Map Data Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\Figure 1 - LAUNDRY ANNEX LOCATION PLAN.mxd



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NOTES

1. EXISTING CONDITIONS AND FEATURES SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON INFORMATION OBTAINED FROM BASE PLAN CONTAINED IN THE SEPTEMBER 2015 FINAL TRIP REPORT BY BATTELLE AND AECOM, THE OCTOBER 1997 SITE INVESTIGATION REPORT BY ROY F. WESTON, FIELD WORK PERFORMED ON NOV. 2, 2016, AND JULY 20, 2017.

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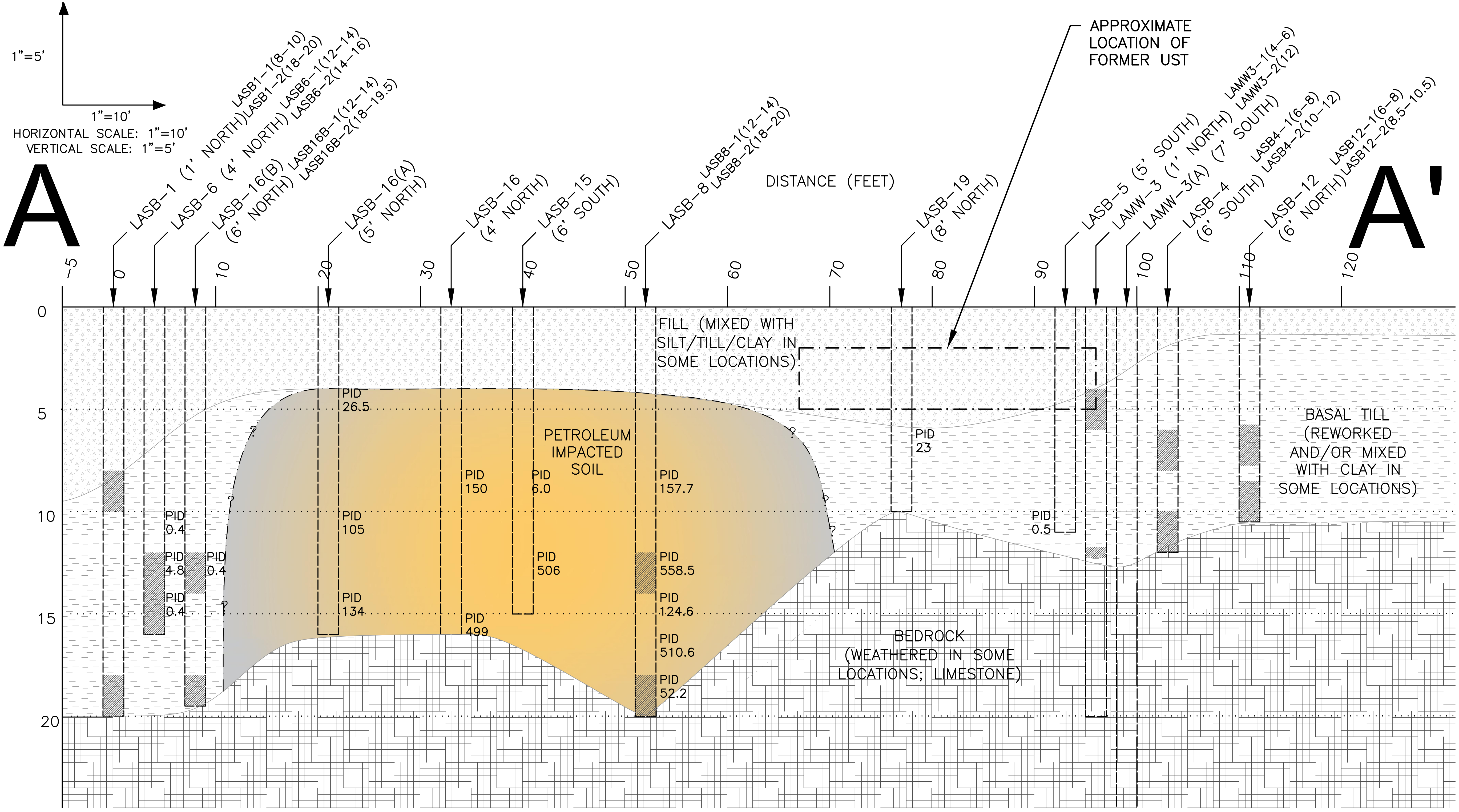
FIGURE 2
LAUNDRY ANNEX
DETAILED SITE PLAN

FORMER LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

⊕	SOIL BORING (CREDERE, JULY 2017)	⊞	CATCH BASIN
⊕	SOIL BORING (CREDERE, NOVEMBER 2016)	)	OUTFALL
⊕	BEDROCK WELL INSTALLED IN 2015	┼	RAILROAD
⊕	OVERBURDEN/BEDROCK INTERFACE WELL INSTALLED IN 2015	▭	SUSPECTED FORMER LOCATIONS OF 100-GALLON UST
⊕	HISTORICAL SOIL BORING (WESTON, 1996)	▭	DRY CLEANING BUILDING
◕	MONITORING .WELL DISCOVERED IN 2015	—	APPROX. SITE BOUNDARY
⊕	ABANDONED MONITORING WELLS (INSTALLED BY WESTON, 1996)	▬	CULVERT
⊘	SEDIMENT SAMPLE LOCATION	⋯	STEPOUT/IN PATHWAY
		●	SURFACE WATER SAMPLE LOCATION

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\FIGURE 2 - LAUNDRY ANNEX_RI_2020.mxd



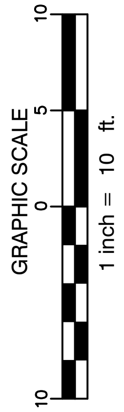
NOTES

1. THE GEOLOGIC SECTION IS AN INTERPRETIVE SIMPLIFICATION OF THE SUBSOIL ENCOUNTERED BASED ON EXPLORATIONS AT THE SITE. BEDROCK DEPTHS ARE BASED ON REFUSAL OF NEARBY EXPLORATIONS.
2. SOIL BORINGS LASB–5 THROUGH LASB–11 AND LASB–12 THROUGH LASB–19 WERE ADVANCED BY COUNTY ENVIRONMENTAL ENGINEERS OF CARIBOU, MAINE, USING A GEOPROBE AND LOGGED BY CREDERE PERSONNEL IN NOVEMBER 2016 AND JULY 2017.
3. SOIL BORINGS/MONITORING WELLS LAMW–1A, LASB/MW–4A, AND LAMW/5A WERE ADVANCED USING SONIC DRILLING AND LOGGED BY AECOM IN MAY 2015.
4. HISTORICAL SOIL BORINGS/MONITORING WELLS LASB/MW–1 THROUGH LASB/MW–4 WERE ADVANCED BY MAINE TEST BORINGS OF BREWER, ME, USING HOLLOW STEM AUGERS AND LOGGED BY WESTON IN 1996.
5. HISTORICAL PID READINGS WERE NOT INCLUDED IF INCONSISTENT WITH CURRENT 2016–2017 OBSERVATIONS AT THE SITE.
6. PETROLEUM IMPACTED SOIL EXTENT BASED ON AN INTERPRETIVE COMBINATION OF PID AND LABORATORY RESULTS.

EXPLORATION NOMINCLATURE

LASB–16(B) (6'NORTH)	EXPLORATION ID (OFFSET)
LASB–16B–1(12–14) LASB–16B–2(18–19.5)	SAMPLE ID (DEPTH INTERVAL) SAMPLE ID (DEPTH INTERVAL)
PID 499	LIMITS OF RESIDUAL IMPACTED SOIL AND CURRENT PID MAX IN ppm
▨	SAMPLE INTERVAL

FIGURE 3
GEOLOGIC CROSS-SECTION - WEST TO EAST LINE A-A'



LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

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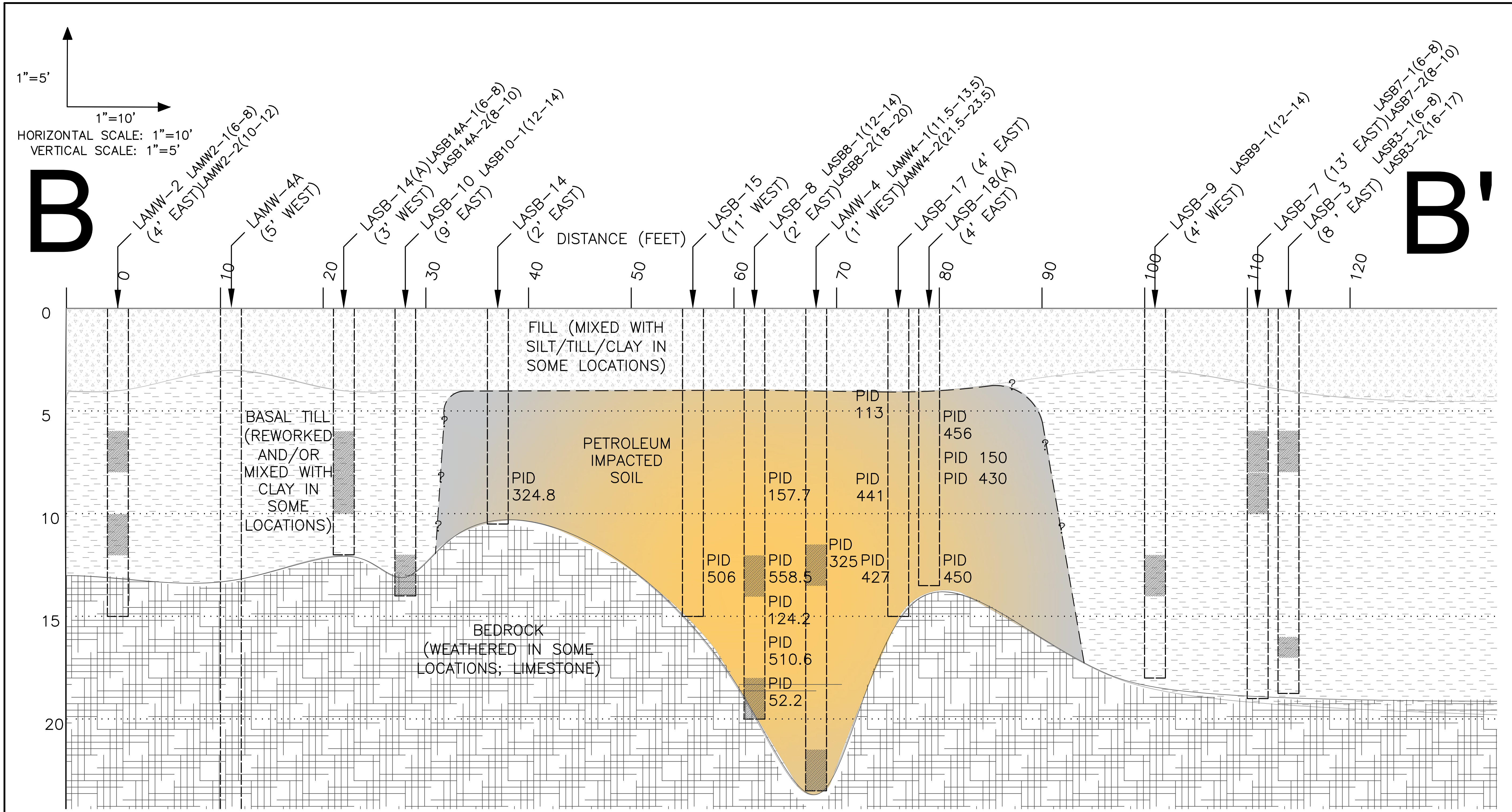

NOTES

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3. SOIL BORINGS/MONITORING WELLS LAMW-1A, LASB/MW-4A, AND LAMW/5A WERE ADVANCED USING SONIC DRILLING AND LOGGED BY AECOM IN MAY 2015.
4. HISTORICAL SOIL BORINGS/MONITORING WELLS LASB/MW-1 THROUGH LASB/MW-4 WERE ADVANCED BY MAINE TEST BORINGS OF BREWER, ME, USING HOLLOW STEM AUGERS AND LOGGED BY WESTON IN 1996.
5. HISTORICAL PID READINGS WERE NOT INCLUDED IF INCONSISTENT WITH CURRENT 2016-2017 OBSERVATIONS AT THE SITE.
6. PETROLEUM IMPACTED SOIL EXTENT BASED ON AN INTERPRETIVE COMBINATION OF PID AND LABORATORY RESULTS.

EXPLORATION NOMINCLATURE

LASB-16(B) (6'NORTH)	EXPLORATION ID (OFFSET)
LASB-16B-1(12-14) LASB-16B-2(18-19.5)	SAMPLE ID (DEPTH INTERVAL) SAMPLE ID (DEPTH INTERVAL)
PID 499	LIMITS OF RESIDUAL IMPACTED SOIL AND CURRENT PID MAX IN ppm
▨	SAMPLE INTERVAL

FIGURE 4

GEOLOGIC CROSS-SECTION - SOUTH TO NORTH (B-B')

GRAPHIC SCALE
10 5 0 10
1 inch = 10 ft.

LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

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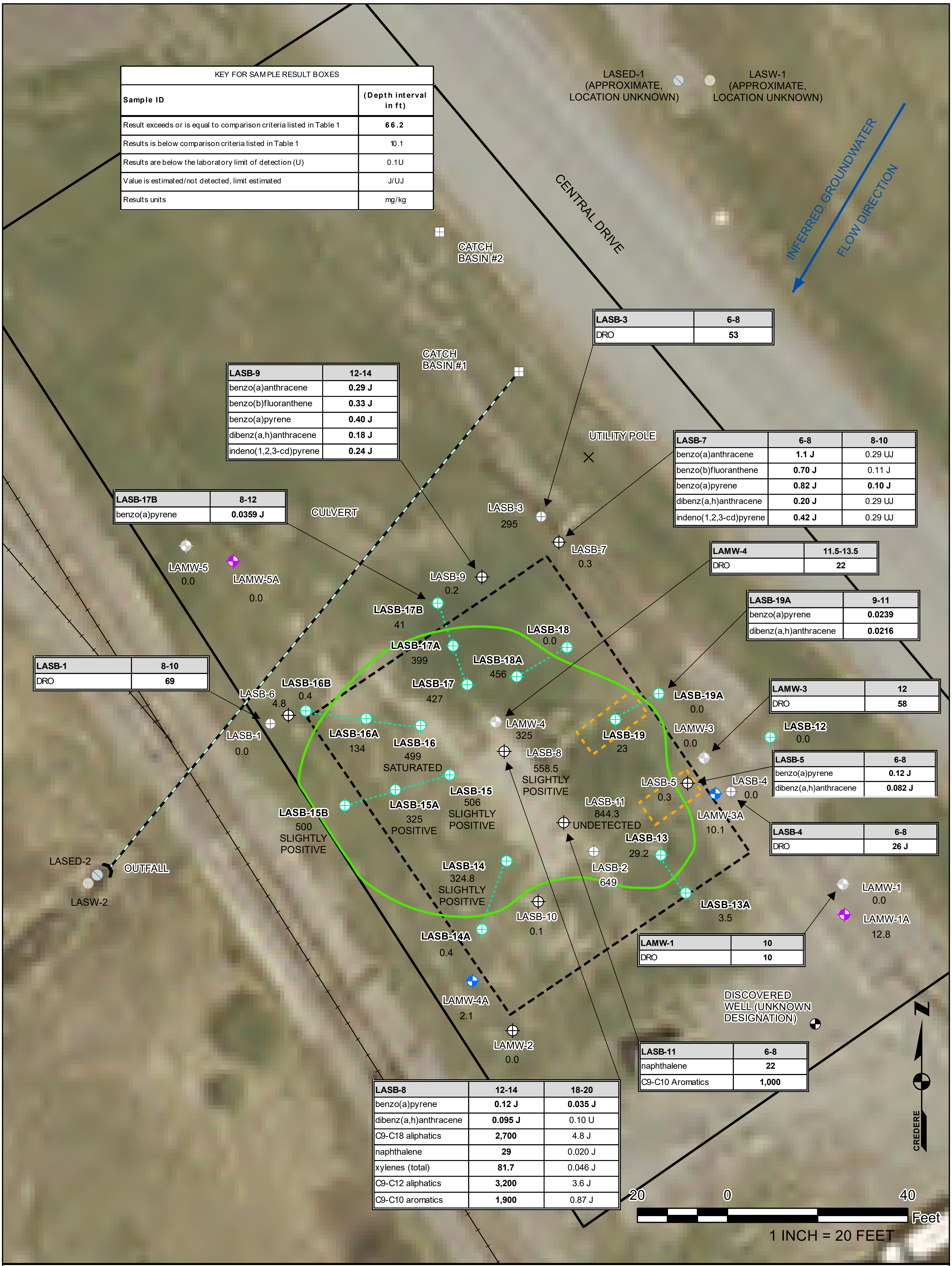

KEY FOR SAMPLE RESULT BOXES

Sample ID	(Depth interval in ft)
Result exceeds or is equal to comparison criteria listed in Table 1	**66.2**
Results is below comparison criteria listed in Table 1	10.1
Results are below the laboratory limit of detection (U)	0.1U
Value is estimated/not detected, limit estimated	J/UJ
Results units	mg/kg

LASB-3	6-8
DRO	**53**

LASB-9	12-14
benzo(a)anthracene	**0.29 J**
benzo(b)fluoranthene	**0.33 J**
benzo(a)pyrene	**0.40 J**
dibenz(a,h)anthracene	**0.18 J**
indeno(1,2,3-cd)pyrene	**0.24 J**

LASB-7	6-8	8-10
benzo(a)anthracene	**1.1 J**	0.29 UJ
benzo(b)fluoranthene	**0.70 J**	0.11 J
benzo(a)pyrene	**0.82 J**	**0.10 J**
dibenz(a,h)anthracene	**0.20 J**	0.29 UJ
indeno(1,2,3-cd)pyrene	**0.42 J**	0.29 UJ

LASB-17B	8-12
benzo(a)pyrene	**0.0359 J**

LAMW-4	11.5-13.5
DRO	**22**

LASB-19A	9-11
benzo(a)pyrene	**0.0239**
dibenz(a,h)anthracene	**0.0216**

LASB-1	8-10
DRO	**69**

LAMW-3	12
DRO	**58**

LASB-5	6-8
benzo(a)pyrene	**0.12 J**
dibenz(a,h)anthracene	**0.082 J**

LASB-4	6-8
DRO	**26 J**

LAMW-1	10
DRO	**10**

LASB-11	6-8
naphthalene	**22**
C9-C10 Aromatics	**1,000**

LASB-8	12-14	18-20
benzo(a)pyrene	**0.12 J**	**0.035 J**
dibenz(a,h)anthracene	**0.095 J**	0.10 U
C9-C18 aliphatics	**2,700**	4.8 J
naphthalene	**29**	0.020 J
xylenes (total)	**81.7**	0.046 J
C9-C12 aliphatics	**3,200**	3.6 J
C9-C10 aromatics	**1,900**	0.87 J

NOTES
1. ALL RESULTS SHOWN EXCEED AT LEAST 1 COMPARISON CRITERION ON TABLE 1, HIGHER OF DUPLICATED PAIR RESULTS SHOWN WHERE APPLICABLE.
2. EXISTING CONDITIONS AND FEATURES SHOWN ON THIS PLAN ARE APPROXIMATE AND ARE BASED ON INFORMATION OBTAINED FROM BASE PLAN CONTAINED IN THE SEPTEMBER 2015 FINAL TRIP REPORT BY BATTELLE AND AECOM, THE OCTOBER 1997 SITE INVESTIGATION REPORT BY ROY F. WESTON, FIELD WORK PERFORMED ON NOV. 2, 2016, AND JULY 20, 2017.
3. PPMv - PARTS PER MILLION BY VOLUME
4. "POSITIVE"/"SLIGHTLY POSITIVE" INDICATES OIL IN SOIL SHAKE TEST RESULTS

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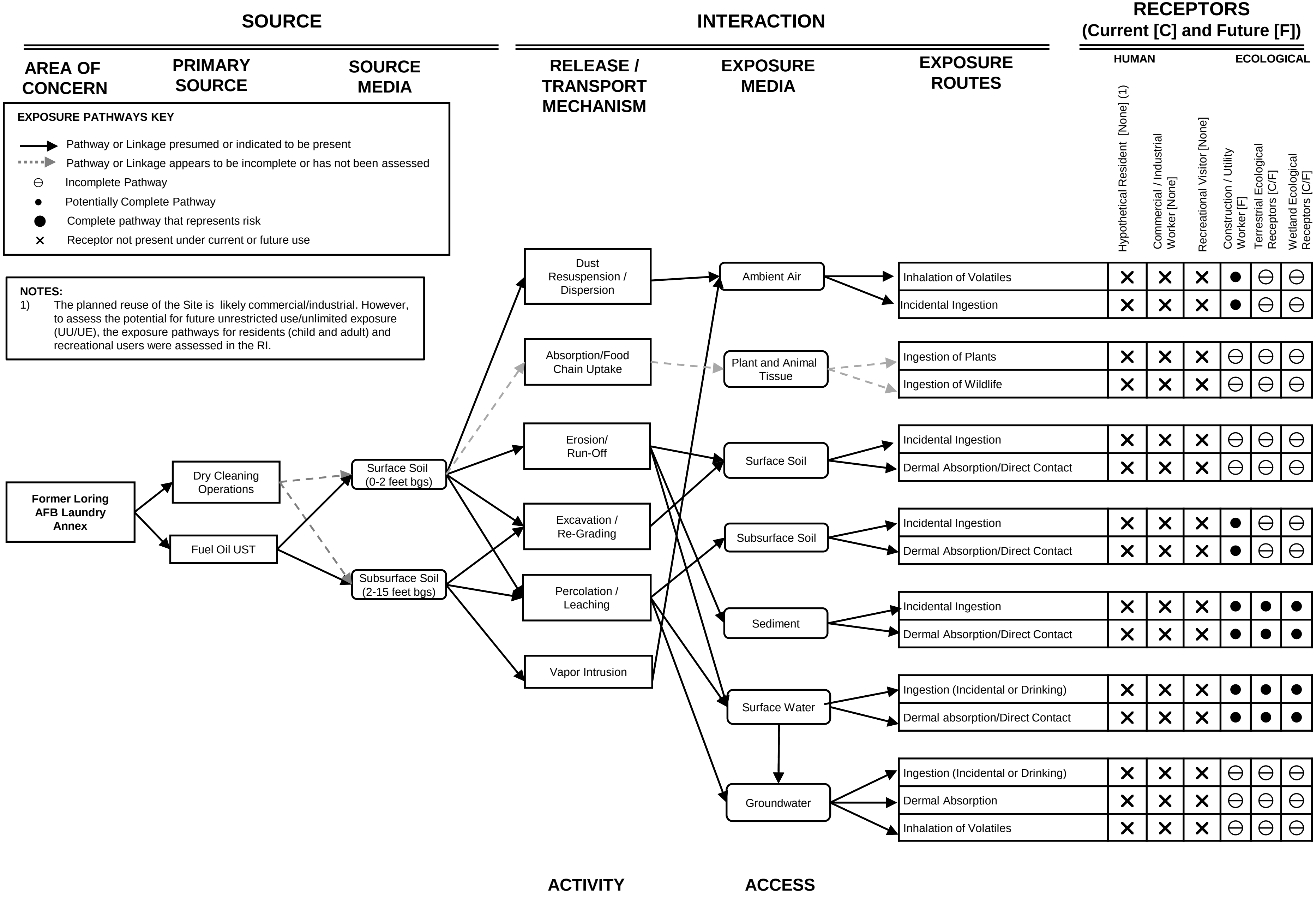
FIGURE 5
LAUNDRY ANNEX
INFERRED EXTENT OF
PETROLEUM
SOIL CONTAMINATION

FORMER LORING AFB
LAUNDRY ANNEX
CENTRAL DRIVE
PRESQUE ISLE, MAINE 04769

⊕ SOIL BORING, CREDERE, JULY 2017
⊕ SOIL BORING, CREDERE, NOVEMBER 2016
⊕ BEDROCK WELL INSTALLED IN 2015
⊕ OVERBURDEN/BEDROCK INTERFACE WELL INSTALLED IN 2015
⊕ HISTORICAL SOIL BORING
◐ MONITORING WELL DISCOVERED IN 2015
⊕ ABANDONED MONITORING WELLS
🟩 APPROX. EXTENT OF VOLATILE PETROLEUM CONTAMINATION
⊘ SEDIMENT SAMPLE LOCATION
- - - STEPOUT/IN PATHWAY
⊞ CATCH BASIN
OUTFALL
┼ RAILROAD
SUSPECTED FORMER LOCATIONS OF 100-GALLON UST
APPROX. LOCATIONS OF FORMER DRY CLEANING BUILDING FOUNDATION
APPROX. SITE BOUNDARY
CULVERT
0.0 PID FIELD SCREENING RESULT (IN PPMv)
● SURFACE WATER SAMPLE LOCATION

Document Path: T:\Data\ME\Town\Presque Isle\15001301 - Laundry Annex\FIGURE 5 - LA_VPH_EXTENT_RI.mxd

FIGURE 6
Conceptual Site Model Flow Chart for the Former Loring Air Force Base Laundry Annex, Presque Isle, ME



EXPOSURE PATHWAYS KEY

- → Pathway or Linkage presumed or indicated to be present
- ⇢ Pathway or Linkage appears to be incomplete or has not been assessed
- ⊖ Incomplete Pathway
- • Potentially Complete Pathway
- ● Complete pathway that represents risk
- × Receptor not present under current or future use

NOTES:

1) The planned reuse of the Site is likely commercial/industrial. However, to assess the potential for future unrestricted use/unlimited exposure (UU/UE), the exposure pathways for residents (child and adult) and recreational users were assessed in the RI.

