APPENDIX M
EVS MODELING

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Appendix M
Earth Volumetric Studio (EVS) Modeling

PFAS CERCLA Remedial Investigation Site Characterization Summary Report
Former Loring Air Force Base, Limestone, ME

A three-dimensional visualization was utilized to construct a dynamic site and coordinate a correct conceptual model to support the Loring per- and polyfluoroalkyl substances (PFAS) Remedial Investigation (RI). The visualization was prepared using Earth Volumetric Studio and was comprised of historic and current site-specific data. The major components of the visualization and, where applicable, the methodologies used are detailed below.

Layout features:

- Regional topography and orthophoto from National Elevation Dataset (2021 LiDAR based DEM, 1 meter resolution)
- Site boundary and sub-areas including Groundwater Management Zones, flow fields as defined under the OU12 RI, Installation Restoration Program (IRP) Sites, and land use restrictions
- Regional streams and surface water
- Utilities
- Monitoring wells with screened intervals

Geology data and depiction:

- Regional and local bedrock structure interpretation from the OU12 RI
- Borehole lithology characterization data from wells installed during the RI. Boring log data for cored rock characterized as:
    - Highly weathered/fractured till-rock interface
    - Moderately weathered with some fracturing
    - Highly weathered fractured
    - Competent
- Unconsolidated materials (till and sand/gravel deposits). The volumetric depiction of unconsolidated soils overlying bedrock is based on lithologic descriptions of monitoring well borings. Volume created in a convex hull grid, interpolated with Indicator Kriging using all points and simple anisotropy (horizontal : vertical, 10:1).
- Bedrock geology. The volumetric depiction of bedrock was created in a convex hull grid, and interpolated with Indicator Kriging using all points. The top of rock surface was created using the OU12 interpreted bedrock surface as a starting point. This surface was adapted with additional information collected during the various phases of the PFAS RI field efforts.

Hydrogeology data:

- Extent of sand and gravel aquifers from United States Geological Survey interpretation
- Bedrock groundwater divides from OU12 RI
- Bedrock discharge areas from OU12 RI
- Extent of discontinuous saturated overburden from OU12 RI updated with data obtained during the PFAS RI field efforts
- Potetiometric surfaces created from synoptic water level measurement rounds collected during the groundwater analytical sampling efforts (Spring and Fall sampling from 2022 through 2024)
- Vertical gradient depiction and evaluation

Analytical sample results and plume estimation:

- Surface water analytical results from all PFAS RI samples
    - Maine Department of Environmental Protection (MEDEP) Sum of 6
    - Perfluorooctanesulfonic acid (PFOS)
    - Perfluorononanoic acid (PFOA)
    - Hexafluoropropylene oxide dimer acid (HFPO-DA)
    - Perfluorononanoic acid (PFNA)
    - Perfluorohexanesulfonic acid (PFHxS)
    - Perfluorobutanesulfonic acid (PFBS)
    - 1H,1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)
    - Perfluorobutanoic acid (PFBA)
    - Perfluorodecanoic acid (PFDA)
    - Perfluorohexanoic acid (PFHxA)
    - Perfluorooctane sulfonamide (PFOSA)
    - Perfluoropentanoic acid (PFPeA)
    - Perfluoropentanesulfonic acid (PFPeS)
- Groundwater analytical results from six rounds of groundwater sampling
    - MEDEP Sum of 6
    - PFOS
    - PFOA
    - HFPO-DA
    - PFNA
    - PFHxS
    - PFBS

- 6:2 FTS
- PFBA
- PFDA
- PFHxA
- PFOSA
- PFPeA
- PFPeS

Groundwater analytical results are depicted by contouring the screened interval with respect to orders of magnitude above or below the Maximum Contaminant Level or applicable screening criteria. Volumetric depictions of groundwater distribution were created for each compound with a convex hull grid and Kriging of all points. Volumetric plume estimations were also completed using only bedrock data and only overburden data to assess the estimation sensitivity on an aquifer specific basis and support risk assessment decision making.