EXPOSURE MEDIA	EXPOSURE ROUTES	Hypothetical Resident [None] (1)	Commercial / Industrial Worker [None]	Recreational Visitor [None]	Construction / Utility Worker [F]	Terrestrial Ecological Receptors [C/F]	Wetland Ecological Receptors [C/F]
Ambient Air	Inhalation of Volatiles	×	×	×	●	⊖	⊖
	Incidental Ingestion	×	×	×	●	⊖	⊖
Plant and Animal Tissue	Ingestion of Plants	×	×	×	⊖	⊖	⊖
	Ingestion of Wildlife	×	×	×	⊖	⊖	⊖
Surface Soil	Incidental Ingestion	×	×	×	⊖	⊖	⊖
	Dermal Absorption/Direct Contact	×	×	×	⊖	⊖	⊖
Subsurface Soil	Incidental Ingestion	×	×	×	●	⊖	⊖
	Dermal Absorption/Direct Contact	×	×	×	●	⊖	⊖
Sediment	Incidental Ingestion	×	×	×	●	●	●
	Dermal Absorption/Direct Contact	×	×	×	●	●	●
Surface Water	Ingestion (Incidental or Drinking)	×	×	×	●	●	●
	Dermal absorption/Direct Contact	×	×	×	●	●	●
Groundwater	Ingestion (Incidental or Drinking)	×	×	×	⊖	⊖	⊖
	Dermal Absorption	×	×	×	⊖	⊖	⊖
	Inhalation of Volatiles	×	×	×	⊖	⊖	⊖

TABLES

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LASB-1						LASB-2				LASB-3				LASB-4						LAMW-1			
							Sample ID:	LASB1-1				LASB1-2		LASB2-1		LASB2-2		LASB3-1		LASB3-2		LASB4-1				LASB4-2		LAMW1-1		LAMW1-2	
							Sample Depth:	8-10				18-20		13-15		15-17		6-8		16-17		6-8				10-12		4-6		10	
							Sample Date	9/27/1996				9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		DUPS-3		9/27/1996		9/27/1996		9/27/1996	
	Comparison Criteria^6						**Field QC:**	FS		RE		FS		FS		FS		FS		FS		FS		FD		FS		FS		FS	
Parameter*	**EPA Residnetial RSL^1**	**EPA Industrial RSL^1**	**Commercial Maine DEP RAG^2**	**Construction Worker Maine DEP RAG^2**	**Maine DEP Commercial PG^3**	**Maine DEP Construction PG^3**	**Former Guideline ^{4}**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																															
Acetone	6100	67000	100,000	98,000	NE	NE	NA	**0.068**		**0.052**		0.006	U	0.031	U	0.006	U	**0.079**		**0.015**		0.006	U	0.006	U	**0.034**		0.006	U	0.006	U
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Toluene	490	4700	810	820	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.031	U	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	0.006	U	0.006	U	0.006	U	**0.018**	**J**	0.006	U	0.008	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U	0.006	U
Ethylbenzene	5.8	25	380	470	NE	NE	NA	0.006	U	0.006	U	0.006	U	**0.13**		0.006	U	**0.018**		0.006	U	0.006	U	0.006	U	**0.002 J**		0.006	U	0.006	U
Total xylenes	58	250	260	260	NE	NE	NA	0.006	U	0.006	U	0.006	U	**0.63**		0.006	U	**0.12**		0.006	U	0.006	U	0.006	U	**0.01**		0.006	U	0.006	U
Diesel Range Organics (DRO) (mg/kg)																															
DRO	NE	NE	NE	NE	NE	NE	10	**69**		NS		5.5	U	**9.4**		5.5	U	**53**		**7**	**J**	5.9	U	**26**	**J**	**7.8**		**5.7**	**J**	**10**	**J**
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																															
PCBs	0.12	0.95	13	74	NE	NE	NA	ND		NS		ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
Pesticides																															
4,4-DDE	2	9.3	130	100	NE	NE	NA	0.0093	U	NS		0.0088	U	0.0098	U	0.0088	U	0.013	U	0.009	U	0.0095	U	0.0098	U	**0.0091**	**J**	0.0093	U	0.045	U
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	0.0093	U	NS		0.0088	U	**0.0098**		0.0088	U	0.013	U	0.009	U	0.0095	U	0.0098	U	**0.0091**	**J**	0.0093	U	0.045	U
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	0.0093	U	NS		0.0088	U	0.0098	U	0.0088	U	0.013	U	0.009	U	0.0095	U	0.0098	U	**0.0091**	**J**	0.0093	U	**0.0011 J**	**J**
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	0.0093	U	NS		0.0088	U	0.0098	U	0.0088	U	**0.013**	**J**	0.009	U	0.0095	U	0.0098	U	0.0091	U	0.0093	U	0.045	U
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																															
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
2-methylnaphthalene	24	300	4,100	960	730	120	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
chrysene	110	2100	29000	100000	350	4,300	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																															
benzene	1.2	5.1	75	240	86	30	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
toluene	490	4700	810	820	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
ethylbenzene	5.8	25	380	470	430	3,900	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
total xylenes	58	250	260	260	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LAMW-2				LAMW-3				LAMW-4				LAMW-5				LASB-5						LASB-6			
							Sample ID:	LAMW2-1		LAMW2-2		LAMW3-1		LAMW3-2		LAMW4-1		LAMW4-2		LAMW5-1		LAMW-5-2		LASB-5-1		LASB-5-1-D		LASB-5-2		LASB-6-1		LASB-6-2	
							Sample Depth:	6-8		10-12		4-6		12		11.5-13.5		21.5-23.5		8-11.7		18-20		6-8				9-11		12-14		14-16	
							Sample Date	9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/27/1996		9/28/1996		11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016	
	Comparison Criteria[6]						Field QC:	FS		FS		FS		FS		FS		FS		FS		FS		FS		FD		FS		FS		FS	
Parameter*	**EPA Residnetial RSL[1]**	**EPA Industrial RSL[1]**	**Commercial Maine DEP RAG[2]**	**Construction Worker Maine DEP RAG[2]**	**Maine DEP Commercial PG[3]**	**Maine DEP Construction PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																																	
Acetone	6100	67000	100,000	98,000	NE	NE	NA	**0.072**		0.006	U	**0.31**		**0.018**		**15**		0.006	U	**2.7**		**0.054**		NS		NS		NS		NS		NS	
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	0.006	U	0.006	U	**0.055**		0.006	U	6.4	U	0.006	U	**0.58**		0.006	U	NS		NS		NS		NS		NS	
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	0.006	U	**0.004**	**J**	0.006	U	0.006	U	6.4	U	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	0.006	U	**0.002**	**J**	0.006	U	0.006	U	6.4	U	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Toluene	490	4700	810	820	NE	NE	NA	0.006	U	0.006	U	**0.002**	**J**	0.006	U	6.4	U	0.006	U	**0.008**	**J**	0.006	U	NS		NS		NS		NS		NS	
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	0.006	U	0.006	U	0.006	U	0.006	U	6.4	U	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Ethylbenzene	5.8	25	380	470	NE	NE	NA	0.006	U	0.006	U	**0.006**	**J**	0.006	U	**2.6**	**J**	0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Total xylenes	58	250	260	260	NE	NE	NA	0.006	U	0.006	U	**0.073**		0.006	U	**31**		0.006	U	0.014	U	0.006	U	NS		NS		NS		NS		NS	
Diesel Range Organics (DRO) (mg/kg)																																	
DRO	NE	NE	NE	NE	NE	NE	10	**9.5**	**J**	**6.4**	**J**	6.5	U	**58**		**22**		5.5	U	**7**	**J**	**3.5**	J	NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																																	
PCBs	0.12	0.95	13	74	NE	NE	NA	ND		ND		ND		ND		ND		ND		ND		ND		NS		NS		NS		NS		NS	
Pesticides																																	
4,4-DDE	2	9.3	130	100	NE	NE	NA	0.0099	U	0.0089	U	0.01	U	**0.0018 J**	**J**	0.01	U	0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	0.0099	U	0.0089	U	0.01	U	0.0087	U	**0.0017 J**		0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	0.0099	U	**0.00074 J**		0.01	U	**0.012**		0.01	U	0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	0.0099	U	0.0089	U	0.01	U	0.0087	U	0.01	U	0.0088	U	0.12	U	0.0095	U	NS		NS		NS		NS		NS	
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																																	
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	UJ	0.12	UJ	0.11	UJ	0.13	UJ	0.11	UJ
2-methylnaphthalene	24	300	4,100	960	730	120	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	0.12	U	0.11	U	0.13	U	0.11	U
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.071**	J	**0.15**	J	0.11	U	0.13	U	0.11	U
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.092**	J	**0.17**	J	0.11	U	0.13	U	0.11	U
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.052**	J	**0.10**	J	0.11	U	0.13	U	0.11	U
chrysene	110	2100	29000	100000	350	4,300	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.10**	J	**0.16**	J	0.11	U	0.13	U	0.11	U
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.091**	J	**0.11**	J	0.11	U	0.13	U	0.11	U
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	**0.14**	J	0.11	U	0.13	U	0.11	U
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.081**	J	**0.12**	J	0.11	U	0.13	U	0.11	U
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.057	U	**0.098**	J	0.11	U	0.13	U	0.11	U
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.11	U	**0.082**	J	0.11	U	0.13	U	0.11	U
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**0.072**	J	**0.13**	J	0.11	U	0.13	U	0.11	U
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		6.7	U	**18**	J	6.6	U	**57**		**3.5**	J
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		11	U	12	U	11	U	13	U	11	U
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		**7.4**	J	**14**	J	6.6	U	**7.9**	J	6.6	U
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		NA		NA		NA		NA		NA	
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																																	
benzene	1.2	5.1	75	240	86	30	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
toluene	490	4700	810	820	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
ethylbenzene	5.8	25	380	470	430	3,900	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
total xylenes	58	250	260	260	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
naphthalene	3.8	17	250	130	3,700	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.042	U	0.041	U	0.034	U	0.057	U	0.036	U
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		2.0	U	2.0	U	1.6	U	2.7	U	1.7	U
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		2.7	U	2.6	U	2.2	U	**17**		2.3	U
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	NS		NS		NS		NS		NS		NS		NS		NS		0.33	U	0.33	U	0.27	U	**4.0**	J	0.29	U

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LASB-7				LASB-8				LASB-9		LASB-10		LASB-11		LASB-12				LASB-13A			
							Sample ID:	LASB-7-1		LASB-7-2		LASB-8-1		LASB-8-2		LASB-9-1		LASB-10-1		LASB-11-1		LASB-12-1		LASB-12-2		LASB-13A-1		LASB-13A-2	
							Sample Depth:	6-8		8-10		12-14		18-20		12-14		12-14		6-8		6-8		8.5-10.5		6-8		8-10	
							Sample Date	11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016		11/2/2016		7/20/2017		7/20/2017		7/20/2017		7/20/2017	
	Comparison Criteria[6]						**Field QC:**	FS		FS		FS		FS		FS		FS		FS		FS		FS		FS		FS	
Parameter*	**EPA Residnetial RSL[1]**	**EPA Industrial RSL[1]**	**Commercial Maine DEP RAG[2]**	**Construction Worker Maine DEP RAG[2]**	**Maine DEP Commercial PG[3]**	**Maine DEP Construction PG[3]**	**Former Guideline [4]**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																													
Acetone	6100	67000	100,000	98,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Toluene	490	4700	810	820	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Ethylbenzene	5.8	25	380	470	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Total xylenes	58	250	260	260	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Diesel Range Organics (DRO) (mg/kg)																													
DRO	NE	NE	NE	NE	NE	NE	10	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																													
PCBs	0.12	0.95	13	74	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Pesticides																													
4,4-DDE	2	9.3	130	100	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																													
naphthalene	3.8	17	250	130	3,700	10,000	NA	**0.20**	J	0.29	UJ	**15**	J	0.10	UJ	0.20	UJ	0.11	UJ	**7.2**	J	0.0019	U	0.0021	U	0.0022	U	0.0018	U
2-methylnaphthalene	24	300	4,100	960	730	120	NA	**0.3**	J	0.29	UJ	**1.8**		0.10	UJ	0.20	U	0.11	U	**0.6**		0.0019	U	0.0021	U	0.0022	U	0.0018	U
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	**1.0**	J	0.29	UJ	**0.4**		0.10	U	**0.31**	J	0.11	U	0.14	U	**0.00089**	**J**	0.0021	U	0.0022	U	0.0018	U
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	**0.3**	J	0.29	UJ	0.16	U	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	0.20	UJ	0.29	UJ	0.16	U	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	**0.072**	J	0.29	UJ	**0.14**	J	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	**0.16**	J	0.29	UJ	0.16	U	0.10	U	0.20	U	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	U	0.0018	U
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	**1.6**	J	0.29	UJ	**0.4**		0.10	U	**0.5**		0.11	U	0.14	U	**0.0023**	**J**	**0.0012**	**J**	**0.0012**	**J**	**0.0011**	**J**
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	**1.9**	J	**0.20**	J	**0.5**		0.10	U	**0.6**		0.11	U	0.14	U	**0.0021**	**J**	**0.0011**	**J**	**0.0012**	**J**	**0.0012**	**J**
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	**1.1**	J	0.29	UJ	**0.12**	J	0.10	U	**0.29**	J	0.11	U	0.14	U	**0.0019**	**J**	0.0021	U	0.0022	U	**0.001**	**J**
chrysene	110	2100	29000	100000	350	4,300	NA	**1.4**	J	**0.15**	J	**0.21**	J	0.10	U	**0.5**		0.11	U	0.14	U	**0.0015**	**J**	0.0021	U	0.0022	UJ	**0.0009**	**J**
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	**0.7**	J	**0.11**	J	**0.12**	J	0.10	U	**0.33**	J	0.11	U	0.14	U	**0.0021**	**J**	0.0021	U	0.0022	U	**0.0012**	**J**
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	**0.7**	J	0.29	UJ	**0.14**	J	0.10	U	**0.4**		0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	UJ	0.0018	U
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	**0.8**	J	**0.10**	J	**0.12**	J	**0.035**	J	**0.4**	J	0.11	U	0.14	U	**0.0016**	**J**	0.0021	U	0.0022	U	**0.00087**	**J**
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	**0.4**	J	0.29	UJ	**0.079**	J	0.10	U	**0.24**	J	0.11	U	0.14	U	**0.001**	**J**	0.0021	U	0.0022	U	0.0018	U
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	**0.20**	J	0.29	UJ	**0.095**	J	0.10	U	**0.18**	J	0.11	U	0.14	U	0.0019	U	0.0021	U	0.0022	UJ	0.0018	U
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	**0.5**	J	0.29	UJ	**0.11**	J	0.10	U	**0.33**	J	0.11	U	0.14	U	**0.0011**	**J**	0.0021	U	0.0022	U	0.0018	U
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	**7.9**	J	17	UJ	**2700**		**4.8**	J	12	U	6.4	U	**1000**		7.1	UJ	6.9	UJ	7.2	UJ	6.3	UJ
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	**12**	J	**40**	J	82	U	10	U	**36**	J	11	U	69	U	12	U	12	U	12	UJ	11	U
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	**120**	J	**110**	J	**120**		6.2	U	**130**		6.4	U	**39**		NA		NA		NA		NA	
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NA		NA		NA		NA		NA		NA		NA		7.1	U	6.9	U	7.2	U	6.3	U
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																													
benzene	1.2	5.1	75	240	86	30	NA	**0.034**	J	0.23	U	1.9	U	0.038	U	**0.03**	J	0.036	U	1.2	U	0.046	U	0.048	U	0.078	U	0.037	U
toluene	490	4700	810	820	10,000	10,000	NA	**0.1**		**0.063**	J	1.9	U	0.038	U	**0.049**	J	0.036	U	1.2	U	0.046	U	0.048	U	0.078	U	0.037	U
ethylbenzene	5.8	25	380	470	430	3,900	NA	**0.019**	J	0.23	U	**4.4**		0.038	U	0.13	U	0.036	U	1.2	U	0.046	U	0.048	U	0.078	U	0.037	U
total xylenes	58	250	260	260	10,000	10,000	NA	**0.146**	J	0.23	U	**81.7**		**0.046**	J	0.13	U	0.036	U	**22.5**		0.046	U	0.048	U	0.078	U	0.037	U
naphthalene	3.8	17	250	130	3,700	10,000	NA	**0.054**	J	0.23	U	**29**		**0.020**	J	**0.028**	J	0.036	U	**22**		0.046	U	0.048	U	0.078	U	0.037	U
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	2.1	U	11	U	**48**	J	1.8	UJ	6.4	U	1.8	U	**32**	J	**1.1**	**J**	2.3	U	**3.8**	**J**	1.8	U
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	2.8	U	15	U	**3200**		**3.6**	J	**4.0**	J	2.3	U	**2300**		2.9	U	3.1	U	5.0	U	2.4	U
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	0.35	U	1.8	U	**1900**		**0.87**	J	1.1	U	0.29	U	**1000**		**0.87**	**J**	0.38	U	**0.74**	**J**	0.30	U

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

							Boring Location:	LASB-14A						LASB-15B		LASB-17B		LASB-18		LASB-19A	
							Sample ID:	LASB-14A-1				LASB-14A-2		LASB-15B-1		LASB-17B-1		LASB-18-1		LASB-19A-1	
							Sample Depth:	6-8				8-10		12-14		8-12		12-14		9-11	
							Sample Date	7/20/2017				7/20/2017		7/20/2017		7/20/2017		7/20/2017		7/20/2017	
	Comparison Criteria^{6}						**Field QC:**	FS		FD (LASB-141-1)		FS		FS		FS		FS		FS	
Parameter*	**EPA Residnetial RSL^{1}**	**EPA Industrial RSL^{1}**	**Commercial Maine DEP RAG^{2}**	**Construction Worker Maine DEP RAG^{2}**	**Maine DEP Commercial PG^{3}**	**Maine DEP Construction PG^{3}**	**Former Guideline ^{4}**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/kg)																					
Acetone	6100	67000	100,000	98,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
2-Butanone	2700	19000	28,000	11,000	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
1,2-Dichloropropane	1.6	6.6	99	110	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Trichloroethene	0.41	1.9	28	3.9	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Toluene	490	4700	810	820	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Tetrachlorethene	8.1	39	160	85	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Ethylbenzene	5.8	25	380	470	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Total xylenes	58	250	260	260	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Diesel Range Organics (DRO) (mg/kg)																					
DRO	NE	NE	NE	NE	NE	NE	10	NS		NS		NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) by EPA Method 8082A (mg/kg)																					
PCBs	0.12	0.95	13	74	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Pesticides																					
4,4-DDE	2	9.3	130	100	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
4,4-DDD	0.19	2.5	34	7.7	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
4,4-DDT	1.9	8.5	120	160	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Endrin aldehyde	NE	NE	340	510	NE	NE	NA	NS		NS		NS		NS		NS		NS		NS	
Extractable Petroleum Hydrocarbons (EPH) by MassDEP Method EPH-04-1.1 (mg/kg) (Polycyclic Aromatic Hydrocarbon Targets by 8270D SIM for 2017 soil samples)																					
naphthalene	3.8	17	250	130	3,700	10,000	NA	0.0021	U	0.0022	U	0.0022	U	**0.0084**		**0.0068**	**J**	0.0018	U	0.0019	U
2-methylnaphthalene	24	300	4,100	960	730	120	NA	0.0021	U	0.0022	U	0.0022	U	**0.0021**	**J**	**0.0020**	**J**	0.0018	U	0.0019	U
phenanthrene	NE	NE	23,000	72,000	5,400	1,800	NA	**0.00096**	**J**	0.0022	U	**0.0018**	**J**	**0.0111**		**0.0270**	**J**	**0.0014**	**J**	**0.009**	
acenaphthylene	NE	NE	45,000	48,000	10,000	10,000	NA	0.0021	U	0.0022	U	0.0022	U	**0.0011**	**J**	**0.0118**	**J**	0.0018	U	0.0019	U
acenaphthene	360	4500	62,000	48,000	10,000	2,000	1,500	0.0021	U	0.0022	U	0.0022	U	**0.00092**	**J**	0.0031	UJ	0.0018	U	0.0019	U
fluorene	240	3000	41,000	96,000	7,300	10,000	NA	0.0021	U	0.0022	U	0.0022	U	**0.0013**	**J**	**0.0036**	**J**	0.0018	U	0.0019	U
anthracene	1,800	23,000	100,000	100,000	10,000	760	NA	0.0021	U	0.0022	U	0.0022	U	**0.0026**	**J**	**0.0074**	**J**	0.0018	U	**0.0111**	
fluoranthene	240	3000	41,000	96,000	7,300	10,000	NA	**0.0026**	**J**	**0.001**	**J**	**0.0023**	**J**	**0.0211**		**0.0730**	**J**	**0.002**	**J**	**0.0215**	
pyrene	180	2300	31,000	72,000	5,500	10,000	NA	**0.0026**	**J**	**0.00087**	**J**	**0.0024**	**J**	**0.0211**		**0.0679**	**J**	**0.0021**	**J**	**0.0231**	
benzo(a)anthracene	1.1	21	280	1700	3.5	43	NA	**0.0039**	**J**	0.0022	U	**0.0015**	**J**	**0.01**		**0.0424**	**J**	**0.0014**	**J**	**0.0266**	
chrysene	110	2100	29000	100000	350	4,300	NA	**0.0036**	**J**	0.0022	U	**0.0014**	**J**	**0.0082**		**0.0363**	**J**	**0.0012**	**J**	**0.0226**	
benzo(b)fluoranthene	1.1	21	290	1700	3.5	43	NA	**0.004**	**J**	0.0022	U	**0.0017**	**J**	**0.0102**		**0.0470**	**J**	**0.0017**	**J**	**0.0228**	
benzo(k)fluoranthene	110	210	2900	17000	35	430	NA	**0.0031**	**J**	0.0022	U	0.0022	U	**0.0028**	**J**	**0.0170**	**J**	0.0018	U	**0.0209**	
benzo(a)pyrene	0.11	2.1	29	9.9	0.35	4.300	NA	**0.0034**	**J**	0.0022	U	**0.0013**	**J**	**0.007**		**0.0359**	**J**	**0.0013**	**J**	**0.0239**	
indeno(1,2,3-cd)pyrene	1.1	21	290	1700	3.5	43	NA	**0.0035**	**J**	0.0022	U	**0.001**	**J**	**0.0042**		**0.0217**	**J**	**0.0009**	**J**	**0.0252**	
dibenzo(a,h)anthracene	0.11	2.1	29	170	0.35	4.3	NA	**0.0026**	**J**	0.0022	U	0.0022	U	**0.0011**	**J**	**0.0065**	**J**	0.0018	U	**0.0216**	
benzo(g,h,i)perylene	NE	NE	23,000	72,000	5,500	10,000	NA	**0.0032**	**J**	0.0022	U	**0.001**	**J**	**0.0044**		**0.0238**	**J**	**0.0011**	**J**	**0.022**	
C9-C18-aliphatics	NE	NE	14,000	4,800	10,000	10,000	NA	7.7	UJ	6.9	UJ	7.1	UJ	**6.8**	**J**	8.5	UJ	**4.2**	**J**	6.4	UJ
C19-C36 aliphatics	NE	NE	100,000	100,000	10,000	10,000	NA	13	U	12	U	12	U	11	U	14	U	11	U	11	UJ
Adjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	NA		NA		NA		NA		NA		NA		NA	
Unadjusted C11-C22 aromatics	NE	NE	33,000	74,000	5,500	10,000	NA	7.7	U	**19**	**J**	7.1	U	6.6	U	8.5	U	**28**		**8.2**	**J**
Volatile Petroleum Hydrocarbons (VPH) by MassDEP Method VPH-04-1.1 (mg/kg)																					
benzene	1.2	5.1	75	240	86	30	NA	0.081	U	0.047	U	0.052	U	0.053	U	0.091	U	0.046	U	0.039	U
toluene	490	4700	810	820	10,000	10,000	NA	0.081	U	0.047	U	0.052	U	0.053	U	0.091	U	0.046	U	0.039	U
ethylbenzene	5.8	25	380	470	430	3,900	NA	0.081	U	0.047	U	0.052	U	0.053	U	0.091	U	0.046	U	0.039	U
total xylenes	58	250	260	260	10,000	10,000	NA	0.081	U	0.047	U	0.052	U	0.053	U	**1.9**		0.046	U	0.039	U
naphthalene	3.8	17	250	130	3,700	10,000	NA	0.081	U	**0.020**	**J**	0.052	U	**0.14**	**J**	**0.078**	**J**	0.046	U	0.039	U
Adjusted C5-C8 aliphatics	NE	NE	11,000	430	10,000	10,000	NA	3.9	U	2.2	U	2.5	U	2.6	U	4.4	U	2.2	U	1.9	U
Adjusted C9-C12 aliphatics	NE	NE	14,000	2,300	10,000	10,000	NA	5.2	U	3.0	U	3.3	U	**37**		**18**		3.0	U	2.5	U
C9-C10 aromatics	NE	NE	3500	2600	5,500	10,000	NA	0.65	U	0.37	U	0.41	U	**20**		**18**		0.37	U	0.31	U

Table 1
Summary of Historical Soil Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

NOTES:

mg/kg - milligrams per kilogram

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - US EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2017 (THQ 0.1 or 1x10-6)

2 - Maine Department of Environmental Protection (DEP) Remedial Action Guidelines (RAGs), October 19, 2018, Table 3: Maine RAGs for the Soil Exposure Pathway, by Exposure Scenario (THQ=1 or 1x10-5)

3 - Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (PGs), May 23, 2014, Table 5: Soil Remediation Guidelines for Petroleum Target Compounds and Hydrocarbon Fractions (THQ=1 or 1x10-5)

4 - Former guideline provided for reference since current criteria are not available.

5 - PAH target compounds were analyzed by 8270D SIM for samples collected July 2017.

6 - Darker highlights are considered the primary comparison criteria.

ND - Results were below the laboratory reporting limits, reporting limits vary by compound

NE - Not established

NS - Not sampled

bgs - below ground surface

J - Results are considered estimated

UJ - Results are below the laboratory LOD, LOD is estimated

U - Not detected at the laboratory LOD or considered ND due to blank contamination, LOD indicated

FS - field sample

FD - field duplicate

RE - reanalyzed result

NA - Not applicable, current criteria available or criteria vary by compound with all results below the reporting limit.

Bold Exceeds laboratory LOD or is an estimated concentration (J) below the LOD

Exceeds/equals residential RSL or construction worker hydrocarbon fraction RAG

Exceeds/equals outdated or secondary comparison criteria

LOD exceeds comparison criteria

Table 2
Summary of Historical Groundwater Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

Sample Location:						LAMW-1				LAMW-3				LAMW-4				LAMW-5								LAMW-1A		LAMW-3A		LAMW-4A		LAMW-5A			
Sample ID:						LAW1-1		LAW1-2		LAW3-1		LAW3-2		LAW4-1		LAW4-2		LAW5-1				LAW5-2				LAMW-01A051515		LAMW-03A-051515		LAMW-04A-051515		LAMW-05A-051515			
Sample Date:						11/4/1996		5/31/1997		11/1/1996		5/31/1997		11/1/1996		5/31/1997		11/1/1996		DUP3-R1		5/31/1997		DUP3-R2		5/15/2015		5/15/2015		5/15/2015		5/15/2015		LAMW05A-D-051515	
Parameter*	Former MEGs^1	Current Res RAG^2	Current Ind RAG^2	Tapwater RSL^3	MCL^4	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds (VOCs) by EPA Method 8260 or 504.1 (µg/L)																																			
Vinyl chloride	NA	0.19	0.22	0.019	2	0.5	U	0.5	U	0.5	U	**0.8**		0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	NA	15	1400	1.5	700	0.5	U	0.5	U	**4**		**5**		**2**		**2**		**2**		0.5	U	0.5	U	0.5	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
Total Xylenes	NA	190	2100	19	10,000	0.5	U	0.5	U	**12**		**8**		**21**		**11**		**16**		0.5	U	0.5	U	0.5	U	**0.074**	**J**	0.75	U	0.75	U	0.75	U	0.75	U
1,2,4-Trimethylbenzene	NA	56	1000	5.6	NE	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		**0.051**	**J**	0.25	U	0.25	U	0.25	U	0.25	U
2-Butanone	NA	5600	9000	560	NE	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	**4.0**		1.2	U	1.2	U	1.2	U	1.2	U
Benzene	NA	4.6	350	0.46	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.22**		0.25	U	0.25	U	0.25	U	0.25	U
Carbon disulfide	NA	810	3100	81	NE	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	**0.31**	**J**	0.25	U	0.25	U	0.25	U	0.25	U
Acetone	NA	14000	100000	1400	NE	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	**16**		1.2	U	**2.2**	**J**	**2.2**	**J**	**1.9**	**J**
Chloroform	NA	2.2	170	0.22	80	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**0.076**	**J**	**0.10**	**J**	**6.4**		**0.2**	**J**	**0.19**	**J**
Bromodichloromethane	NA	1.3	130	0.13	80	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.25	U	0.25	U	**0.61**		0.25	U	0.25	U
Toluene	NA	1100	24000	110	1,000	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	**1.3**		**0.44**	**J**	**20**		**0.45**	**J**	**0.41**	**J**
Volatile Petroleum Hydrocarbons (VPH) by MassDEP VPH 04-1.1 (µg/L)																																			
Toluene	NA	1100	24000	110	1000	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		3.8	U	3.8	U	**10**		3.8	U	3.8	U
Extractable Petroleum Hydrocarbons (EPH) by MassDEP EPH 04-1.1 (µg/L)																																			
All fractions and target compounds	NA	NA	NA	NA	NA	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		ND		ND		ND		ND		ND	
Total Petroleum Hydrocarbons (TPH) as Diesel Range Organics (DRO) and Gasoline Range Organics (GRO) (µg/L)																																			
DRO	50	NE	NE	NE	NE	50	U	**220**		**840**		**510**		**420**		**400**		50	U	50	U	50	U	50	U	NS		NS		NS		NS		NS	
GRO	50	NE	NE	NE	NE	50	U	50	U	**1400**		**990**		**500**		**340**		50	U	50	U	50	U	50	U	NS		NS		NS		NS		NS	
Polychlorinated biphenyls (PCBs) (µg/L)																																			
PCBs	NA	0.079	NA	0.0047	0.5	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NS		NS		NS		NS		NS	
Pesticides ((µg/L)																																			
All Compounds	NA	NA	NA	NA	NA	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND		NS		NS		NS		NS		NS	

NOTES:

µg/L - micrograms per liter

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - Former Maximum Exposure Guidelines (MEGs) included for reference for GRO and DRO comparison.

2 - Remedial Action Guidelines for Sites Contaminated with Hazardous Substances, October 19, 2018 (THQ = 1 x 10^{-5})

3 - US EPA Tapwater Regional Screening Levels, May 2020 (THQ = 1 x 10^{-6})

4 - US EPA Drinking Water Standards and Health Advirories Tables, July 11, 2017 (THQ = 1 x 10^{-6})

J - Results are considered estimated due to non-conformances in the data quality assurance/quality check (QA/QC)

U - results are below the laboratory reporting limit, reporting limit indicated.

ND - Results were below the laboratory reporting limits, reporting limits vary by compound or aroclor

NE - Not established

NA - Not applicable, current criteria available or criteria vary by compound with all results below the reporting limit.

Bold Exceeds laboratory reporting limit

Exceeds applicable comparison criteria

Exceeds former guidelines that is no longer applicable. Provided for historical refere

Table 3
Summary of Historical Sediment Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

Sample Location:					**LASED-1**											
Sample ID:					**LASED1-3**		**LASED1-4**		**LASED1-1202**		**LASED1-0403**		**LASED1-0903**		**LASED1-0504**	
Sample Date:					**10/25/1999**		**5/16/2000**		**12/4/2002**		**4/20/2003**		**9/17/2003**		**5/10/2004**	
Field QC:					**FS**		**FS**		**FS**		**FS**		**FS**		**FS**	
Parameter*	**EPA Residential RSL**[1]	**Maine DEP RAG**[2]	**Maine DEP PG**[3]	**Former Guideline**[4]	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds by EPA Method 8260B																
2-Butanone	27000	100,000	NE	NA	**69.5**		63.7	UJ	NS		NS		NS		NS	
Acetone	61000	100,000	NE	NA	**337**		155	UJ	NS		NS		NS		NS	
Methylene Chloride	35	110	NE	NA	**4**	**J**	12.7	UJ	NS		NS		NS		NS	
Styrene	600	70,000	NE	NA	17	U	**6.72**	**J**	NS		NS		NS		NS	
Total Petroleum Hydrocarbons (TPH) by Maine DEP Methods 4.2.17 for GRO and 4.1.25 for DRO																
TPH GRO	NE	NE	NE	NE	1.6	UJ	2.7	UJ	NS		NS		NS		NS	
TPH DRO	NE	NE	NE	10	**39**	**J**	**105**	**J**	**40**		**84**		**96**	**J**	**82**	

Table 3
Summary of Historical Sediment Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

LASED-2																							
LASED2-3				**LASED2-4**				**LASED2-1202**				**LASED2-0403**				**LASED2-0903**				**LASED2-0504**			
10/25/1999		**DUPS-17**		**5/16/2000**		**DUPS-18**		**12/4/2002**		**LASED2**		**4/20/2003**		**LASED2**		**9/17/2003**		**LASED2**		**5/10/2004**		**LASED2**	
FS		**FD**		**FS**		**FD**		**FS**		**FD**		**FS**		**FD**		**FS**		**FD**		**FS**		**FD**	
Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
30.3	U	44	U	11.2	UJ	11.9	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
36.6		**40.8**	**J**	**485**	**J**	**119 J**	**J**	NS		NS		NS		NS		NS		NS		NS		NS	
1.4	**J**	**0.92**	**J**	22.3	UJ	23.8	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
7.6	U	11	U	11.2	UJ	11.9	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
2.7	**J**	**0.9**	**J**	3.6	UJ	3.4	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
163	**J**	**76**	**J**	**220**	**J**	**146**	**J**	**71**		**84**		**72**		**70**		**83**		**84**		**82**		**54**	

Table 3
Summary of Historical Sediment Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

NOTES:
mg/kg - milligrams per kilogram
*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.
1 - US EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites, November 2017 (THQ 0.1 or 1x10-6)
2 - Maine Department of Environmental Protection (DEP) Remedial Action Guidelines (RAGs), October 19, 2018, Sediment Recreator (THQ=1 or 1x10-5)
3 - Maine DEP Remediation Guidelines for Petroleum Contaminated Sites in Maine (PGs), May 23, 2014,
Table 5: Soil Remediation Guidelines for Petroleum Target Compounds and Hydrocarbon Fractions (THQ=1 or 1x10-5)
4 - Former guideline provided for reference since current criteria are not available.
J - Results are considered estimated
UJ - Results are considered estimated due to laboratory non-conformance, results were below the laboraotry reporting limit.
U - Results are below the laboratory reporting limit , reporting limit indicated
NE - Not established
NS - Not sampled
DRO - Diesel range organics
GRO - Gasoline range organics
Bold Exceeds laboratory limit of detection
Exceeds applicable comparison criteria
Exceeds former guidelines that is no longer applicable. Provided for historical reference.

Table 4
Summary of Historical Surface Water Analytical Results
Loring Air Force Base Laundry Annex
Central Drive, Presque Isle, Maine

					Location:	LASW-1														LASW-2																			
					Sample ID:	LASW1-3		LASW1-4		LASW1-1202				LASW1-0403		LASW1-0903		LASW1-0504		LASW2-3		LASW2-4		LASW2-1202				LASW2-0403				LASW2-0903				LASW2-0504			
					Sample Date:	10/25/1999		5/16/2000		12/4/2002		DUP		4/20/2003		9/17/2003		5/10/2004		10/25/1999		5/16/2000		12/4/2002		DUP		4/20/2003		DUP		9/17/2003		DUP		5/10/2004		DUP	
Parameter*	Former MEGs[1]	Current Res RAG[2]	Current Res RAG[2]	EPA Tapwater RSL[3]	MCL[4]	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Volatile Organic Compounds by EPA Method 8260B (µg/L)																																							
Acetone	NA	14000	100000	1400	NE	**20**	**J**	20	U	NS		NS		NS		NS		NS		**20**	**J**	20	U	NS		NS		NS		NS		NS		NS		NS		NS	
Total Petroleum Hydrocarbons (TPH) by Maine DEP Methods 4.2.17 for GRO and 4.1.25 for DRO (µg/L)																																							
TPH - GRO	50	NE	NE	NE	NE	50	U	40	UJ	NS		NS		NS		NS		NS		50	U	40	UJ	NS		NS		NS		NS		NS		NS		NS		NS	
TPH - DRO	50	NE	NE	NE	NE	60	U	50	UJ	50	U	50	U	50	U	50	U	50	U	110	U	**150**	**J**	50	U	50	U	50	U	50	U	50	U	50	U	50	U	50	U

NOTES:

µg/L - Micrograms per liter

*Only samples and analytes with detections are shown, all other sample results analyses were below the laboratory reporting limit.

1 - Former Maximum Exposure Guidelines (MEGs) included for reference for GRO and DRO comparison.

2 - Remedial Action Guidelines for Sites Contaminated with Hazardous Substances, October 19, 2018 (THQ = 1 x 10^{-5})

3 - US EPA Tapwater Regional Screening Levels, May 2020 (THQ = 1 x 10^{-6})

4 - US EPA Drinking Water Standards and Health Advirories Tables, July 11, 2017 (THQ = 1 x 10^{-6})

J - Results are considered estimated

UJ - Results are considered estimated due to laboraotyr non-conformance, results were below the laboraotry reporting limit.

U - Results are below the laboratory reporting limit , reporting limit indicated

NE - Not established

NS - Not sampled

DRO - Diesel range organics

GRO - Gasoline range organics

Bold Exceeds laboratory reporting limit

Exceeds former guidelines that is no longer applicable. Provided for historical reference.

APPENDIX E

LAND USE AGREEMENT DOCUMENTATION

Presque Isle Industrial Council

Developers of Skyway Industrial Park

August 12, 2020

Marie Wojtas
US Army Corp of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

RE: ***Former Dry-Cleaning Building***
Central Drive ~ Skyway Industrial Park ~ Presque Isle, Maine

Dear Marie:

This letter is to acknowledge and agree to the US Army Corp of Engineers request to restrict for the foreseeable future a 0.24-acre parcel of land acquired from the United States of America on November 25, 1974 (Book 1169, Page 75) to its current use which is "green space", parking and snow storage for the adjacent building (Bldg. 306) located at 1050 Central Drive. This 0.24-acre parcel formerly known as "Parcel B, Loring Laundry Annex" is Use Restricted by the deed and further restricted by Municipal Zoning Ordinance.

The road right-of-way was included in the original deed, and once the estimated 30' deep section of road right-of-way is removed, the property is only 55' deep on the south side and 60' deep on the north side. The property is located within the Light Industrial Zone (LIZ), which requires a setback from the road right-of-way of 30' and 30' from the rear property line further restricting future development. Please note that the definition of the zone does not permit residential housing or childcare businesses ensuring that the adjacent property will not be used for these purposes in the foreseeable future.

If you have any other questions or concerns, please feel free to contact us.

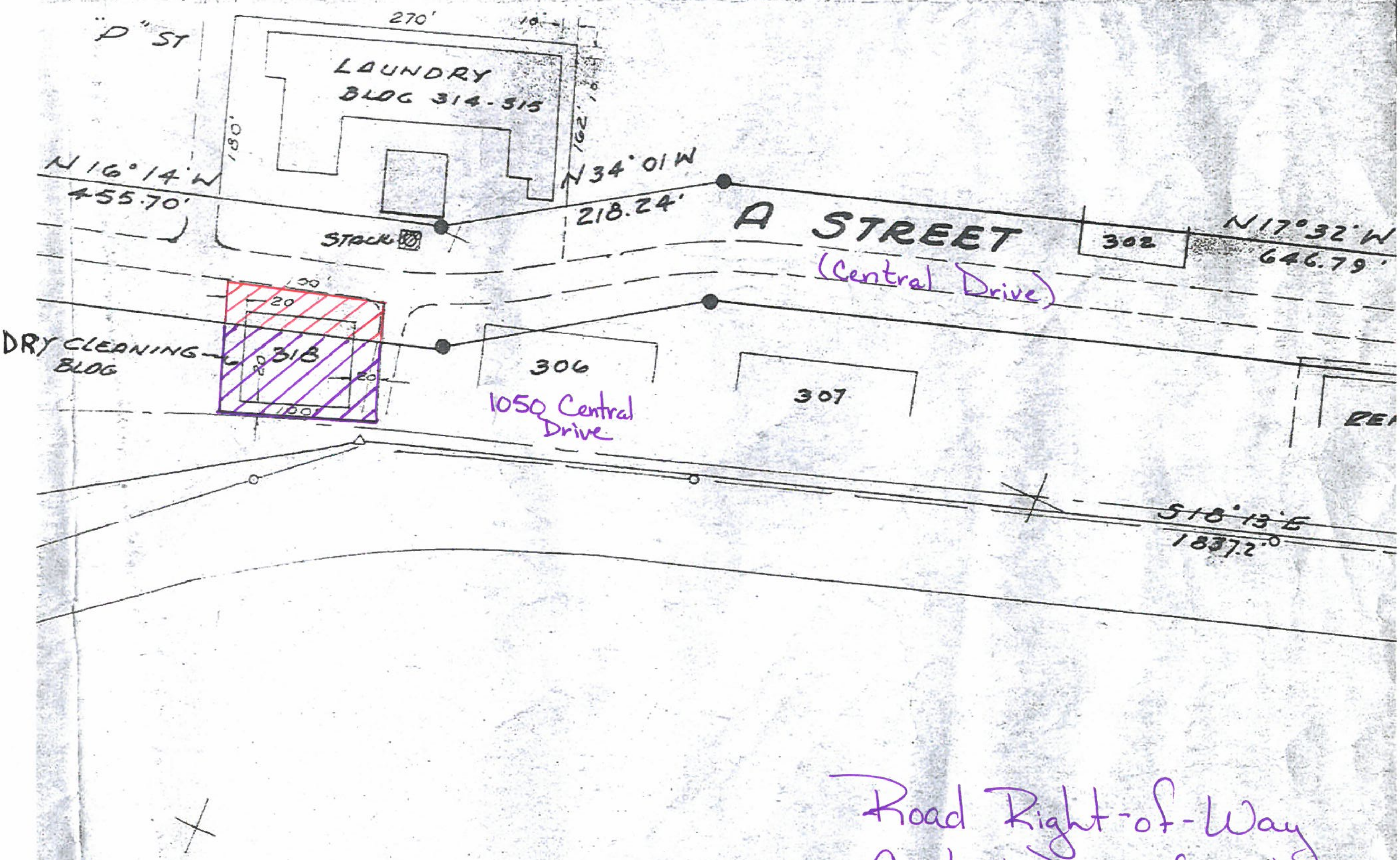
Sincerely,

Thomas W. Powers
Executive Director
Presque Isle Industrial Council

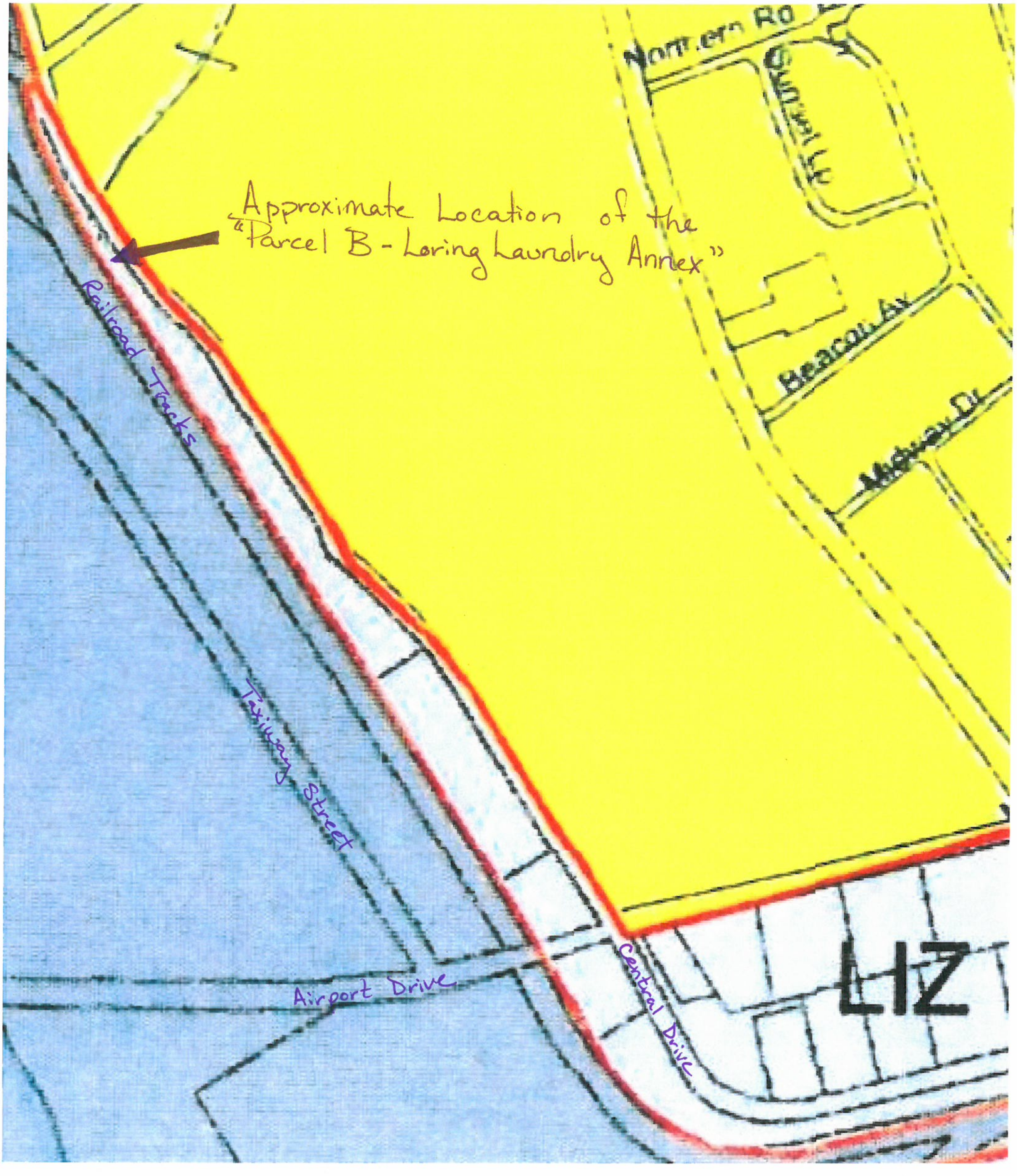
TWP/rkd

Enclosures (4)

650 Airport Drive, Suite 10 • Presque Isle, ME 04769 • Phone: (207) 764-2542 • Fax: (207) 764-2544 • contact@pqiic.com



Road Right-of-Way
Central Drive formerly
"A" Street



Approximate Location of the "Parcel B - Loring Laundry Annex"

SECTION XVI
LIGHT INDUSTRIAL ZONE - LIZ

A. PURPOSE

To provide areas within the City of Presque Isle for urban and suburban light manufacturing, processing, storage, wholesaling and distribution operations, and limited commercial uses. The regulations established in this Code are intended to allow efficient use of the land while at the same time making the district attractive and compatible for a variety of uses.

B. PERMITTED USES

1) Manufacturing and fabrication facilities

2) Laboratories

3) Professional offices

4) Computer and data processing facilities

5) Wholesaling/distribution/storage

6) Mini-warehousing and self-storage facilities

7) Laundries and wholesale dry cleaning plants

8) Machine shops

9) Photo processing

10) Sheet metal shops

11) Maintenance and repair services

12) Research and development facilities

13) Chemical/biochemical manufacturing, production, sales, and services

14) Retail Service Establishment, excluding new & used car lots and junk yards and those uses specifically mentioned under subsection C, which follows

C. SPECIAL EXCEPTIONS

1) Specialty woodworking
2) Equipment leasing/rental
3) Communications facilities
4) Furniture manufacturing
5) Welding shops
6) Building material sales
7) Commercial printing
8) Government maintenance facilities
9) Government offices
10) Public safety facilities
11) Public utility facilities
12) Homeless Shelter

D. STANDARDS

1) The general standards of performance of Chapter II shall be observed.
2) The following space standards shall apply:

Maximum building footprint – (10,000 square feet)

Minimum land area per building – (0.5 acre)

Minimum street frontage – (100 feet)

Minimum front property line – (30 feet)

Minimum side and rear property lines – (30 feet)

Maximum building coverage – (50%)

Maximum building height – (35 feet)**

** In no instance shall any structure pierce the imaginary air space surfaces created and accepted by the City in its then current Airport Master Plan.

D. STANDARDS - Continued

Maximum outdoor stored material coverage – (Two thirds material required distances for front, side, rear yards shall be maintained without material stored thereon.

Minimum setback from streams and waterbodies – (100 feet)

No building or structure shall be erected that exceeds the elevation of 684′ above Mean Sea Level (MSL), as determined from the closest available U.S.G.S. benchmark, without first reviewing the compliance of the proposed project with the Airport Master Plan and all applicable Federal Aviation Administration regulations. This review must be conducted with the Airport Manager or other authorized individual(s).

STATE OF MAINE)
COUNTY OF AROOSTOOK)

1. THIS INDENTURE, made this the 25th day of November 1974, between the UNITED STATES OF AMERICA, also referred to as the Government, acting by and through the Administrator of General Services, under and pursuant to the powers and authority of Article 4, Section 3, Clause 2 of the Constitution of the United States, and the provisions of the Federal Property and Administrative Services Act of 1949, approved June 30, 1949 (63 Stat. 377), as amended, and the Surplus Property Act of 1944 (58 Stat. 765), as amended, and regulations and orders promulgated thereunder, party of the first part, as grantor, and the CITY OF PRESQUE ISLE, a municipality created, operating and existing under and by virtue of the laws of the State of Maine, party of the second part as grantee.

2. WITNESSETH, that the said grantor, for and in consideration of the assumption by the grantee of all the obligations and its taking subject to certain reservations, restrictions, and conditions and its covenant to abide by, and its agreement to, certain other reservations, restrictions and conditions, all as set out hereinafter, has remised, released and forever quitclaimed and by these presents does remise, release and forever quitclaim to the grantee, its successors and assigns, without warranty, express or implied, under and subject to the reservations, restrictions, conditions and exceptions, all as hereinafter expressed and set out, all right, title, interest, claim and demand which the grantor has in and to that certain property situate, lying and being in the County of Aroostook, in the State of Maine, formerly known as Parcel B, Loring Laundry Annex, and described in detail in Attachment "A" hereof, for the use stated therein.

3. WHEREAS, all the property hereby conveyed has heretofore been declared surplus to the needs of the UNITED STATES OF AMERICA, is presently under the jurisdiction of the General Services Administration, is available for disposal and its disposal has been heretofore authorized by the Administrator of General Services, acting pursuant to the above referred to laws, regulations and orders.

4. TO HAVE AND TO HOLD the same, together with all and singular the appurtenances thereunto belonging or in anywise appertaining, and all the estate, right, title, interest or claim whatsoever of the grantor, either in law or in

mail Presque Isle Industrial Council, P.O. Box 831, P. Isle, Maine, March 7, 1975 equity and subject to the reservations, restrictions and conditions set forth in this instrument, to the only proper use, benefit and behalf of the grantee, its successors and assigns forever.

5. NOW, THEREFORE, by the acceptance of this Deed or any rights hereunder, the grantee, for itself, its successors and assigns, agrees that the transfer of all the property transferred by this instrument, is accepted subject to the following restrictions set forth in subparagraphs (a) and (b) of this paragraph, which shall run with the land:

(a) That, except as provided in subparagraph (a) of numbered paragraph 6, the property transferred by this instrument shall be used for public airport purposes for the use and benefit of the public, or reasonable terms and without unjust discrimination and without grant or exercise of any exclusive right for use of the airport within the meaning of the term "exclusive right" as used in subparagraph (c) of the numbered paragraph 6. As used in this instrument, the term "airport" shall be deemed to include all land, buildings, structures, improvements and equipment used for public airport purposes.

(b) That, except as provided in subparagraph (a) of the numbered paragraph 6, the entire landing area, as defined in Section 101 of the Federal Aviation Act of 1968, as amended, and Federal Aviation Regulations pertaining thereto, and all structures, improvements, facilities and equipment in which this instrument transfers any interest shall be maintained for the use and benefit of the public at all times in safe and serviceable condition, to assure its efficient operation and use, provided, however, that such maintenance shall be required as to structures, improvements, facilities and equipment only during the useful life thereof, as determined by the Administrator of the Federal Aviation Administration (FAA) or his successor in function. In the event materials are required to rehabilitate or repair certain of the aforementioned structures, improvements, facilities or equipment, they may be procured by demolition of other structures, improvements, facilities or equipment transferred hereby and located on the above land which have outlived their use as airport property in the opinion of the Administrator of the FAA or his successor in function.

6. FURTHER, by the acceptance of this Deed or any rights hereunder, the grantee for itself, its successors and assigns, also assumes the obligation of, covenants to abide by and agree to, and this transfer is made subject to, the following reservations and restrictions set forth in subparagraphs (a) to (o) inclusive, of this paragraph, which shall run with the land: Provided, that the property transferred hereby may be successively transferred only with the proviso that any such subsequent transferee assumes all the obligations imposed upon the grantee by the provisions of this instrument.

a. That no property transferred by this instrument shall be used, leased, sold, salvaged, or disposed of by the grantee for other than the airport purposes without the written consent of the Administrator of the FAA. The term "property" as used herein is deemed to include revenues or proceeds derived therefrom.

b. Property transferred for the development, improvement, operation or maintenance of airport shall be used and maintained for the use and benefit of the public on fair and reasonable terms, without unjust discrimination. In furtherance of this covenant (but without limiting its general applicability and effect) the grantee specifically agrees (1) that it will keep the airport open to all types, kinds, and classes of aeronautical use without discrimination between such types, kinds and classes. Provided, that the grantee may establish such fair, equal, and not unjustly discriminatory conditions to be met by all users of the airport as may be necessary for the safe and efficient operation of the airport: and provided further, that the grantee may prohibit or limit any given type, kind, or class of aeronautical use of the airport if such action is necessary for the safe operation of the airport or necessary to serve the civil aviation needs of the public. (2) That in its operation and the operation of facilities on the airport, neither it nor any person or organization occupying space or facilities thereupon will discriminate against any person or class of persons by reason of race, color, creed, or national origin in the use of any of the facilities provided for the public on the airport. (3) That in any agreement, contract, lease, or other arrangement under which a right or privilege at the airport is granted to any person, firm or corporation to conduct or engage in any aeronautical activity for furnishing services to the public at the airport, the grantee will insert and enforce provisions requiring the contractor: (a) to furnish said service on a fair, equal and not unjustly discriminatory basis to all users thereof, and (b) to charge fair, reasonable, and not unjustly discriminatory prices for each unit for service, provided that the contractor may be allowed to make reasonable and nondiscriminatory discounts, rebates, or other similar types of price reductions to volume purchasers. (4) That the grantee will not exercise or grant any right or privilege which would operate to prevent any person, firm, or corporation operating aircraft on the airport from performing any services on its own aircraft with its own employees (including, but not limited to maintenance and repair) that it may choose to perform. (5) That in the event the grantee itself exercises any of the rights and privileges referred to in subsection (3) above the services involved will be provided on the same conditions as would apply to the furnishing of such services by contractors or concessionaires of the grantee under the provisions of such subsection (3) of this paragraph 6b.

c. The grantee will not grant or permit any exclusive right for the use of the airport at which the property described herein is located which is forbidden by Section 308 of the Federal Aviation Act of 1958, as amended, by any person or persons to the exclusion of others in the same class and will otherwise comply with all applicable laws. In furtherance of this covenant (but without limiting its general applicability and effect), the grantee specifically agrees that, unless authorized by the Administrator, it will not, either directly or indirectly, grant or permit any person, firm or corporation the exclusive right to conduct any aeronautical activity on the airport including but not limited to, charter flights, pilot training, aircraft rental and sightseeing, aerial photography, crop dusting, aerial advertising and surveying, air carrier operations, aircraft sales, and services, sale of aviation petroleum products whether or not conducted in conjunction with other aeronautical activity, repair and maintenance of aircraft, sale of aircraft parts, and any other activities which because of their direct relationship to the operation of aircraft can be regarded as an aeronautical activity. The grantee further agrees that it will terminate as soon as possible and no later than the earliest renewal, cancellation, or expiration date applicable thereto, any exclusive right existing at any airport owned or controlled by the grantee or hereafter acquired and that, thereafter, no such right shall be granted. However, nothing contained herein shall be construed to prohibit the granting or exercise of or exclusive right for the furnishing of nonaviation products and supplies or any services of a nonaeronautical nature or to obligate the grantee to furnish any particular nonaeronautical service at the airport.

d. The grantee shall, insofar as it is within its powers and to the extent reasonable, adequately clear and protect the aerial approach to the airport. The grantee will, either by the acquisition and retention of easements or other interests in or rights for the use of land airspace or by the adoption and enforcement of zoning regulations, prevent the construction, erection, alteration, or growth of any structure, tree, or other object in the approach areas of the runways of the Airport which would constitute an obstruction to air navigation according to the criteria or standards prescribed in Part 77 of the Federal Aviation Regulations, as applicable, according to the currently approved airport layout plan. In addition, the grantee will not erect or permit the erection of any permanent structure or facility which would interfere materially with the use, operation, or future development of the Airport, in any portion of a runway approach area in which the grantee has acquired, or may hereafter acquire, property interest permitting it to so control the use made of the surface of the land. Insofar as is within its power and to the extent reasonable the grantee will take action to restrict the use of the land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations including landing and take-off of aircraft.

e. The grantee will operate and maintain in a safe and serviceable condition, as deemed reasonably necessary by the Administrator of the FAA, the airport and all facilities thereon and connected therewith which are necessary to service the aeronautical users of the airport other than facilities owned or controlled by the United States and will not permit any activity thereon which would interfere with its use for airport purposes: Provided, that nothing contained herein shall be construed to require that the airport be operated for aeronautical uses during temporary periods when snow, flood, or other climatic conditions interfere with such operation and maintenance, repair, restoration or replacement of any structure or facility which is substantially damaged or destroyed due to an act of God or other condition or circumstance beyond the control of the grantee.

f. That the grantee will make available all facilities of the airport at which the property described herein is located or developed with Federal aid and all those usable for the landing and taking off of aircraft to the United States at all times, without charge, for use by aircraft of any agency of the United

States in common with other aircraft, except that if the use by aircraft or any agency of the United States in common with other aircraft, is substantial, a reasonable share, proportional to such use, of the cost of operating and maintaining facilities so used, may be charged; and unless otherwise determined by the FAA or otherwise agreed to by the grantee and the using Federal agency, substantial use of an airport by United States aircraft will be considered to exist when operations of such aircraft are excess of those which, in the opinion of the FAA, would unduly interfere with use of the landing area by other authorized aircraft or during any calendar month that (1) either five (5) or more aircraft of any agency of the United States are regularly based at the airport or on land adjacent thereto, or (2) the total number of movements (counting each landing as a movement and each take-off as a movement) of aircraft of any agency of the United States is 300 or more, or (3) the gross accumulative weight of aircraft of any agency of the United States using the airport (the total movements of such Federal aircraft multiplied by gross certified weights thereof) is in excess of five million pounds.

g. That during any national emergency declared by the President of the United States of America or the Congress thereof, including any existing national emergency, the Government shall have the right to make exclusive or nonexclusive control and possession without charge, of the airport, or of such portion thereof as it may desire, provided, however, that the Government shall be responsible for the entire cost of maintaining such part of the airport as it may use exclusively, or over which it may have exclusive possession or control, during the period of such use, possession, or control, and shall be obligated to contribute a reasonable share, commensurate with the use made by it, of the cost of maintenance of such property as it may use nonexclusively or over which it may have nonexclusive control and possession: Provided, further, that the Government shall pay a fair rental for its use, control, or possession, exclusively or nonexclusively, of any improvements to the airport made without United States aid and never owned by the United States. All property herein conveyed is subject to the above said national emergency use provisions.

h. The grantee does hereby release the Government, and will take whatever action may be required by the Administrator of the FAA to assure the complete release of the Government from any and all liability the Government may be under for restoration or other damage under any lease or other agreement covering the use by the Government of the airport, or part thereof, owned, controlled or operated by the grantee, upon which, adjacent to which, or in connection with which, any property transferred by this instrument was located or used.

i. That whenever so requested by the FAA, grantee will furnish without cost to ghe Federal Government, for construction, operation and maintenance of facilities for air traffic control activities, or weather reporting activities, or communication activities related to air traffic control, such areas of the property described herein or rights in buildings on the airport at which the property described herein is located, as the FAA may consider necessary or desirable for construction at Federal expense of space or facilities for such purposes, and the grantee will make available such areas or any portion thereof for the purposes provided herein within 4 months after receipt of written request from the FAA, if such are or will be available.

j. The grantee will: (1) furnish the FAA with annual or special airport financial and operational reports as may be reasonably requested using either forms furnished by the FAA or in such manner as it elects so long as the essential data are furnished, and (2) upon reasonable request of the FAA; make available for inspection by any duly authorized representative of the FAA the airport, at which the property described herein is located, and all airport records and documents affecting the Airport, including deeds, leases, operation and use agreements, regulations, and other instruments and will furnish to the FAA a true copy of any such document which may be reasonably requested.

k. And, that the grantee will not enter into any transaction which would operate to deprive it of any of the rights and powers necessary to perform or comply with any or all of the covenants and conditions set forth herein unless by such transaction the obligation to perform or comply with all such covenants and conditions is assumed by another public agency found by the FAA to be eligible as a public agency as defined in the Airport and Airway Development Act of 1970 to assume such obligation and have the power, authority, and financial resources to carry out all such obligations and, if an arrangement is made for management or operation of the Airport by any agency or person other than the party of the second part, it will reserve sufficient rights and authority to insure that such Airport will be operated and maintained in accordance with these covenants and conditions, any applicable Federal statute, and the Federal Aviation Regulations.

l. And, that the grantee will keep up to date at all times an airport Layout map of the Airport at which the property described herein is located showing: (a) the boundaries of the Airport and all proposed additions thereto, together with the boundaries of all offsite areas owned or controlled by the grantee for airport purposes and proposed additions thereto; (b) the location and nature of all existing and proposed airport facilities and structures (such as runways, taxiways, aprons, terminal buildings, hangars, and roads), including all proposed extension and reductions of existing airport facilities: (c) the location of all existing and proposed nonaviation areas and of all existing improvements thereon and uses made thereof and such airport layout map and each amendment, revision, or modification thereof, shall be subject to the approval of the FAA, which approval shall be evidenced by the signature of a duly authorized representative of the FAA on the face of the airport layout map, and the grantee will not make or permit the making of any changes or alterations in the Airport or any of its facilities other than in conformity with the airport layout map as so approved by the FAA, if such changes or alterations might adversely affect the safety, utility, or efficiency of the Airport.

m. And, that if at any time it is determined by the FAA that there is any outstanding right or claim of right in or to the Airport property, described herein, the existence of which creates an undue risk of interference with the operation of the Airport or the performance of compliance with covenants and conditions set forth herein, the grantee will acquire, extinguish, or modify such right or claim of right in a manner acceptable to the FAA.

n. That in the event that any of the aforesaid terms, conditions, reservations, or restrictions are not met, observed, or complied with by the grantee or any subsequent transferee, whether caused by the legal inability of said grantee or subsequent transferee to perform any of the obligations herein set out, or otherwise, the title, right of possession and all other rights transferred by this instrument to the grantee, or any portion thereof, shall at the option of the grantor revert to the grantor in its then existing condition sixty (60) days following the date upon which demand to this effect is made in writing by the Administrator of the FAA or his successor in function, unless within said sixty (60) days such default or violation shall have been cured and all such terms, conditions, reservations and restrictions shall have been met, observed, or complied with, in which event said reversion shall not occur and title, right of possession, and all other rights transferred hereby, except such, if any, as shall have previously reverted, shall remain vested in the grantee, its transferees, successors and assigns.

o. That if the construction as covenants of any of the foregoing reservations and restrictions recited herein as covenants or the application of the same as covenants in any particular instance is held invalid, the particular reservation or restrictions in question shall be construed instead merely as conditions upon the breach of which the Government may exercise its option to cause the title, interest, right of possession, and all other rights transferred to the grantee, or any portion thereof, to revert to it, and the application of such reservations or restrictions as covenants in any other instance and the construction of the remainder of such reservations and restrictions as covenants shall not be affected thereby.

AND IT IS FURTHER AGREED AND UNDERSTOOD by and between the parties hereto and the grantee, by its acceptance of this Quitclaim Deed, acknowledges its understanding of the agreement, and agrees that, as part of the consideration for this Deed, the grantee covenants and agrees for itself, its successors and assigns, that: (1) the program for or in connection with which this Deed is made will be conducted in compliance with, and the grantee, its successors and assigns, will comply with all requirements imposed by or pursuant to the regulations of the DOT as in effect on the date of this Deed (49 CFR Part 21) issued under the provisions of Title VI of the Civil Rights Act of 1964, as amended; (2) this covenant shall be subject in all respects to the provisions of said regulations; (3) the grantee, its successors and assigns, will promptly take and continue to take such action as may be necessary to effectuate this covenant; (4) the United States shall have the right to seek judicial enforcement of this covenant; (5) the grantee, its successors and assigns, will: (a) obtain from any person (any legal entity) who, through contractual or other arrangements with the grantee, its successors and assigns, is authorized to provide services or benefits under said program, a written agreement pursuant to which such other person shall, with respect to the services or benefits which he is authorized to provide, undertake for himself the same obligations as those imposed upon the grantee, its successors and assigns, by this covenant; (b) furnish the original of such agreement to the Administrator of the FAA, or his successor, upon his request therefor; and that this covenant shall run with the land hereby conveyed, and shall in any event, without regard to technical classification or designation, legal or otherwise, be binding to the fullest extent permitted by law and equity for the benefit of, and in favor of the grantor and enforceable by the grantor against the grantee, its successors and assigns.

Within premises are conveyed subject to the following:

a. Subject to any state of facts that may be disclosed by a physical examination of the premises.

b. Subject to any state of facts an accurate and adequate survey of the premises may disclose.

c. Subject to Right-of-Way and right to the use of a spring, reserved in the deed to the United States of America.

d. Subject to existing easements for public roads and highways, public utilities, railroads and pipelines.

Within described premises are a portion of the premises acquired by the United States of America in fee simple as part of Tract No. 6 described in a Declaration of Taking in condemnation proceedings entitled "USA vs. 407.10 Acres of land, More or Less, Situate in Aroostook County, Maine & Harry L. Sutter, Et Al," Law No. 90, filed in the U.S. District Court in and for the District of Maine, Northern Division, in which final judgment was entered on October 1, 1941.

IN WITNESS WHEREOF, the party of the first part has caused this Quitclaim Deed to be executed in its name and on its behalf as a sealed instrument the day and year first above written.

UNITED STATES OF AMERICA
Acting By and Through the
ADMINISTRATOR OF GENERAL SERVICES

By Albert O.
Regional Administrator
General Services Administration
Boston, Massachusetts

WITNESSES:
Helen L. Badasarian
Mary A.

CITY OF PRESQUE ISLE

By ______________________
City Manager

WITNESSES:

____

Laurie A. Berry

COMMONWEALTH OF MASSACHUSETTS) ss.
COUNTY OF SUFFOLK)

In Boston, in said County and State, on this 25th day of November 1974, before me personally appeared ALBERT A. GAMMAL, JR., Regional Administrator, General Services Administration, Boston, Massachusetts, duly empowered and authorized and delegated by the Administrator of General Services, to me known and known by me to be the party executing the foregoing instrument and acknowledged said instrument by him duly executed to be the free act and deed of the United States of America, as his free act and deed individually, and in his capacity as Regional Administrator, General Services Administration, Boston, Massachusetts.

William F. Manley
Notary Public
My Commission Expires NOV. 4, 1977

STATE OF MAINE)
COUNTY OF AROOSTOOK)

In Presque Isle, in said County and State, on the 3rd day of December 1974, before me, then and there personally appeared Dana F. Connors City Manager duly empowered and authorized and delegated, who signed the foregoing instrument and acknowledged the same to be his free act and deed in his said capacity and the free act and deed of the City of Presque Isle.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year aforesaid.

____
Notary Public
My Commission Expires [illegible]

ATTACHMENT "A"

As specified on Page 1, in Numbered paragraph 2, of the foregoing Quitclaim Deed dated this is Attachment "A".

1. The following property is hereby conveyed as aeronautical use property, which property has been determined essential, suitable, desirable or reasonably necessary to fulfill the immediate and foreseeable requirements of the grantee for the development, improvement, operation or maintenance of the airport, to wit:

All that tract or parcel of land situate in the City of Presque Isle, County of Aroostook, State of Maine, and more particularly described as follows:

Beginning at the point of intersection of the Westerly line of "A" Street with the Northwesterly side line of Building 318 extended Northeasterly;

thence running Southeasterly along the Westerly line of "A" Street about 100 feet to a point 20.0 feet distant Southeasterly from and at right angle to the Southeasterly side line of Building 318 extended Northeasterly;

thence turning and running Southwesterly, parallel to and 20.0 feet distant Southeasterly from the Southeasterly side line of Building 318, about 85 feet to the Easterly right-of-way line of the Railroad Spur Track;

thence turning and running Northwesterly along the Easterly right-of-way line of the said Railroad Spur Track about 122 feet to a point 20.0 feet distant Northwesterly from and at right angle to the Northwesterly side line of Building 318 extended Southwesterly;

thence turning and running Northeasterly, parallel to and 20.0 feet distant Northwesterly from the Northwesterly side line of Building 313, about 90 feet to the Westerly line of "A" Street;

thence turning and running Southeasterly along the Westerly line of "A" Street about 20 feet to the point of beginning.

Including Building No. 318 located thereon.

Containing 0.24 of an acre, more or less.

Reserving to the Grantor the right to remove from the above granted premises all of the following items of personal property which may be located on said premises during the 120 day period following the recording of the above said deed

1. 35101708472, Tank Dry Cleaning Solvent, single compt storage type w/liquid level sight glass, 750 gal cap.

2. 35101418197, Dry tumbler, dry cleaning 100 lb dry wt cap for u/w 100 deg. F flash point petroleum base solvent

3. 35105807101, Drying tumbler laundry comm end door loading reversible noncirculating 100 lb. dry wt cap AG 220 V60 cyc 3 ph

4. 35107914687, Combination washer extractor Pet 100 lb. cap.

5. 35101709346, Filter dry cleaning solvent pressure plate type w/externally operable screenscraping or back washing device w/derrick lid lifting device w/button trap 3200 gal rated filter cap per hr AC208 to 230v 60 cyc 3ph

6. 35102886310, Washing machine, laundry comm manual unloading metal cylinder single speed semi-automatic w/o wringer 300 lb dry wt cap AC200v 60 cyc 3 ph

7. 35102875441, Filter, Dry Cleaning solvent Pressure plate type w/externally oper. screen scraping or back washing device w/derrick lid lifting device w/button trap, 8000 gal rated cap per hour

8. 35102875448, Extractor

9. 35106402896, Garment dryer, dry cleaning comm DBL garment type, standard model AC110v 60 cyc 5 ph

10. 35102886353, still vacuum dry cleaning vacuum and pressure type gage rotary type vacuum pump 125 gal cap per hr AC220v 60 cyc 3 ph

11. 43205544526, Pump positive acting rotary power drive w/electric motor

AROOSTOOK, ss. Received February 18, 1975 at 8h 30m A. M.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

DEPARTMENT ORDER
IN THE MATTER OF

CITY OF PRESQUE ISLE) SITE LOCATION OF DEVELOPMENT
Presque Isle, Aroostook County)
AIRPORT & INDUSTRIAL PARK (Partial ATF))
L-18711-L3-A-N (Approval)) FINDINGS OF FACT AND ORDER

Pursuant to the provision of Title 38 M.R.S.A. Section 481 _et seq._, the Department of Environmental Protection has considered the application of the CITY OF PRESQUE ISLE with its supportive data, agency review comments, and other related materials on file and finds the following facts:

1. PROJECT DESCRIPTION:

A. History of Project: The Northern Maine Regional Airport was originally built as a military base in the early 1940's. In 1961 the City of Presque Isle acquired the site and has continued aeronautical operations at the facility. The airport currently provides direct access to the National Air Transportation System for both general aviation and scheduled commercial air transport users in the Aroostook County region. Since 1961 development occurred within the confines of the old military complex as the City transformed the site into a publicly operated airport and industrial park. Since 1970 a number of improvements and expansions have occurred at the facility which require review under the Site Location of Development Act.

B. Summary: The applicant now proposes construction of T-hangars and an apron expansion, reconstruction of taxiway "C" and the intersection of taxiway "A/B", construction of a 2,400 square foot addition onto building #609, and requests after-the-fact approval for certain conveyances or improvements constructed after 1970 all as shown on a set of plans the first of which is entitled "Northern Maine Regional Airport/Skyway Industrial Park, Overall Project Plan" drawn by Oest Associates, dated 15 September 1994.

C. Current Use of the Site: The site of development is currently used as an airport and industrial park. The airport covers 1,100 acres of the 1,500+ acre development. The industrial park covers 400 acres. A 13 acre contiguous parcel, known as Fairview Acres, was purchased by the City in 1984 and is currently open space.

2. FINANCIAL CAPACITY:

The total cost of the project is estimated to be $2,250,000. The Federal Aviation Administration will fund 90% of the cost of capital improvements with the remaining 10% of the costs split between the City and State.

3. TECHNICAL ABILITY:

The applicant has operated the airport since 1961. The airport and industrial park both have full time managers responsible for daily facility operations. The applicant has also retained the services of Oest Associates, a professional engineering firm, to assist in the design and engineering of the project.

4. SOLID WASTE:

The development annually generates approximately 208 cubic yards of general solid waste by the airport facility and 7,175 cubic yards by the industrial park. An existing 3.8 acre wood waste landfill was created by Columbia Forest Products operations since 1962. On 9 September 1994 Columbia Forest Products received approval for final closure of the landfill by Order S-21338-WN-A-N. All general solid wastes from the development has been and will be disposed of at the Presque Isle landfill which is currently in substantial compliance with the Solid Waste Management Regulations.

5. WATER SUPPLY:

All of the existing facilities are connected to the municipal water distribution network. The airport currently uses up to 730 gallons of water per day. The industrial park uses up to 191,000 gallons per day. The applicant has submitted a letter from the Presque Isle Water District, dated 6 January 1994, indicating that they have been capable of servicing the development.

6. TRAFFIC MOVEMENT/ROADWAYS:

The development is accessed via several roads including Central Drive, Airport Drive, and Missile Street. Central Drive is a paved, 2 lane road with 22-33 foot wide travel surface. Airport Drive is a 2 lane road with a 20-26 foot wide travel surface. The interior roads are paved generally with a 21 foot wide travel surface.

The applicant has submitted a report analyzing traffic to be generated by the development and recommending certain road improvements to accommodate this traffic. The report was prepared on the assumption that the development currently generates less traffic when compared with 1970 conditions. This report has been reviewed by the Maine Department of Transportation (MDOT). MDOT has submitted the following comments:

On-Site Impacts:

Intersection site distances are adequate for all project driveways.

At the airport terminal, there is a curved interior roadway between the parking area and the terminal, with vertical granite curb and sidewalk on the terminal side. The roadway is a divided roadway with a paved 14 foot wide traveled way on either side of a 4 foot wide, mountable, concrete island. On the sidewalk side, just before the end of the island, and adjacent to the terminal entrance, there is a painted 7 foot wide parking space with a sign reading "No Parking-Taxi Stand". This situation leaves only 7 feet of traveled way, which results in drivers traveling over the concrete island to get around the parked taxi. It is recommended that the parking for Taxi stands be relocated so that vehicles traveling on this curved interior roadway will not have to encroach onto the concrete island or into the opposing lane in order to bypass a parked vehicle.

We concur with the following Consultant's recommendations:

a) Install a stop sign on the Central Drive Approach to Missile Street.

b) Install stop signs on exit drives from the Northern Maine Regional Airport.

c) Monitor future accidents at the intersection of Edgemont Drive and Skyway Street to ensure that the 1992 sign change (i.e. from yield to stop sign) is adequately providing for safe conditions. If accident experience for the 3 year period (1992 thru 1995) indicates that this intersection still remains classified as a High Accident Location, then it is recommended that appropriate measures be implemented to correct the deficiency.

d) Maintain adequate site distance through snow removal operations and increase speed enforcement at the intersection of Edgemont Drive and Central Drive.

e) Install a stop ahead warning sign on Airport Drive prior to the intersection of Airport Drive and Missile Street.

The applicant has agreed to make the improvements as recommended above, except that the curved lane near the terminal has been posted for one-way circulation only, thereby eliminating the need for alterations in this area. The applicant also agrees to continue to monitor the Edgemont Drive/Skyway Street intersection, but proposes to evaluate the data when available to determine appropriate corrective measures. The Department finds the applicant's proposals to be acceptable.

7. AIR QUALITY:

No significant sources of air emissions have been identified other than those projects within the development that have already obtained Air Emission Licenses (AEL). The three businesses that have obtained AEL are Tater Meal, Inc. (A-459-72-B-R), International Paper Company (A-311-74-C-R), and Columbia Forest Products (A-353-73-B-R).

8. NATURAL DRAINAGE WAYS:

Most of the runoff from the site flows in a southerly direction toward Presque Isle Stream. The stream flows easterly and then northerly through the downtown section of the municipality and then discharges into the Aroostook River. A manmade surface water body, Hanson Lake, exists to the northwest of development. The majority of the area within the watershed of Hanson Lake owned by the applicant is undeveloped and is not proposed for development at this time.

9. STORMWATER RUNOFF:

The applicant has submitted a stormwater management plan for the site based on estimates of the pre-development and post-development runoff flows for the 2, 10 and 25 year storms using the methodology outlined in "Urban Hydrology for Small Watersheds", Technical Release #55, U.S.D.A., Soil Conservation Service. The stormwater management plan identifies the peak flow rates from the site. The final plan has been reviewed and revised in response to the comments of the Department which found that, based on the information presented, the plan meets the standards set forth by the Department.

10. EROSION AND SEDIMENTATION CONTROL:

The applicant has submitted an Erosion and Sedimentation Control Plan as exhibit 14 of the application. This plan and plan sheets containing erosion control details have been reviewed by, and revised in response to the comments of the Department, which has found the revised plans to be in accordance with Departmental standards for erosion and sediment control.

11. SURFACE WATER QUALITY:

The majority of the development is not within the watershed of a lake or great pond. Small portions of the development are located in the watershed of Hanson Lake, however no change of land use in the watershed is proposed. No discharges to surface waters are proposed other than stormwater.

12. GROUNDWATER QUALITY:

The project site is not located over a sand and gravel aquifer or a fractured bedrock aquifer. The project does not propose any withdrawal from, or discharge to, any groundwater. The applicant has identified potential sources of contamination including petroleum leaks, and chemical spills. The applicant has developed spill prevention, containment and control plans for the development.

Sewage for most of the development will be disposed of within the municipal sewer collection system, with the exception of the general aviation building and the hangars north of taxiway "E" which have individual on-site septic systems. The general aviation building and the hangars north of taxiway "E" each have an on-site system with 1,000 gallon septic tanks and leachfields constructed in 1971 and constructed by the military in the 1940's respectively. The on-site systems are regularly maintained and show no sign of malfunction.

13. BUFFER STRIPS:

Significant areas of forest and open space exist throughout the development area. The applicant owns over 1,500 acres surrounding developed portions of the facility. The Department finds that the applicant has made adequate provisions to buffer the development from the surrounding area.

14. HISTORIC SITES:

The project site has been reviewed by the Maine Historic Preservation Commission (MHPC). MHPC has found that the proposed project will have no effect upon any structure or site of historic, architectural, or archaeological significance as defined by the National Historic Preservation Act of 1966. However, MHPC identified the existence of an area of historic significance associated with the Snark Missile installation constructed by the U.S. Air Force in the late 1950's located near the northerly boundary of the development.

The Snark site was the first intercontinental ballistic missile base in the Air Force and its components constitute significant historical and military engineering features within the context of the Cold War period according to MHPC. MHPC submitted plans of the installation from its archives delineating the boundary and commented that any alteration to the building exteriors or topography associated with the installation must be reviewed and approved prior to alteration. Prior approval for alterations is required until the City and MHPC agree on a Development Plan for this area. The City and MHPC have agreed to continue to meet and discuss details of the Development plan.

15. UNUSUAL NATURAL AREAS:

There is no record of any known rare or unusual features on the property. This is based on a review of the Maine Natural Heritage Program data base.

16. SOILS:

The applicant has submitted a high intensity soil survey of the project site and a summary of soils limitations prepared by a certified soils scientist. This summary indicates that the soils on the site present no limitations to the proposed project which cannot be overcome through standard engineering practices.

17. WASTEWATER DISPOSAL:

When completed the proposed project is anticipated to discharge approximately 191,730 gallons per day (gpd) to the Presque Isle Sewer District's wastewater treatment facility. The applicant has submitted a letter from the Presque Isle Sewer District indicating that it will accept these flows. This project has been reviewed by the Bureau of Water Quality Control which has indicated that the Presque Isle Sewer District has the capacity to treat these flows and is operating in substantial compliance with the water quality laws of the State of Maine.

18. FLOODING:

No structures are proposed to be located within the 100 year floodway of any river or stream and the proposed project is not anticipated to cause or increase flooding or cause an unreasonable flood hazard to any structure.

19. NOISE:

No significant sources of noise have been identified.

BASED on the above findings of fact, and subject to the Conditions listed below, the Department makes the following conclusions pursuant to 38 M.R.S.A. Section 481 *et seq.*:

A. The applicant has provided adequate evidence of financial capacity and technical ability to develop the project in a manner consistent with state environmental standards.

B. The applicant has made adequate provision for traffic movement of all types into, out of or within the development area and any traffic increase attributable to the proposed development will not result in unreasonable congestion or unsafe conditions on a road in the vicinity of the proposed development provided that the applicant follow recommendations, conduct the post-development monitoring and undertake corrective actions as outlined in finding 6 above.

C. The applicant has made adequate provision for fitting the development harmoniously into the existing natural environment and the development will not adversely affect existing uses, scenic character, air quality, water quality or other natural resources in the City of Presque Isle or in neighboring municipalities provided that no alterations occur to the exterior of structures or topography within the Snark installation except as outlined in finding 14 above.

D. The proposed development will be built on soil types which are suitable to the nature of the undertaking and will not cause unreasonable erosion of soil or sediment nor inhibit the natural transfer of soil.

E. The proposed development will not pose an unreasonable risk that a discharge to a significant groundwater aquifer will occur.

F. The applicant has made adequate provision of utilities, including water supplies, sewerage facilities, solid waste disposal and roadways required for the development and the development will not have an unreasonable adverse effect on the existing or proposed utilities and roadways in the municipality or area served by those services provided that the applicant follow recommendations, conduct the post-development monitoring and undertake corrective actions as appropriate as outlined in finding 6 above.

G. The activity will not unreasonably cause or increase the flooding of the alteration area or adjacent properties nor create an unreasonable flood hazard to any structure.

THEREFORE, the Department APPROVES the above noted application of the City of Presque Isle, SUBJECT TO THE FOLLOWING CONDITIONS, and all applicable standards and regulations:

1. The Standard Conditions of Approval, a copy attached.

2. In addition to any specific erosion control measures described in Finding 10 of this order, the City of Presque Isle shall take all necessary actions to ensure that its activities or those of its agents do not result in noticeable erosion of soils or fugitive dust emissions on the site during the construction and operation of the project covered by this approval.

3. The applicant shall install the recommended roadway improvements, conduct the post-development monitoring, and undertake corrective actions as outlined in finding 6 above.

4. There is ongoing discussions between the City of Presque Isle and the Maine Historic Preservation Commission (MHPC) as to future development within the former Snark Missile Base area. Any alteration, except routine maintenance, to the building exteriors, launch related structures, or existing topography within the Snark area must be reviewed and approved in writing by the Department prior to the alteration. This condition shall apply until a Development Plan, as outlined in finding 14 above, is developed by the City and MHPC, and that Plan is reviewed and approved by the Department.

DONE AND DATED AT AUGUSTA, MAINE, THIS 7th DAY OF October, 1994.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Martha Kirkpatrick
DEBORAH N. GARRETT, ACTING COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application 10 June 1994
Date application accepted for processing 14 June 1994

Date filed with Board of Environmental Protection

DS:L18711AN

FILED
OCT - 7 1994
BOARD OF ENVIRONMENTAL PROT.
STATE OF MAINE